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ELECTROCOMMS AND ENERGYUTILITIES INDUSTRY SKILLS COUNCIL LTD

EE-OZ TRAINING STANDARDS



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INTRODUCTION & OBJECTIVES

The ElectroComms and EnergyUtilities Industry Skills Council (ISC), trading as EE-Oz Training Standards, is the Industry Skills Council for the Electrotechnology, Communications, Electricity Generation, Transmission and Distribution, Rail Traction and Gas Supply Industries.

On an annual basis, each of the eleven Industry Skills Councils, including EE-Oz Training Standards, develops an 'Environmental Scan', for the information and utilisation of the National Quality Council (NQC), Skills Australia, the Department of Education, Employment and Workplace Relations (DEEWR), industry and training stakeholders.

The intent of the Report is to alert these bodies of "*potentially significant issues at a product, operational and systemic level*". This level of immediacy is the document's key characteristic and relies on real-time industry views and evidence captured from across Australia.

METHODOLOGY

EE-Oz Training Standards has an extensive and comprehensive formal consultative structure. This consultative structure comprises; the EE-Oz Board of Directors, General Standing Committees of the Board, Sector Councils, industry-specific National Training Advisory Groups (NTAGs) and sector-specific Technical Advisory Committees (TACs), National Project Steering Committees and other committees of regional, state, national and international significance.

In addition to these groups, EE-Oz actively collects 'grass-roots' industry intelligence from a number of key stakeholder consultation forums, namely: an annual National Workshop Series involving one or more stakeholder consultation workshops in each state and territory; the Annual EE-Oz Conference and associated meetings, and; specific industry/sector and project meetings conducted throughout the year.

EE-Oz Training Standards has also initiated strong working relationships with the network of State and Territory Industry Training Advisory Bodies (ITABs) servicing the ElectroComms and EnergyUtilities industries across Australia. EE-Oz Training Standards has formally engaged the ITAB network to provide industry intelligence and has utilised numerous ITAB reports to Government to inform this 2010 Environmental Scan.

KEY MESSAGES 2008-2010

In April 2008, ISCs entered into a three year Service Agreement with the Australian Government, represented by the Department of Employment, Education and Workplace Relations (DEEWR). The Environmental Scan is the primary annual deliverable under this Service Agreement.

This is the third Environmental Scan to be delivered under the current Service Agreement.

In 2008, the 'Top 5' influences shaping workforce development within the industries under the ISC's coverage, in no priority order, were:

- demand for knowledge and skills;
- skill shortages;
- the aging workforce;
- new technologies, and;
- managing increasing demand whilst meeting regulatory, environmental and safety compliance requirements.

Whilst these impacts continued to influence workforce development within the industries during 2009, in that year the 'Top 5' influences shaping workforce development within the industries under the ISC's coverage, in no priority order, were:

- the Global Financial Crisis;
- the Australian Government's increasing focus on reducing Australia's carbon footprint;
- The natural disasters of early 2009, namely;

flooding in Queensland and fires in Victoria;

- Harmonisation of Energy Technical and Safety Regulation, and;
- The role of VET in regard to these key influences.

This year, EE-Oz's research has identified that the 'Top 5' influences shaping workforce development within the industries under the ISC's coverage, in no priority order, are:

- Government policy around reducing Australia's carbon footprint
- Skills shortages and the aging workforce
- New technologies
- Harmonisation of energy technical and safety regulation
- Economic climate and infrastructure development

During 2009, EE-Oz Training Standards continued to establish itself as a leader in the provision of advice to government and industry regarding workforce development and training for Australia's Energy industries. A considerable amount of advice has been provided in regard to the above detailed influences.



ElectroComms and EnergyUtilities Industry Skills Council (ISC), trading as EE-Oz Training Standards, is the Industry Skills Council for the Electrotechnology, Communications, Electricity Generation, Transmission and Distribution, Rail Traction and Gas Supply Industries.

In 2008, against the backdrop of a new policy framework, *Skilling Australia for the Future*, EE-Oz Training Standards entered into a new three year funding agreement with the Australian Government, as represented by the Department for Education, Employment and Workplace Relations (DEEWR).

A key deliverable under the new Agreement was the compilation of an annual Environmental Scan to inform the work of the Department, the National Quality Council (NQC), the newly formed Skills Australia Board, industry and training stakeholders.

All three agencies, and other stakeholders, have acknowledged the value of the real-time industry intelligence provided by both the 2008 and 2009 Environmental Scans. The same methodology has been utilised for this 2010 Environmental Scan.

SECTION 1: LATEST INDUSTRY INTELLIGENCE

1.1 INTRODUCTION

EE-OZ Training Standards has conducted extensive research into the factors influencing the industries under its coverage at the present time. This research has been supplemented by relevant statistical information from key industrial and economic research houses (eg; ABS, NCVER, Monash, ABARE) and various Government Departments.

The following sections provide a broad analysis of the changes, evolving trends and new factors in the three primary environments which impact and shape workforce development in the industries under EE-Oz coverage, namely;

- Macro-environment broad factors and emerging trends across and between industries, and global trends or changes which impact on the need and nature of skills.
- **2. Industry** enterprises, professional and industry associations and other key stakeholders
- 3. Market the VET environment, VET stakeholders and peak organisations

1.2 THE MACRO-ENVIRONMENT

Despite the Global Financial Crisis of 2008/9, global demand for energy is increasing. At the same time, the energy sector is undergoing significant change. The uncertainty of supply, rising costs of energy, and the need to address climate change, are driving global energy sector restructures.

New energy markets are developing worldwide; nations are realigning in new ways; corporations are adjusting their priorities, changing how they do business and making investments to secure market opportunities to address rising energy costs, and; climate change mitigation policies are driving research and investment into new, cleaner energy sources and technologies.

In the long term, Australia's global economic prospects are good. Whilst a significant reduction in pace has been evident, continued growth in the emerging Chinese and Indian markets and in the developed European and Asian markets, is expected.

Additionally, the full affect on Australia of US President Obama's policy to create a new Renewable Energy industry is currently unknown. Industry stakeholders are, however, starting to consider the possible ramifications to Australia.

Similarly, with the current push for a decentralised electricity grid, Australia must consider the experiences of European countries, such as Germany and the Netherlands, who have already progressed down this path, and learn from the organisations who have tackled the workforce development and training challenges decentralisation creates.

1.3 THE INDUSTRY ENVIRONMENT

Broadly, the Australian ElectroComms and EnergyUtilities industry sectors are characterised by the following factors:

- Industry regulation and a strong emphasis on Occupational Health and Safety
- Significant technical knowledge and skills
- Structured work roles
- Continual change in response to advances in technology and work practices
- Responsiveness to policy and acting as an agent for policy implementation.

In 2008, the 'Top 5' influences shaping workforce development within the industries under the ISC's coverage, in no priority order, were:

- demand for knowledge and skills
- skill shortages
- the aging workforce
- new technologies
- managing increasing demand whilst meeting regulatory, environmental and safety compliance requirements.

Whilst these impacts continued to influence workforce development within the industries during 2009, in that year the 'Top 5' influences shaping workforce development within the industries under the ISC's coverage, in no priority order, were:

- the Global Financial Crisis
- the Australian Government's increasing focus on reducing Australia's carbon footprint
- The natural disasters of early 2009, namely; flooding in Queensland and fires in Victoria
- Harmonisation of energy technical and safety regulation
- The role of VET in regard to these key influences.

GOVERNMENT POLICY AROUND REDUCING AUSTRALIA'S CARBON FOOTPRINT

The Australian Governments are committed to creating an enabling environment that provides the skills, training and knowledge required for workers, investors, and entrepreneurs to participate in, and benefit from, the transition to a sustainable, low carbon future (DEEWR, 2009).

Against this backdrop, 2009 saw considerable momentum in the area of Government policy and initiatives to increase Australia's energy efficiency and reduce its carbon footprint, including considerable Government support for the acceleration of the large scale development, adoption, demonstration and deployment of new, clean energy technologies.

Over the period, EE-Oz Training Standards has continued to establish itself as a leader in the provision of advice to government regarding workforce development and training for Australia's Energy industries. EE-Oz has been involved in discussions on, and has provided a considerable amount of industry advice regarding, the following:

- GreenSkills/Skills for sustainability
- Energy Efficiency
- Installation of insulation in roof spaces
- The Energy Industry Workforce to 2030
- The national roll-out of Smart Meters
- National licensing

As an active member of the ISC Forum, EE-Oz Training Standards has also contributed to the suite of briefing papers and responses submitted by the Forum for Government consideration.

Hence, for the Australian ElectroComms and EnergyUtilities industries there is not one but two very distinct areas of skill need. Industry members require 'sustainable work practice' skills. They also require the technical skills and knowledge to design, develop, install, commission, maintain, repair and/ or decommission renewable/ sustainable energy technologies. Again, this distinction is recognised in the NQC's Report (Nov, 2009).

EE-Oz Training Standards, as the custodian of the industries' Training Packages, is therefore responsible for assisting industry to develop the Clauses, Units, Qualifications and Skills Sets to meet both areas of skill need.

TRAINING IN SUSTAINABLE WORK PRACTICES

EE-Oz Training Standards, in consultation and cooperation with industry, has undertaken work towards the development and incorporation of clauses and units focussing on sustainable work practices in its suite of Training Packages. These are comprehensively detailed in the ISC Forum's Environmental Sustainability Report (May 2009) but include aspects such as; 'apply environmental and sustainable energy procedures', 'promote sustainable energy practice in the community' and 'participate in environmentally sustainable work practices'.

Given the large number of qualifications in the EE-Oz suite (111), priority has been given to developing and incorporating 'sustainable work practices' clauses and units for the 'high volume' qualifications, namely; those at Certificate III (Trade) and Certificate IV (post trade). EE-Oz is also cognisant of, and working towards addressing the objectives of, the Council of Australian Governments Green Skills Agreement. The Agreement aims to ensure that, from January 1 2010, every apprentice who commences training will graduate with a core set of green skills, knowledge and training.

However, suitable clauses and units must also be developed for the Certificate I/II and Diploma/ Advanced Diploma level qualifications. At this point in time, EE-Oz Training Standards believes that an additional 13-20 new units focussing on sustainable work practices will be required across the four Training Packages in the EE-Oz suite.

Additionally, Industry sees benefit in the inclusion and/or strengthening of 'sustainable work practices' clauses in each of the industries' 1036 units.

TRAINING IN NEW AND EMERGING RENEWABLE-SUSTAINABLE ENERGY OCCUPATIONS AND TECHNOLOGIES

The Renewable Energy Jobs in 2009 and Forecasts for 2020 Report (DEWHA, 2009) identified that there are currently just over 10,000 employees in the Renewable Energy Industry and there will be between 24,000 and 29,000 direct job requirements to 2020.

The Australian Government has since developed the Australian *Renewable Energy Training and Workforce Strategy for 2020*. The key components of the strategy are:

Targeted TAFE training – A significant increase in the number of TAFE level institutions offering renewable energy training.

Increased student and trainer numbers – The number of people seeking training in renewable energy technology will require an increase in student places of around 300 per cent over current levels. This potential increase in students also highlights the need to ensure that the additional number of trainers is also provided.

Short courses – Short courses at all levels are required to assist workers with existing skills and qualifications to rapidly gain knowledge of renewables. It would be useful to have specialist staff able to offer short courses in different aspects of renewable energy and able to travel to areas where the demand is greatest.

Resources – With the rapid increase in the renewable energy sector, a great deal of new curricula material and a significant number of skilled training staff will be required. In addition, trainers skilled in online course delivery will be needed to modify courses for e-learning modes.

Source: EcoGeneration - September/October 2009

EE-Oz Training Standards is working closely with industry to develop and incorporate Units, Qualifications and post-trade Skills Sets necessary to service new and emerging industry occupations and to skill existing industry operatives in new and emerging renewable and sustainable energy technologies.

To date, units, skill sets and qualifications have been included in the EE-Oz suite of Training Packages for the following:

- Domestic grid connected photovoltaic (solar) arrays – design, development, installation, maintenance and grid connection.
- Solar generation technologies design, development, installation, maintenance and grid connection
- Wind generation technologies design, development, installation, maintenance and grid connection
- Smart Meters design, development, installation, maintenance and grid connection
- 'Stand alone' remote area power generation systems
- Co-generation, Tri-generation and local generation



- Use of natural refrigerants and the reclamation of synthetic refrigerants in air-conditioning and refrigeration systems
- Advanced energy efficient lighting design and installation.

The development and review of these competencies is ongoing and EE-Oz is monitoring technological change and policy settings in order to ensure that industry is able to access training standards that support the new policies and practices.

In addition to the above, and in light of the Australian Governments' current suite of policies and initiatives, EE-Oz Training Standards believes that industry will require new and amended units, qualifications and skill sets covering the following:

EE-Oz, in consultation with industry, is responsible for developing the units, qualifications and skill sets necessary to address the training needs associated with these new and emerging technologies.

SKILLS SHORTAGES & THE AGEING WORKFORCE

TRADE SKILL SHORTAGES

For almost two decades, the ElectroComms and EnergyUtilities industries have suffered Skills Shortages at trade-level. The severity of these shortages peaked just after the turn of the Century (2003-2004), after which time, strategies to address the shortages have been exercising the minds of industry employers and representative bodies (ie; Unions, Employer Associations).

Despite this, industry intelligence indicates that a further 23,000 tradespeople will be required across all sectors of the energy industries including; electricity generation, transmission and distribution, gas and electrotechnology. EE-Oz is continuing to provide advice on the priority and targeting of these so that shortages and gaps can be addressed.

Occupations currently experiencing skill shortages are comprehensively detailed in Section 2.3 below.

POST-TRADE SKILL SHORTAGES

EE-Oz believes that the intensifying skills shortages, particularly those in the area of renewable energy,

sector must be urgently addressed. The qualifications required to meet the current demand for renewable energy systems technicians are predominately at the Certificate IV and Diploma level. EE-Oz has indentified and developed industry training standards for these areas. Resources now need to be applied to encourage the implementation and delivery of training programs based on these national competency standards. EE-Oz will continue to work with all stakeholders to facilitate effective training solutions to the skills crisis.

TECHNICAL TRAINER SKILL SHORTAGES

Similarly, all four industry sectors under the ISC's coverage have identified considerable concern regarding the present severity of technical trainer shortages.

Skilled, knowledgeable and experienced technical teaching staff are critical to the continued development and success of the Australian ElectroComms and EnergyUtilities industries. The particularly technical nature of the industries and the advances in technology that are occurring in response to climate change, dictate that the industries' trainers must be highly skilled and qualified personnel, able to deliver effective training in accordance with continuously changing technologies and work practices.

"Skilled, knowledgeable and experienced technical teaching staff are critical to the continued development and success of the Australian ElectroComms and EnergyUtilities industries"

The industries are, however, suffering severe skills shortages in this critical occupational area, with recent studies identifying that the average age of the current VET professional workforce servicing the Australian Energy industries is 55 years of age.

The matter is cause for concern and strategies to expand the industry's technical teaching workforce and improve the currency of those already in the system are required. Industry stakeholders have identified the need for a campaign to develop suitably qualified and experienced trainers for the industries. EE-Oz, in consultation and cooperation with industry, has identified appropriate training, in the form of a Diploma qualification, to support such a scheme. The training includes technical and theoretical (mathematics and physic) refreshers and the mentoring skills required to work with young apprentices.

Inclusion of the qualification in the UEE07 Training Package has, however, met with some resistance from the State and Territory Training Authorities (STAs). Due to the severity of trainer skill shortages in across all sectors, industry has requested EE-Oz continue to liaise with the STAs towards a solution.

AGING WORKFORCE

The Australian Treasury has recently released its 2010 Intergenerational Report (January 2010). The report identifies that "population ageing, and the associated decline in workforce participation, is projected to reduce the potential economic growth rate of the Australian economy. Over the past 40 years, real GDP growth has averaged 3.3 per cent a year. For the next 40 years, real GDP growth is expected to slow to 2.7 per cent a year... The ageing population will see the number of people aged 65 to 84 years more than double and the number of people 85 years and over more than quadruple...The number of people of working age to support every person aged 65 years and over is projected to decline to 2.7 people by 2050 (compared with 5 people now)" (Treasury, 2010).

The Australian Energy industries are no exception. The Electrotechnology industry demographic is typical of the Australian workforce. The large majority of workers in the Gas and Generation industries are approaching 50 years of age and the demographic of the ESI-Transmission, Distribution and Rail industry is such that nearly half the workforce is under 35 years of age (due to the broad scale apprentice recruitment drives of recent years) and over half the workforce is over 45 years of age. Similarly, in many of the Electrotechnology industry sectors, particularly the communications sectors, 45-50% of the workforce is expected to retire in the next five years (TITAB, 2009).

Research conducted as part of a recent EE-Oz project



has confirmed that even with the efforts currently being devoted to the recruitment and training of large numbers of apprentices and operatives (hundreds in the case of the larger Electricity Supply companies) across Australia, the severity of skills shortages across all industry sectors and levels are such that the number of recruits will not cover the aged retirements expected in the next five years.

NEW TECHNOLOGIES

Today's industry members, regardless of sector or discipline, work in highly technical and continually changing environments. Science and technology continue to influence existing products and trigger new processes and equipment to meet global and local community demands. Hence, the industry requires personnel able to apply their knowledge and skills, communicate ideas both orally and in writing, control highly technical equipment, critically assess and appraise situations and apply creative, diagnostic and problem solving techniques on a day-to-day basis, whilst simultaneously maintaining pace with technological advancement.

NEW TECHNOLOGIES TO INCREASE ENERGY EFFICIENCY

EE-Oz is aware that the deployment of new technologies such as retrofits, replacements or adjuncts to existing (often antiquated) systems has significant implications for energy efficiency and that training is required to ensure these are appropriately applied.

The scope and scale of the technologies and systems that can be deployed across domestic, commercial and industrial settings to contribute to increased energy efficiency is very broad. In commercial/ industrial settings these may require significant capital investment in redesigned 'whole of premises' installations.

In 2010, EE-Oz will continue to develop new training standards for these new and emerging technologies and systems.

EE-Oz also sees value in assigning a particularly high priority to the development of training standards for energy auditing and performance monitoring which will underpin the design, deployment and successful operation of energy efficient systems.

Specifically, there are new roles emerging for qualified personnel to:

- Audit and assess current installations, both holistically and at a systems level
- Provide advice on the reconfiguration and optimisation of existing systems for energy efficiency
- Provide advice on the design, deployment and integration of new technologies to increase energy efficiency.

And

- Monitor and report energy usage, both holistically and at a systems level
- Assess energy efficiency
- Optimise individual and integrated systems to achieve maximum energy efficiency.

These roles will be particularly relevant in commercial/ industrial premises where energy usage is a significant economic and environmental cost and opportunities exist for efficiencies and savings.

In regard to 'smart meters', EE-Oz has worked with the Department of Resources, Energy and Tourism (DRET) and the Victorian Department of Primary Industries (DPI) to identify a pathway via the *Certificate IV in Electrical – Renewable Energy* for practitioners to achieve the competencies required to carry out new installations and retrofits of smart meters and associated communications technologies.

Industry is particularly concerned that this work be undertaken by appropriately qualified personnel as there are a number of aspects that must be appropriately dealt with, especially where retrofitting is required. These include:

- Asbestos in old installations
- Correct installation of apparatus, taking into account the age of existing systems
- The need to address other appliance and fixed wiring related issues
- Accommodating changes in technology over the life of the roll-out
- Ensuring compliance with service rules.

EE-Oz has advised DEEWR that approximately 12,000 (FTE) skilled workers will be needed to achieve the roll out of 2.5 million meters in Victoria, on time. EE-Oz will continue to work with DRET, the Victorian DPI and Skills Victoria to ensure training is in place to support this roll-out.

HARMONISATION OF ENERGY TECHNICAL AND SAFETY REGULATION

NATIONAL LICENSING INITIATIVE

EE-Oz is currently involved in the National Licensing agenda through representation on the Ministerial Council's Interim Occupational License Advisory Committee.

The Intergovernmental agreement for a national licensing system for specified occupations identifies the objectives of the national system, to be set out in legislation, are to:

- a. ensure that licences issued by the national licensing body allow licensees to operate in all Australian jurisdictions;
- ensure that licensing arrangements are effective and proportional to that required for consumer protection, and worker and public health and safety, while ensuring economic efficiency and equity of access;
- c. facilitate a consistent skill base for licensed occupations;

- ensure effective coordination exists between the national licensing body and relevant jurisdictional regulators;
- e. promote national consistency in:
 - i. licensing structures and policy across comparable occupational areas,
 - ii. regulation affecting the conduct requirements of licensees, and
 - iii. the approaches to disciplinary arrangements affecting licensees;
- f. provide flexibility to deal with jurisdiction or industry specific issues; and
- **g.** provide access to public information about licensees.

REFRESHER TRAINING FOR THE AUSTRALIAN ESI INDUSTRY

It is now widely accepted that one of the key affects of climate change is an increase in the severity and occurrence of extreme weather events with the potential to cause natural and national disasters. Examples include monsoonal troughs, creating torrential rain, which in turn leads to flooding, as evidenced in Queensland, and; heat waves and high winds creating perfect bushfire conditions, as evidenced in Victoria.

In recent years, the increasing frequency of extreme weather events, combined with the severity of skills shortages affecting the ElectroComms and EnergyUtilities industries, has resulted in Australia's energy industry organisations being increasingly called upon to assist each other in times of crisis.

Organisational and operative mobility has been considerably assisted by the National Training Package's nationally endorsed and recognised units of competence, qualifications and assessment guidelines.

Whilst the industries are comfortable with the Training Packages, there remained aspects of industry work practice, training and accreditation that were not nationally consistent and this inconsistency continued to affect the ability of organisations to assist each other in times of crisis.

In November 2007, the Commonwealth Government committed to work with State and Territory

Governments and the energy sector to improve the consistency of state-based regulations that apply to the energy sector.

In the second half of 2008, the Ministerial Council on Energy (MCE) established an 'Energy Technical and Safety Leaders Group' to lead the development of an energy technical and safety regulation harmonisation enhancement plan, consistent with the MCE's Principles, noting the possible overlap with the work of the COAG review of general Occupational Health and Safety regulations.

The work of the MCE and the Leaders Group gained increased importance following the advent of the January 2009 floods in Queensland and the February 2009 fires in Victoria.

During 2009, EE-Oz Training Standards, in consultation and cooperation with industry developed 11 Units of Competence and 10 Competency Development Plans supporting Refresher Training for the Australian Electricity Supply Industry.

EE-Oz was initially contracted by the Australian Government, through DEEWR to research and enhance the national consistency of refresher training across the Australian Electricity Supply Industry. However, in light of the Victorian bushfire disaster of February 2009, EE-Oz was subsequently contracted by the Department of Resources, Energy and Tourism



(DRET) to fast-track this work at the direct request of the Federal Minister for Energy, Minister Ferguson.

The agreed completion date of the initial contract between EE-Oz and the Australian Government, as represented by DEEWR, was 30 November, 2009. At the request of Minister Ferguson, the objective of the DRET contract was to fast-track the work, with the completion date being brought forward to June, 2009. The new timelines were met, with the EE-Oz Chief Executive Officer and Products Manager able to present the outcomes to Mr Bill Nagle, Chair of the Energy Technical and Safety Leaders Group and the Minister's advisors in a meeting on the 5th of June, 2009.

On 8 September, 2009, Minister Ferguson, the National Secretary of the Communications, Electrical and Plumbing Union (CEPU), Mr Peter Tighe and; the Chair of the Energy Networks Association (ENA), Mr George Maltabarow, endorsed a Protocol committing every electricity network owner in Australia to utilisation of the new suite of national competencies. The Protocol includes the signature of the Chief Executive Officer of each supply organisation (Figure 1).

This was a land-mark event in the history of the Australian Electricity Supply Industry. The 11 Units of Competence were subsequently incorporated in Version 2 of the UET09 Training Package.

FIGURE 1: NATIONAL REFRESHER TRAINING RECOGNITION PROTOCOL

HIGH RISK LICENSING UNITS & SUPPORT MATERIALS

For some time, EE-Oz Training Standards in consultation and cooperation with the Australian Electricity Generation Industry, has been working with WorkSafe Australia to develop and implement competency standards and mandatory assessment materials supporting the high risk licences for steam turbines and reciprocating steam engines.

ACCREDITATION SCHEMES OUTSIDE THE NATIONAL REGULATORY AND TRAINING FRAMEWORKS

The emergence of new technologies and technological applications is leading to a proliferation of new accreditation schemes beyond established industry regulatory frameworks. These accreditation schemes are being developed to support specific government programs or at the instigation



of special interest groups outside of industry. The accreditations are predominately targeting the renewable/sustainable energy sector with schemes in place, or under consideration, for:

- Grid Connected Photovoltaic Systems
- Grid Connected Micro-wind generation
- Energy efficiency auditors
- Energy efficiency advisors

The Australian Energy industries have a strong commitment to employee and public safety and quality work. The Industry, through EE-Oz, develops and maintains national competency standards that comprehensively align to Electricity Regulatory Authorities Council (ERAC) requirements and have the support of industry, employer and employee representative bodies.

The development and mandating of additional accreditation schemes, beyond the industry regulatory frameworks, is occurring outside established industry consultation processes. Interest groups have identified opportunities to lobby government for a role in regulation/accreditation. This approach is based not on consultation with industry, but on perceived gaps in current industry regulation and practice. The groups use existing consultative and advisory roles they have with government to achieve recognition as industry experts and appropriate accreditation agencies. This approach has a number of impacts on the industry and the wider Australian economy including:

- Increased costs to industry through dual accreditation/registration requirements
- Increased costs to the economy/community of funding multiple accreditation systems
- Confusion and increased costs for consumer
- Confusion for industry as to which regime applies to specific activities
- Competition between accrediting bodies
- Fragmentation of industry standards and regulation

EE-Oz, through its industry consultations, has noted the concern of all sectors of industry, including relevant peak associations and state and territory regulators, at the expansion of accreditation schemes in already closely regulated industries. EE-Oz believes a co-ordinated industry-wide response is required to provide government and regulators with clear advice on the introduction of accreditations or regulations, whether they be specific to new technologies, work practices or government initiatives.

This will ensure that consumers have access to new systems and technologies and are assured of safe and cost effective services from the industry whilst national productivity is not impaired by unnecessary regulation and associated costs.

ECONOMIC CLIMATE AND INFRASTRUCTURE DEVELOPMENT

Australia did not completely escape the global financial crisis, with a general tightening of the economy and a significant reduction in pace of many industries, including the construction industry. In the long term, however, Australia's global economic prospects are good. Continued growth in the emerging Chinese and Indian markets and in the developed European and Asian markets is expected and there is currently significant investment by all Australian Governments in infrastructure development and maintenance:

- Northern Territory (NT) In 2008/09, the former NT Department of Planning and Infrastructure delivered a record program comprising capital works, minor new works and repairs and maintenance projects valued at over \$500 Million. However, the significance of this 2008/009 program pales against the expected infrastructure expenditure for the 2009/10 year which is valued at over \$1 billion (NT Dept of Infrastructure, 2010).
- South Australia (SA) The South Australian Government has committed significant funds to renewing, developing and improving the State's infrastructure, particularly: SA's rail and light rail systems; metropolitan and state arterial roads; community infrastructure; ports; water and energy. Over the next decade, \$2 billion will be spent on the South Australian rail and light rail systems alone (SA Dept of Infrastructure & Planning).
- Queensland (QLD) The Queensland Government is currently undertaking its most ambitious infrastructure program since Federation, with more than \$100 billion dedicated to the planning and delivery of infrastructure projects (Qld

Dept of Infrastructure & Planning, 2010).

- Western Australia (WA) Western Australia is currently enjoying a 'once-in-a-generation' economic boom. The WA Government invested a record \$5.8 billion on infrastructure in 2007-08, and will invest \$21.6 billion over the four years from 2008/09 to 2011/12 (WA Dept of Planning & Infrastructure, 2010).
- New South Wales (NSW) The 2009/10 NSW budget outlined a record \$62.9 billion infrastructure program for the four years to 2012/13. In 2010 alone, the NSW Government will issue \$6.6 billion in bonds to assist the funding of major infrastructure projects (NSW Infrastructure Summit, 2009).
- Australian Capital Territory (ACT) In 2008, the ACT Government established its \$1 billion *Building the Future* infrastructure program as the cornerstone of the Government's 2008-09 Budget. The five-year program will provide the necessary works and other infrastructure to meet the city's health, transport, urban amenity, environmental, social and economic development needs into the future (ACT Dept Lands & Planning, 2010).
- Tasmania (Tas) In Tasmania, more than A\$2 billion in major infrastructure projects, including natural gas, wind energy, Basslink, a fibre optic network, super fast ferries and water developments to boost agricultural production, have commenced over the past five years. Major infrastructure development activity is continuing along the north-west coast and around the major cities of Launceston and Hobart (Tas Dept Economic Development, Tourism and the Arts, 2010).
- Victoria (Vic) In Victoria, the state government has allocated \$3 billion to deliver better transport and employment security, this includes \$2.07 billion to boost Victoria's train, tram and bus networks and associated jobs and \$992.3 million to improve Victoria's roads (Vic Department of Transport, 2010). Additionally, Victoria was the first state in Australia to approve the wide spread roll-out of smart meters. Covering 2.2 million homes and 300,000 businesses, the roll-out represents one of the biggest improvements to

energy infrastructure in the state's history (Vic Dept Primary Industries, 2010).

In addition to the State and Territory Government's commitments to infrastructure development, the Australian Government is committing \$8.5 billion to 15 nationally significant infrastructure projects from 2008-09 to 2013-14 under its *Nation Building for the Future*.

Given that the Australian ElectroComms and EnergyUtilities industries are intricately involved in their own infrastructure projects, the 'roll-out' of the State/ Territory and Federal Governments' infrastructure development and renewable/sustainable energy initiatives; of 'Smart Meters' and also the national Broadband roll-out, the workforce development and training ramifications for the industries are significant.

There is considerable concern amongst industry enterprises that there simply will not be enough industry members to service the number and size of infrastructure development and 'roll-out' projects, particularly given the significance of the industries' skills shortages and ageing workforces.

Added to this is industry concern regarding the strain that major resources sector projects will place on the industry. As detailed below (Section 2), the ElectroComms and EnergyUtilities industries employ personnel particularly suited to occupations within the resources industry; in terms of skills and knowledge, but also in terms of work ethic, occupational health and safety consciousness and industry culture. Consequently, many sector personnel transition to the resources industry. EE-Oz is participating in the National Resources Sector Employment Taskforce consultations and will provide a response to the Government's '*Resourcing the Future*' Discussion Paper.

DENTIFIED WORKFORCE DEVELOPMENT NEEDS

SECTION 2: IDENTIFIED WORKFORCE DEVELOPMENT NEEDS

2.1 INTRODUCTION

It is impossible to forecast precisely how demand for labour will evolve, as there are many factors involved. What is important, is to identify the skills for which demand will grow, or where a significant replacement will be necessary (e.g. for retirement). Rather than producing complex, elaborate projections, it is better to devise systems to quickly identify trends and approaches to respond and adjust as necessary.

To this end, the following sections detail each sector's labour force characteristics and workforce development needs as determined by EE-Oz and industry data collection activities.

2.2 METHODOLOGY

EE-Oz Training Standards has an extensive and comprehensive formal consultative structure. This consultative structure comprises the EE-Oz Board of Directors, General Standing Committees of the Board, three industry-specific Sector Councils supported by four industry-specific National Training Advisory Groups (NTAGs) and eleven sector-specific Technical Advisory Committees (TACs), National Project Steering Committees and other committees of regional, state, national and international significance (refer Figure A1 and Appendix B).

Each year, EE-Oz Training Standards actively collects intelligence from a number of key stakeholder consultation forums, namely;

- National Workshop Series (stakeholder consultation workshops in each state and territory)
- 2. Annual EE-Oz Conference and associated meetings
- 3. Specific Industry/Sector Meetings

EE-Oz Training Standards utilises these forums to collect 'grass-roots' intelligence, gauge national client satisfaction levels and identify opportunities for improvement of the ISC's products and services from stakeholders in each State and Territory. The EE-Oz *Annual Stakeholder Survey and Survey to inform the Environmental Scan* are key mechanisms in this data collection methodology.

The surveys are also distributed by the EE-Oz network of State and Territory ITABs, posted on the EE-Oz Training Standards website and included in the Summer edition of the EE-Oz Magazine and a number of EE-Oz E-bulletins. The magazine and E-bulletin are distributed to over 3000 EE-Oz Training Standards clients.

EE-Oz Training Standards also utilises each and every meeting, forum, workshop, conference or industry gathering throughout the year to collect information for incorporation in the Annual Environmental Scan. Advice provided to Government and industry throughout the year is also re-iterated in the Scan.

EE-Oz Training Standards is very fortunate to have strong working relationships with the network of State and Territory Industry Training Advisory Bodies (ITABs) servicing the ElectroComms and EnergyUtilities industries across Australia. Each year, EE-Oz Training Standards formally engages the State and Territory ITABs to provide industry intelligence. This State/ Territory based intelligence has informed this 2010 Environmental Scan.

As a conservative estimate, close to 1000 individuals contributed to EE-Oz Training Standards' 2009/2010 intelligence gathering processes. These individuals represent small, medium and large industry organisations, industry representative bodies (ie; unions, employer associations), Registered Training Organisations, State and Territory Industry Training Advisory Bodies, industry regulatory bodies, Training Authorities and VET support agencies. Appendix B comprehensively details the activities undertaken by EE-Oz to inform this Environmental Scan and the individuals who have provided feedback and information.

2.3 INDUSTRY SECTOR ANALYSIS

2.3.1 THE ENERGYUTILITIES INDUSTRIES

Since the mid 1990s, there has been increased private investment in Australian energy infrastructure. The creation of a National Electricity Market (NEM), the segregation of energy businesses, the elimination of regulatory barriers to interstate energy trade, the establishment of third party access to the services of energy infrastructure and the liberalisation of ownership in the energy sector, all have created opportunities for private sector investment.

The extent of privatisation, acquisition and merger activity in the industry has been an important aspect of market activity over the last few years. The tendency now is towards greater specialisation, with entities concentrating on a particular sector: generation, distribution or retail. Mergers are, however, increasing *within* each of these sectors.

All-in-all the Australian energy sector is expanding rapidly and changing significantly. This expansion is producing ongoing and increasing demand for skilled workers and training for these workers.

ELECTRICITY GENERATION

Note: The following information has been compiled from intelligence gained through the above detailed activities (refer Section 2.2). The information has been validated by the EE-Oz Board, Electricity Sector Council and ESI-Generation NTAG members (refer Appendix B).

PROFILE

The Generation sector of the Electricity Supply Industry produces electricity for use in industry, business and private homes. The industry is supported primarily by large, state-owned or privatised power stations. Historically, the majority of electricity production in Australia was the preserve of these coalfired and hydro power stations, ranging in capacity from approximately 5 MW's to stations in excess of 2000 MW's.

In recent times, however, Australian electricity production has become more decentralised, with electricity now being generated from renewable energy sources such as wind and solar farms and, to a lesser degree, from domestic, commercial and industrial buildings supplying power 'back-to-the-grid'. This is a significant shift that has occurred over a relatively short period of time.

Operatives employed in the Generation sector may be involved in a wide range of tasks, including, but not restricted to; operation of unit plant from the control room, local operation of plant systems, management and coordination of unit or station operations, mechanical maintenance, electrical maintenance, electronic/ instrumentation maintenance and/or installation of new plant.

The Australian Bureau of Agricultural and Resource Economics (ABARE) has estimated that gross electricity generation in Australia will rise from 907 PJ (252 TWh) in 2004-05 to 1468 PJ (408 TWh) in 2029-30, an increase of 62% over the period.

DRIVERS

Clean Energy

Australia presently relies heavily on fossil fuels to meet energy requirements. The large majority of Australia's electricity is currently generated from coal. Although Hydro, Wind and Solar power generation is continuing to grow, coal and gas remain the most cost effective means of supplying electricity in Australia and, hence, are predicted to remain the main fuel sources for electricity generation in the foreseeable future.



In this context, perhaps the most significant challenge for the Australian energy industry is to ensure a reliable and sustainable supply of energy to meet the needs and aspirations of governments, industries and the community, whilst simultaneously suppling this energy in the most environmentally benign and sustainable way as possible.

The development and adoption of energy efficient and low emission technologies and energy sources is fundamental to maintaining economic growth while reducing greenhouse emissions. The Government's Renewable Energy Target (RET) and the pending introduction of the Carbon Pollution Reduction Scheme (CPRS) are initiatives driving this goal.

The following extract from the Australian Treasury's Intergeneration Report (January 2010) details the Government's current thinking on the matter, *"The expanded national Renewable Energy Target (RET) is designed to ensure that, by 2020, 20 per cent of Australia's electricity supply comes from renewable energy sources. By helping accelerate the deployment of renewable energy, the RET will assist the energy sector transition to the introduction of the CPRS. By 2050, output from the alternative energy sector is expected to be up to 20 times larger under a CPRS and expanded RET".*

In the short term, the reduction in greenhouse gas emissions will be achieved by the use of currently available energy efficient technologies in generation and end use sectors. By means of example, in Queensland, where 90% of current electricity supply is fuelled by coal, electricity generators have adopted the more efficient supercritical boiler technology. In NSW, the 'Owen Report' recommended \$A3-4 billion be spent on retrofitting existing power stations to meet carbon reduction targets. Additionally, in the future many power stations will incorporate gas-fired generators.

The Australian Government has allocated \$4.5 billion over nine years to its Clean Energy Initiative. The initiative will support investment in low-emissions technologies which enhance Australia's infrastructure and skills capacity. Specifically, \$2 billion will support commercial-scale integrated projects under the Carbon Capture and Storage Flagship Program, \$1.5 billion will support large-scale solar electricity generation under the Solar Flagships Program and \$500,000 will support the Australian Centre for Renewable Energy's work to promote the development, commercialization and deployment of new and existing renewable technologies (Treasury, 2010).

Carbon capture and storage technologies, involving the separation of carbon dioxide arising from the combustion of fossil fuels, are currently used in industrial processes, but the technology is presently too expensive to implement in power plants.

Solar energy is the world's fastest-growing energy source, with production of photovoltaics (solar cells) doubling every two years. The Australian Governments' 'Feed-in Tariff' incentive structures have significantly boosted the public's adoption of photovoltaic (solar) cells through government legislation in all States and Territories. Feed-In-Tariffs are a mechanism by which owners of grid-connect photovoltaic solar power systems are paid more than the retail price for any excess electricity production that is fed back into the grid. Feed-In-Tariffs have had significant success in Germany and Spain, and operate in over 40 jurisdictions around the world, now including Australia.

As at December 2008, there were 50 wind farms in Australia, with a total of 756 operating wind turbines and a total operating wind generating capacity of close to 1,500 megawatts (MW), providing 1.3% of Australia's national electricity demand. South Australia has more than half of the nation's wind power capacity, Victoria also has a sizeable capacity, with large proposals for expansion.

In November, 2009 the Prime Minister Kevin Rudd and NSW Premier Nathan Rees opened the Capital Wind Farm, near Canberra. With its 67 turbines, the wind farm is the biggest renewable energy project in NSW since the Snowy Hydro scheme and will generate enough capacity to power 60,000 homes. In his opening address, Mr Rudd said the wind farm would boost Australia's wind power capacity by 10 per cent.

In addition to solar, wind and hydro-electricity generation, there are a number of new and emerging renewable energy technologies. These include geothermal, co-generation and tri-generation systems. Geo-thermal electricity generation is still in its infancy in Australia, however, "Australia's vast hot sedimentary aquifer (HSA) and hot rock resources have the potential to become a significant, secure, renewable base load power source. Preliminary work carried out by Geoscience Australia has suggested that by extracting 1 per cent of the available geothermal energy, 1.2 billion petajoules could be yielded, which is equivalent to 26,000 times Australia's primary usage annual energy" (Ecogeneration, Jan/Feb 2010).

As at January 2010, the Australian Geothermal Industry was estimated to include around 50 companies (Ecogeneration, Jan/Feb 2010). The majority of companies are involved in 'pegging' ground'. However, the Federal Government has recently funded two commercial-scale projects in South Australia. Funded under the Renewable Energy Demonstration Program (REDP), the projects will use different technologies in two different geological settings to generate geothermal electricity.

In the Australian context, the implementation of cogeneration and tri-generation technologies is much closer. Cogeneration, also known as Combined Heat and Power (CHP) is the use of a heat engine or a power station to simultaneously generate both electricity and useful heat.

Conventional power plants emit the heat created as a by-product of electricity generation into the environment through cooling towers, flue gas, or by other means. By contrast CHP captures the by-product heat for domestic or industrial heating purposes. CHP use for district heating is especially common in Scandinavia and eastern Europe, with hot water temperatures ranging from approximately 80 to 130 °C.

By-product heat at moderate temperatures (212-356°F/100-180°C) can also be used in absorption chillers for cooling. The production of electricity, heat and cold is called tri-generation.

A Fuel Cell generates electricity through reaction between a fuel and an oxidant in the presence of an electrolyte. Many combinations of fuels and oxidants are possible, however, hydrogen fuel cells are the most comment, whereby hydrogen is used as the fuel and oxygen, from the air is the oxidant. Fuel Cells are commercially available in Australia. In terms of impact on the industry's workforce development and training; new entrants and existing workers will need to be skilled in the design, development, commissioning, maintenance, repair and/or decommissioning of the new and/or continually advancing technologies.

A key component of EE-Oz's Continuous Improvement activities for the UEP06 ESI Generation Sector Training Package at the present time is the development and integration of the necessary units of competence, qualifications and skills sets to assist industry operatives develop the skills and knowledge required to respond to the technological advances associated with reducing Australia's carbon footprint.

Unfortunately, however, the industry's workforce is ageing, with many operatives now well over the age of 45 and skill shortages abound in the majority of occupational areas and levels across the sector.

Skills and Labour Shortages

a. Current Skills and Labour Shortages

Table 1 details workforce categories and occupations in the Australian Electricity Generation sector that are currently experiencing skills shortages. Industry intelligence indicates that these skills shortages will continue into the foreseeable future and may very well intensify as a result of considerable aged retirements expected in the next five years, particularly in the area of power station system operations. Table 1 also details areas of emerging skill shortages.

This detail has been generated from information provided, and validated, by industry and its training partners over the 12 months from February 2009 to February 2010.

b. Barriers to overcoming skills and labour shortages

Privatisation of segments of the electricity generation industry in NSW and Queensland may well disrupt training schemes. The experience in Victoria was that public companies provided stable employment and training for large cohorts of personnel; a system which was not maintained following privatisation. Hence, there is a risk that a change in the pattern of ownership in NSW and Queensland could also impact training programs.

Additionally, workforce development and training in the Australian Generation sector has historically been hamstrung by a lack of take up of the Generation Training Package, stemming from a severe lack of training and assessment resources and a very small number of RTOs with the Package on scope.

Hence, there is currently very little training being undertaken leading to nationally recognised industry qualifications.



TABLE 1: CURRENT AND EMERGING SKILL SHORTAGE WORK CATEGORIES & OCCUPATIONS FOR THE ESI GENERATION SECTOR

CURRENT SKILL SHORTAGE AREAS			
Trade	All areas (especially mechanical & electrical)		
	Electrical Instrumentation & Control Technicians		
	Riggers & Scaffolders		
	Welders		
Technical Officers	Coal-fired Power Station System Operators (especially senior operators)		
	Gas-fired Power Station System Operations (especially Senior operators)		
	Commissioning & Protection Technicians		
	Electrical Technicians		
Engineering	Mechanical Engineers		
	Electrical Engineers		
	Information Technology Engineers		
Training	Industry specialist technical trainers & writers (off-job)		

EMERGING SKILL SHORTAGE AREAS

In addition to the above, predicted areas of future skill shortages include:

• New systems/technologies associated with new and emerging technologies to increase energy efficiency and reduce carbon emissions.

c. Solutions and potential sources of labour

In recent years, two key solutions to the current situation have been widely supported by industry, namely:

- **1.** Source project funding to develop training delivery and assessment support materials
- Ensure inclusion of Generation Training Package qualifications on the Australian Government's Priority Qualifications List for the Productivity Placement Program, namely;

In regard to point 1, EE-Oz on behalf of the Generation sector, with the support of the Australian Government, through DEEWR, is currently developing training support resources for the Generation Training Package. Work has commenced on the development of materials against qualifications for which there are presently no, or very few, support resources. This work will be extended to the other qualifications in priority order over coming months. In regard to point 2, a range of Generation Training Package qualifications have been included on the Australian Government's Priority Qualifications List for the Productivity Places Program. These include:

- Certificate II in Electrotechnology Electrician
- Certificate III in Electrotechnology Instrumentation
 and Control
- Certificate IV in Electrotechnology Electrical -Instrumentation
- Certificate IV in ESI Generation (Electrical/ Electronic)
- Certificate IV in ESI Generation (Operations)
- Diploma of ESI Generation (Systems Operations)
- Diploma of ESI Generation (Operations)

These qualifications cover all the work categories/ occupations identified as suffering skills shortages in Table 1 above. Sources of labour is a particular area of concern for the industry at the present time. The Australian resources industry boom has been a key factor affecting the skills shortage crisis for the sector in recent years. Electricity generators employ personnel particularly suited to occupations within the resources industry; in terms of skills and knowledge, but also in terms of work ethic, occupational health and safety consciousness and industry culture. Consequently, many sector personnel have been attracted to the resources industry. Additionally, with the pending level of aged retirements across the sector, large-scale employment and training of new entrants is required.

ELECTRICITY TRANSMISSION, DISTRIBUTION & RAIL TRACTION

Note: The following information has been compiled from intelligence gained through the above detailed activities (refer Section 2.2). The information has been validated by the EE-Oz Board, Electricity Sector Council and ESI-Transmission, Distribution and Rail NTAG members (refer Appendix B).

PROFILE

This industry sector covers the transmission and distribution of electricity via overhead and underground lines; cable-jointing, and; rail, light rail and tram traction.

Operatives in the industry may be involved in a wide range of tasks, including, but not restricted to; installation, maintenance, servicing, commissioning, network protection, network operation, management, planning and vegetation control.

In recent years, the sector has been significantly affected by:

- Changes in organisational structures (including privatisation and/or corporatization, contracting out and internal reviews/re-structures);
- Changes in work methods, staffing levels and management approaches;
- Restructuring of the energy market;
- The consumer competition policy, and;
- Increasing government and consumer demand for a response to global warming;

Additionally, there has been strong investment in the sector. In the Transmission sector alone, investment in high volume electricity transmission infrastructure is

around \$700 million per annum, with real transmission investment forecast to rise by 80% in the next five years, driven largely by transmission network expansion and upgrades.

In the Electricity Transmission and Distribution sector collectively, investment is continuing to grow significantly. By means of example:

- In 2008, ABARE estimated that \$30-35 billion of new energy infrastructure will be required to 2020.
- In July 2009, industry representatives at the Australian Energy & Utilities Summit confirmed that \$97 billion dollars worth of infrastructure development and maintenance is required in the next 5 years.
- In 2010, Mr George Maltabarow, Managing Director, EnergyAustralia identified that EnergyAustralia alone would be investing around \$8 billion in the NSW electricity network over the next 5 years.

The Rail sector too expects significant growth in coming years. Whether it is because of growing community environmental consciousness, rising fuel prices or simply population growth, there is considerable growth in the public transport sector, including trams and trains. Consequently, the current level of capital investment in rail infrastructure, including refurbishment and upgrade of existing infrastructure, is considerable.

Worthy of note is the South Australian Government's intent to invest \$2 billion in the State's public transport system over the next decade, delivering a tramline from the Adelaide City to West Lakes, Port Adelaide and Semaphore, electrification of the major northern and southern rail lines and a modernisation of the ticketing system.

From June 2008, \$648.4 million will be spent over four years for the first stage of the program to rebuild South Australia's rail and light-rail transport infrastructure.

Across the board, the increasing number of services currently being delivered and required into the future translates to an increasing number of functions and technologies that industry operatives need to perform and master. In addition to mainstream linework and cable-jointing functions, powerline workers in some regions are now being called upon to undertake tasks such as substation/network installation and maintenance, specialised testing and protection, meter installation and the like.

The composition of the sector is also expected to change in future years, with a decline in Electrical tradespeople used to undertake activities and, an increase in the number of lineworkers and cable jointers carrying out the work; a change being driven by the growing specialisation of systems.

In the past, there was significant activity in fostering the use of dual-trade electrician/lineworker programs to offset the huge restructuring that had affected the sector. The strategy was seen as a useful mechanism to streamline and ultimately reduce staff numbers. By multi-skilling individuals, enterprises felt they could get better value for money and appropriate skills sets for the work required. However, with the increased differentiation in electrical competencies caused by changes in electrical licensing and the dedicated lineworker capabilities required by enterprises, the dual-trade model did not eventuate as intended.

More importantly, the increasing capabilities required of lineworkers to meet technological advances and work organisation (reduced team numbers and more responsibility) has required enterprises to review the recruitment strategies previously deployed, with view to selecting staff with very specific qualities. This has resulted in the industry competing with other industries for applicants with the relevant attributes.

Full-time employment is expected to continue as the predominant employment arrangement in the sector. There has also been a re-emergence of direct employment by the sector with less reliance on contracting-out, which has proven less reliable and cost effective than initially envisaged.

DRIVERS

EE-Oz and industry research has identified the following aspects as key drivers of the ESI – TDR industry at the present time:

Managing increasing demand whilst meeting regulatory, environmental and safety compliance requirements

As detailed above, the industry is significantly involved in the maintenance, replacement and refurbishment of ageing assets (overhead and underground) and will be increasingly involved in major new infrastructure projects in all States and Territories over coming years.

The Australian Government's implementation of infrastructure projects to stimulate economic growth will be in addition to these.

The challenge for the sector's member organisations is to manage their own network infrastructure programs and works associated with Government initiatives whilst simultaneously meeting customer and regulatory expectations, specifically:



- Network reliability, including quality and security of supply to consumers (residential, commercial and industrial);
- Health and Safety of employees and consumers;
- Risk management, and;
- Compliance with regulatory requirements, including the submission of all necessary documentation

These challenges must also be balanced with increasing government and community pressure for all organisations to display a consciousness of their impact on the environment. Enterprises must be seen to be implementing real and workable measures to address this impact and community concerns.

Managing increasing demand whilst meeting regulatory, environmental and safety compliance requirements requires highly skilled and knowledgeable tradespeople, technical officers, engineers, project and corporate managers.

Unfortunately, as detailed below, considerable skills shortages exist in all of these areas and many organisations are concerned that they will not have the capacity to resource the level of internal and government infrastructure works required in the coming years.

Smart-Grids & Smart-meters

On the 29th of October 2009, the Federal Government officially invited bids to transform Australia's energy grid through the SmartGrid, Smart City initiative. The \$100 million initiative will involve Government and the Energy and Communications sectors working in partnership to deploy Australia's first commercial-scale smart grid. In the media release of 30 October 2009, Minister Garrett identified that "early estimates show that if smart grid applications are adopted around Australia, they could deliver significant economic and environmental benefits to the Australian economy, including an estimated minimum reduction of 3.5mega-tonnes of carbon emissions per annum" (Australian Government, 2009). Minister Ferguson identified that "this program is a good opportunity to test the costs and benefits of smart grid and smart meter applications before wider regulated roll-out of smart meters in certain jurisdictions in the coming years" (Australian Government, 2009).

• Workforce Demographic, Skills and Labour Shortages

a. Current Skills and Labour Shortages

As detailed above, the EnergyUtilities industries are currently suffering from trade skill shortages resultant of a period of low employment and training during the late 1980's and 1990's in which recruitment practices were affected by factors such as privatisation, restructuring of the energy market, the consumer competition policy and increasing demand for a shift in power supply towards renewable resources.

For many years, electricity supply organisations maintained a 1:1 or even 1:2 trainee to qualified line worker ratio. However, with the wide-ranging changes across the industry, redundancies were offered, often to relatively young lineworker's (35-40 yrs) and positions were not filled, nor new trainees employed.

Consequently, today's industry demographic is such that nearly half of the workforce is under 35 years of age (due to the broad scale apprentice recruitment drives of recent years) and over half the workforce is over 45 years of age. The result is that many industry organisations have insufficient numbers of senior tradespeople to train and mentor the large numbers of apprentices being employed each year, and those that are still in the industry are quickly approaching retirement age.

In light of the above, industry has warned that in the future there is every possibility that new tradespeople, not long out of their apprenticeships, will be required to assume team-leader responsibilities for their crews, including responsibility for the training and supervision of apprentices.

Similarly, the industry is concerned about the significant shortages of qualified 'Glove and Barrier' workers. These tradespeople work on 'live' high voltage lines, the potentially most dangerous activity within the vocation. For this reason, individuals do not usually commence glove and barrier work until 8 or 9 years after commencement (4-5 years after completion of their apprenticeship). Industry employers have noted that there may not be enough senior lineworkers left in 5 to10 years to provide the necessary 'Glove and Barrier' training to those now progressing through their apprenticeships.

Table 2 details the workforce categories and occupations in the Australian ESI Transmission, Distribution and Rail sectors that are currently suffering from skills shortages and areas where skill shortages are expected in the future. This detail has been generated from information provided, and validated, by industry and its training partners over the 12 months from February 2009 to February 2010. Industry intelligence indicates that the skills shortages will continue in the workforce categories and occupations identified, as a direct result of aged retirements and at least five years of sustained capital works programs.

Hence, the industry will need to continue to recruit, train and retain its workers well beyond the 'real time' requirements. It is worthy of note that no areas of the ESI-Transmission, Distribution or Rail industries are currently suffering decline.

b. Barriers to overcoming skills and labour shortages

Global Skills Shortages

Many electricity supply organisations are seeking to source skilled operatives from overseas as an immediate 'fix' for the existing skills shortages affecting Australian industry.

Recent international industry reports have, however, identified that many other countries with large electricity distribution networks and infrastructure are, like Australia, entering a period of significant up-grade and overhaul. Hence, the evident skills shortages are of a global, rather than national, nature.

Where international operatives can be sourced, and at present this is predominately from South Africa, England, the Philippines and India, a challenge often arises in the application of their knowledge and skills in an Australian workplace; in the Australian context. This particular context gives rise to a gap which is identifiable and for which training can be made available; this gap has been termed the 'Minimum Australian Context Gap'.

Australian industry regulators are particularly concerned that the gap be addressed in trade vocations such as electrical, plumbing, refrigeration and air conditioning and linework, where the work context may differ markedly between countries and where such differences could endanger lives or major systems. Under the COAG Skills Recognition Taskforce, an agreed scope of work has been nationally developed for each occupation identified above. EE-Oz Training Standards has been involved in this work. Today, any RTO assessing an overseas applicant for an Australian Training Package qualification must ensure that the applicant is technically competent and that the defined Minimum Australian Context Gap has, or can be, addressed through suitable and comprehensive training and assessment.

Lack of mentors/trainers

Critical to the continued development and success of the Australian EnergyUtilities industries is skilled, knowledgeable and experienced technical teaching staff.

However, as detailed above, today's industry demographic is such that the industry has insufficient numbers of senior tradespeople to train and mentor the large numbers of apprentices being employed each year, and those that are still in the industry are quickly approaching retirement age.

c. Solutions and potential sources of labour

In recent years, two key solutions to the current situation have been widely supported by industry, namely:

- **1.** Source project funding to develop training delivery and assessment support materials
- Ensure inclusion of ESI-TDR Training Package qualifications on the Australian Government's Priority Qualifications List for the Productivity Placement Program, namely;

In regard to point 1, EE-Oz on behalf of the ESI-TDR Industry, with the support of the Australian Government, through DEEWR, is currently developing a suite of training support resources for the ESI-TDR Training Package. The resources include: Competency Development Plans (CDPs), Learning and Assessment Plans (LAPs) and Task Books (refer Section 5).

Work has commenced on the development of materials against the primary 'high volume' qualification in the Training Package, namely; Certificate III ESI – Distribution. This work will be extended to the other qualifications, in priority order, over coming months.

IDENTIFIED WORKFORCE DEVELOPMENT NEEDS

TABLE 2: CURRENT SKILL SHORTAGE WORK CATEGORIES & OCCUPATIONS

CURRENT SKILL S	HORTAGE AREAS - ESI – TRANSMISSION & DISTRIBUTION
Trade	Electricians
	Instrumentation & Control Technicians
	Transmission Lineworkers
	Distribution Lineworkers (including HV Live Line workers)
	Cable Jointers (new work & asset improvement, in particular underground cable- jointing. Also specialist cable-jointers, eg; paper/lead)
Technical Officers	Control Room/System control officers
	Engineering Technicians/officers
	Distribution Designers (design, drafting & construction of assets & intelligent systems)
	Meter Technicians (next 5 years as 'SMART' metering is introduced, peak in 2-3 years)
	Protection & Control Technicians
	Test & Commissioning Technicians
	Substation Technicians
	Project Managers (especially Construction PMs)
	System Operations (incl. Senior plant leaders, controllers)
	Network Operations
	Compliance Officers
	Energy Market Operations Officers
	Instrumentation Technicians
	Embedded Generation Technicians
Engineers	Electrical/Power Engineers (incl. embedded generation, testing/protection & commissioning, design/planning/ analysis)
	Construction Engineers
Inspections/Safety	Electrical Inspectors
	Safety Managers
Training	Workplace mentors, trainers & assessors (on-job)
	Industry specialist technical trainers (off-job)
Management	Managers with trade backgrounds

CURRENT SKILL SHORTAGE AREAS - RAIL

Trade	Rail Traction Lineworkers (especially emergency maintenance personnel)
	Signal Electricians
Technical Officers	Signalling & Track Technicians
Engineers	Signals Engineers

EMERGING SKILL SHORTAGE AREAS

- Installation of smart metering systems
- Design and installation of grid connected photovoltaic (solar) systems
- Wind energy systems
- Energy efficiency management and auditing
- Energy efficient lighting

- Co-generation and local generation
- Domestic integrated energy management systems
- Commercial/industrial energy management systems integration
- Communications

In regard to point 2, a range of ESI-TDR Training Package qualifications have been included on the Australia Government's Priority Qualifications List for the Productivity Places Program. These include:

- Certificate II in Vegetation Control
- Certificate III in ESI- Distribution
- Certificate III in ESI Transmission
- Certificate III in ESI Cable Jointing
- Certificate III in Electrotechnology Electrician
- Certificate IV in Energy Management & Control (incl. HV Switching)
- Certificate IV in ESI Power Systems (incl. live work & specialist c/jointing)
- Certificate IV in ESI Substations
- Certificate IV in Electrotechnology Electrical Instrumentation
- Certificate IV in ESI Network Infrastructure
- Certificate IV in Electrical Installation Inspection & Audit
- Diploma of ESI Power Systems
- Advanced Diploma of ESI Power Systems

Rail, Light Rail and Tram sector qualifications on the Priority List include:

- Certificate III in ESI Rail Traction
- Certificate IV in ESI Power Systems (covers advanced rail traction)
- Certificate IV in Electrical Rail Signaling

These qualifications cover all the work categories/ occupations identified as suffering skills shortages in Table 2 above.

It is worthy of note that in 2009, Theiss, in cooperation with EE-Oz Training Standards, secured funding under the Government's National Enterprise Productivity Places Programme Trail initiative to deliver the Certificate III in ESI – Distribution and Certificate III in ESI – Cable jointing qualifications from the Training Package. Eighty (80) operatives are being trained through the programme.

Additionally, many electricity supply organisations see 'blended learning' arrangements as an avenue to assist alleviate the skills shortages. Several enterprise-specific training initiatives and industry-wide pilot programs have shown that blended learning arrangements provide an effective and efficient way of delivering knowledge and skills for the sectors.

> "Additionally, many electricity supply organisations see 'blended learning' arrangements as an avenue to assist alleviate the skills shortages"

The projects have shown that blended learning solutions can:

- be used to successfully train regional-based trainees with substantial cost savings
- alleviate the significant skills shortage of technical trainers by freeing up face-to-face trainer time
- ensure consistent, high quality knowledge transfer
- more effectively control and track training progress
- facilitate the transfer of knowledge from experienced industry practitioners to the next generation.

This industry sector has been particularly pro-active in regard to embracing blended learning concepts and integrating blended learning methodologies into its traditional training regimes.

In regard to sources of labour, electricity supply organisations do not generally have difficulty in attracting potential entry-level operatives (eg; Apprentices), with most organisations inundated with applications. Some organisations, have, however, reported difficulty in sourcing applicants of the appropriate caliber for entry into the industry.

In regard to senior personnel, the Australian resources industry boom has been a key factor affecting the skills shortage crisis for the industry in recent years. Electricity supply organisations employ personnel particularly suited to occupations within the resources industry; in terms of skills and knowledge, but also in terms of work ethic, occupational health and safety consciousness and industry culture. Consequently, many personnel have been attracted to the resources industry.

GAS SUPPLY, TRANSMISSION AND DISTRIBUTION

Note: The following information has been compiled from intelligence gained through the above detailed activities (refer Section 2.2) and the inaugural EE-Oz hosted Gas Industry Skills Summit conducted in February 2010. The information has been validated by the EE-Oz Board, Gas Sector Council and Gas NTAG members (refer Appendix B).

PROFILE

For the purposes of National Gas Industry Training Package coverage, the term 'gas industry' refers to the industry which supplies natural gas, via transmission and distribution pipelines, and Liquid Petroleum Gas (LPG), via cylinders, to a variety of domestic, commercial and industrial customers. It does not refer to the extraction of gas from its source, nor the installation or maintenance of gas appliances within domestic or manufacturing environments (refer Figure 2).

Employment in the industry may involve one or more of the following; design of transmission, distribution, processing and/or storage systems; construction and maintenance of the systems; commissioning and decommissioning of the above systems; metering and billing of customers.

DRIVERS

On 9 February 2010, EE-Oz Training Standards hosted the inaugural Gas Industry Skills Summit. The Summit allowed key industry and training representatives from across Australia to come together to discuss pertinent workforce development and training issues within the Australian Gas Industry. A number of issues were acknowledged at the summit and have been identified for future action. Table 3 details the outcomes of the Summit.

Regulation

A key driver for the Australian Gas industry at this point in time is regulation. COAG's agreement to move towards National Regulatory Regimes will significantly affect the industry in coming years.

At present, all jurisdictions across Australia have State based Technical Regulators for the distribution sector; operating under differing Acts, Legislation and Regulations but with a high degree of commonality regarding Australian Gas Standards.

There is currently an industry drive for the new gas technical regulation to be centered on output based key performance measures and deliverables.

Clean Energy

The Gas industry is a major supplier of energy to Australian homes and factories, supplying around 30% of industry energy needs and 20% of domestic needs.

Gas is considered to be the transitional fuel that will help meet Australia's growing energy needs until renewable energy and cleaner technologies become more widely available.

To this end, Government policies are accelerating the implementation of natural gas technologies. By means



Sectors covered by the UEG06 Training Package

TABLE 3: KEY WORKFORCE DEVELOPMENT AND TRAINING ISSUES – AUSTRALIAN GAS INDUSTRY

ISSUE	DETAIL
Recruitment- Attracting youth to Industry	 Engaging Youth - Traineeship Schemes Formal Structure of Traineeships may inhibit engagement Engaging mature Trainees Promotion of careers and opportunities within the Industry Changing image of industry to be more appealing
Retention & Skills Recognition for Existing Workers	 Retaining people within industry/workforce Limited facilities – not enough RTOs servicing the industry Industry members are unaware of opportunities for skills recognition Transfer from mature generations to younger generations
Involvement of Gas Industry Leaders & Asset owners	 Engage Industry leaders in Workforce Development Devise strategies or procedures to involve leaders Engage asset owners and contractors equally in the development of the workforce
Government funding initiatives	 Industry unaware of all initiatives available. EE-Oz Training Standards to support industry and keep industry notified and involved
RTOs, Trainers & Increasing Partnerships	 There is currently a lack of RTOs There is currently a lack of trainers RTOs & RTOs engaging trainers Small group of trainers needed to deliver necessary training Flexibility in the delivery of training will increase access Increase partnerships between industry and RTOs Increase partnerships between industry professionals
Training Package	 Too Complex – need to simplify Training Package Industry needs to develop a better understanding Continued involvement of RTOs and Industry in development
Training Resources	 Training Resources are limited Budgets/ Funding for development Training Resources are in industry Identify funding for Other Training Expenses
Minimum Industry Standards	 Cert II or Cert III – most applicable Also call for training at higher vocational levels – Dip & AD
National Co-Ordination	Need co-ordination of Standards and regulation

of example, Queensland has the "13% Gas Scheme", whereby electricity retailers and other large electricity users must source at least 13 percent of their electricity from gas-fired generation. Arrow Energy and ERM Power's coal seam gas-fired Braemar 2 Power Station near Dalby in Queensland was officially opened in late 2009. Arrow is currently supplying approximately 5.5 petajoules per annum (PJ/a) of gas to the power station, which is expected to increase over the next 12 months to 15 PJ/a. Under a 12 year gas sales agreement, two other joint ventures with Shell; Tipton West and Daandine, will contribute another 15 PJ/a (Gas Today, Nov 2009).

Coal seam gas already meets 60% of Queensland's total gas needs and offers the possibility of meeting the growing demand for gas across the eastern states.

New gas-fired power stations have been opened in New South Wales and Western Australia. Santos is expected to make a final investment decision on the Shaw River gas-fired Power Station, near Orford, Victoria in the second half of 2010, with first power generation expected in 2013. Exploration for coal seam gas is also being conducted in new areas of South Australia, Victoria, Tasmania, Queensland and Western Australia (Gas Today, Nov 2009).

Infrastructure development and maintenance projects

"There is more than \$200 billion of work now coming online in terms of Australia's gas infrastructure. This will re-energise the job market, not just back to the level it was, but more so" Regional Director Simon Winfield, Hays Oil & Gas

The final federal environmental approval for the \$50 billion Gorgon LNG Development project was issued in late August 2009 and the final investment decision made in September. The project is now in train and has an estimated economic life of approximately 40 years from the time of start up. There is reportedly another \$150 billion worth of LNG projects being considered for Queensland, Western Australia and the Northern Territory (Gas Today, Nov 2009)

Many Industry organisations are also involved in considerable maintenance and upgrade works on existing transmission and distribution pipelines. By means of example, Jemena has recently upgraded the 797 km Eastern Gas Pipeline to increase the capacity of the pipeline to deliver gas from Victoria to the Sydney market. Simiarly, due to economic and industrial growth in the Gladstone region, Jemena has expanded its 627km Queensland Gas Pipeline. Additionally, AGL Energy has recently completed the Berwyndale to Wallumbilla Pipeline in Queensland and EPIC Energy has completed an expansion of its South West Queensland Pipeline, with the construction of the 180km QSN link. This expansion enabled the pipeline's connection to EPIC's Moomba to Adelaide Pipeline and APA Group's Moomba to Sydney Pipeline. DBP Transmission in WA is also currently involved in work to increase the capacity of the 1,596km Dampier to Bunbury Pipeline. (Gas Today, Nov 2009 & Feb, 2010).

In regard to gas distribution, SP Ausnet foresees a potential doubling in the demand for natural gas over the next 15 years, with Victoria and New South Wales expected to be the biggest areas for network growth. Hence, it is not surprising that Jemena and SP Ausnet are undertaking significant rehabilitation and expansion work on their respective gas distribution networks inside New South Wales and Victoria. (Gas Today, Nov 2009 & Feb, 2010).

Smart Grids

There is a general expectation that the future of gas distribution in Australia lies in smarter energy grids. Over time the grids are expected to include elements such as: greater penetration of distributed generation, partnering of gas with renewable technologies to boost reliability of supply; more extensive time-of-use gas metering; integrated smart metering and household displays that encompass gas, electricity and other utilities; introduction of remote monitoring within-network metering to provide gas distribution networks with better information on current network performance and improved system control and maintenance (Gas Today, Feb 2010).

• Skills and Labour Shortages

a. Current Skills and Labour Shortages

The Gas industry is currently suffering from skill shortages, predominately in the context of a significant lack of competent personnel. The current situation has arisen from a number of factors, including:

- Industry rationalisation / Potential takeovers. In an uncertain environment, training effort is generally reduced.
- Splintering/specialisation of workforce due to trend towards outsourcing and sub-contracting in recent years
- Limited training opportunities in organisations. Organisations are characterised by flatter structures and limited time and budgets for training; resulting in reduced opportunities
- Aging workforce. By 2013, 47% of gas industry operatives and 65% of those in gas management or leadership roles will be at, or nearing, retirement age (Figures 3 and 4).
- The industry is already experiencing the ramifications of large numbers of retirements, including:
 - reduced corporate memory
 - a lack of senior personnel to move into management roles
 - a lack of senior personnel to mentor and train the new generation of operatives
 - shrinking skilled labour pools. In the past, the industry's workforce has been relatively mobile, with operatives moving from one organisation to another depending on the opportunities offered. Consequently, for many years, organisations maintained a 'hire rather than train' philosophy. Today, all organisations are suffering from a lack of skilled and knowledgeable personnel.

Table 4 details the particular workforce categories and occupations in the Australian Gas industry that are currently suffering from skills shortages. Industry intelligence indicates that skills shortages will continue in the workforce categories and occupations identified. Table 4 also details the areas in which skills shortages are expected in the future, particularly given the significant infrastructure development and maintenance efforts being undertaken by industry organisations now and into the future.

b. Barriers to overcoming skills and labour shortages

In recent years, workforce development and training in the Australian Gas industry has been hamstrung by a lack of take up of the Gas Training Package stemming from a severe lack of training and assessment resources and a very small number of RTOs with the Package on scope.

Hence, there is currently very little training being undertaken leading to nationally recognised industry qualifications.

c. Solutions and potential sources of labour

EE-Oz on behalf of the Gas Industry, with the support of the Australian Government, through DEEWR, is currently developing a suite of training support resources for the Gas Training Package.

Additionally, a range of Gas Training Package qualifications have been included on the Australia Government's Priority Qualifications List for the Productivity Places Program. These include:

- Certificate II Utilities Industry Operations
- Certificate III in Gas Industry Operations
- Certificate IV in Gas Industry Operations
- Certificate IV in Gas Industry Transmission Pipeline
- Diploma of Gas Industry Operations
- Advanced Diploma of Gas Industry Operations

These qualifications cover all the work categories/ occupations identified as suffering skills shortages in Table 4 above.

Additionally, in 2009, Theiss and Origin Energy, in cooperation with EE-Oz Training Standards, secured funding under the Government's National Enterprise Productivity Places Programme Trail initiative to partner with GippsTAFE to deliver the Certificate III and IV qualifications from the Gas Training Package. One hundred and fifteen (115) operatives are being trained through the programme; 80 LPG workers and 35 Gas distribution workers.



FIGURE 3: CURRENT AGE PROFILE OF THE AUSTRALIAN GAS INDUSTRY

FIGURE 4: CURRENT AGE PROFILE OF AUSTRALIAN GAS INDUSTRY MANAGEMENT



This detail has been generated from information provided, and validated, by industry and its training partners over the 12 months from February 2009 to February 2010.

TABLE 4: CURRENT SKILL SHORTAGE WORK CATEGORIES & OCCUPATIONS

CURRENT SKILL SH	ORTAGE AREAS – GAS
Below Trade	Experienced distribution service laying labourers
Trade	Distribution trades
	Transmission trades
	Trades plus (Tradespeople with specialist/advanced technical skills and knowledge)
	LPG technicians
	Network maintenance workers
	Instrumentation, Electrical, Mechanical and Security Trades
	Data Communications
	Crew Supervisors/Team Leaders
Technical Officers	System Operations
	Pipeline Technicians – Mains, Leakage survey, CP & Pipeline patrol
	Corrosion Mitigation
	Meter Technicians (next 5 years as 'SMART' metering is introduced, with peak in next 2-3 years)
	Network Controllers
	Network Planners
	Network Customer consultants
	Regulatory specialists – knowledge of licenses and permits
	Techs with renewable/sustainable energy knowledge/skills
	Techs with SCADA knowledge & skills
Engineers	Gas Engineers (civil & mechanical)
	Instrumentation Engineers
	Engineers with Gas industry experience
Other	Trainers
	Regulators
	Project Managers
	Quality control officers
	Manager

EMERGING SKILL SHORTAGE AREAS – GAS

Increasing severity of existing skill shortages due to increasing demand for infrastructure development and maintenance and labour force losses due to aged retirements, in addition to:

- Installation of smart metering systems
- Workforce development and training managers
- Regulatory specialists knowledge of licenses and permits
- Technicians with renewable/sustainable energy knowledge/skills
- Corrosion, Instrumentation and Mechanical Engineers
2.3.2 ELECTROCOMMS INDUSTRY (ELECTROTECHNOLOGY & COMMUNICATIONS)

Note: The following information has been compiled from intelligence gained through the above detailed activities (refer Section 2.2). The information has been validated by the EE-Oz Board , Electrotechnology Sector Council and NETAG members (refer Appendix B).

"The ElectroComms industries are characterised by a relatively high skills profile compared with the overall Australian labour force. Due to the complex and diverse skills and knowledge requirements associated with the industry, most ElectroComms vocations have an entry level of skill commensurate with an AQF Certificate III or higher qualification"

PROFILE

The Australian ElectroComms industry is currently understood too employ in excess of 460,000 people. However, ElectroComms personnel are found across almost all industries, and although concentrations do exist and these are generally recognised, there are many more industry members than statistical records currently reflect.

The industry sector that covers the largest group of Electrotechnology workers is the 'Installation trade services' (ANZSIC 423) group within the major industry division of 'Construction'. Additionally, a large number of ElectroComms workers are employed in the Communications (data and telecommunications) industry. The other main occupational group is 'electrical and electronic associate professionals'.

The ElectroComms industries are characterised by a relatively high skills profile compared with the overall Australian labour force. Due to the complex and diverse skills and knowledge requirements associated with the industry, most ElectroComms vocations have an entry level of skill commensurate with an AQF Certificate III or higher qualification. Almost a quarter of the industry's work force is in the 'trades' category, compared with around 13% across the total Australian labour force. In some instances, relevant experience is also required in addition to a formal qualification.

The industries also have an above average proportion of workers at the 'Associate Professional' level (typically persons with Diplomas, Advanced Diplomas, or an equivalent) and a below average proportion of 'low-skilled' workers. As a result, approximately 40% of workers in the industries possess a VET level qualification, compared with around 22% of the total labour force.

Industry studies and Australian Bureau of Statistics data indicate strong growth prospects for the ElectroComms industry over the next 5 years, particularly in communications and computerrelated vocations. In a study conducted by the Electrotechnology Working Group, it was found that during the 1990s annual growth in Electrotechnology trades averaged 1.3%. Using forecasts prepared for NCVER, the Group concluded that growth in demand for Electrotechnology trades would be almost double this rate during the early 2000s.

Similarly, the industry has a role to play in the reduction of greenhouse gas emissions through assisting widespread implementation and use of energy efficient technologies in production and end use sectors, including households, transport, services and industry. Energy efficient technologies across all sectors (particularly residential and services), will require a workforce skilled in the installation and technical support of these technologies.

As the industry continues to change and develop, its personnel too must develop increasingly sophisticated

"Energy efficient technologies across all sectors (particularly residential and services), will require a workforce skilled in the installation and technical support of these technologies" technical skills and problem solving abilities. Apprentices and skilled operatives are expected to build high levels of competency, flexibility, and capability across a wide range of areas, equipment, technologies, processes and procedures and be prepared for continuous development of their knowledge and skills throughout their working life.

DRIVERS

Energy Efficiency

In 2009, the Victorian government estimated that 100,000 domestic dwellings in that state would takeup grid connected solar electricity generation following instigation of the feed in tariff. Extrapolating from this figure, a national take-up involving 400,000 or more homes can be expected in the foreseeable future. To achieve this level of uptake, the demand for skilled tradespeople to design, install, integrate and maintain these systems is anticipated to be of the order of 12,000 post-trade (Certificate IV – Diploma) qualified electricians.

It is important to note that these figures are only related to grid connected solar on domestic dwellings and do not include installations on public buildings, schools, hospitals or commercial and industrial premises, which will be significant.

The affect of this initiative is already being felt in the ACT, with the ACT industry regulatory authority having reported that in 2008 there were a total of 30 applications for photovoltaic installations, compared to 500 applications in the first two months of 2009. As at December 2010, a total of 930 systems had been installed in the ACT (DEWHA, 2009). Figure 5 details the total number of photovoltaic installations per state as at December 2009.

In addition to grid connected solar, there are a range of other new technologies, such as smart metering and LED lighting systems, which will also offer significant energy efficiency gains.

The introduction of 'Smart' meters will impact on ElectroComms personnel, particularly those working within the major utilities and gas organisations, for approximately five years from late 2008. This technology will demand operatives develop appropriate knowledge and skills to facilitate the industry's

FIGURE 5: NUMBER OF PHOTOVOLTAIC SYSTEMS INSTALLED BY STATE TO DECEMBER 2009

	GRID	OFF-GRID	TOTAL
NSW	12,442	2,105	14,547
VIC	14,942	1,194	16,136
QLD	13,272	969	14,241
SA	11,151	248	11,399
WA	8,767	65	8,832
TAS	1,076	225	1,301
NT	74	8	82
ACT	930	4	934
	62,654	4,818	67,472

Source: DEWHA, 2009

conversion to the 'Smart' meters. This includes the communication and information technology aspects of the advanced interval metering systems.

Maintaining pace with other technological advances

ElectroComms industry members, regardless of sector or discipline, work in highly technical and continually changing environments. Science and technology continues to influence existing products and trigger new processes and equipment to meet changing global and local community demands. In recent years, the ElectroComms industry has had to adapt quickly to changes in technology, regulatory requirements and customer expectations.

By means of example, the use of 'smart' technologies, such as home automation and the integration of building systems, including electrical, voice, security, fire, air conditioning and data is now commonplace in many sectors of the industry.

Similarly, the advent and introduction of wireless/ satellite communication systems has resulted in the need for technicians skilled in the use of computers and Internet-based systems in every day work environments. There has also been an increased focus on diagnostic skills rather that repair skills at this level.

Overall, the ElectroComms industry is experiencing a considerable and increasing demand for 'Trades plus' personnel. Specifically, tradespeople with advanced/ specialist skills and knowledge in a particular area

or technology, such as data communications, instrumentation, or energy efficiency technologies.

Broadband Rollout

In 2008, the Australian Government finalised its plan for the National Broadband Network initiative. The Government will provide nearly \$5 billion to rollout fibre to over 90% of the Australian population. The roll-out will take 5 to 7 years to complete, commencing in regional areas and working back into metropolitan centres.

ACMA registers currently total 60,000 operatives, including electricians with ACA licenses. The registrars assume that there are another 10,000 unregistered operatives within the industry. Despite these numbers, current industry estimates indicate that another 10,000 new operatives will be required to adequately service the governments' initiatives. Eighty per cent (80%) of these new industry operatives will be required in the areas of construction (rigging, backboning/ backhauling), cabling (customer access network, data communications - optical, coaxial, copper, customer premises cabling & equipment, electronics & communications) and technical operations (installation, commissioning, maintenance, tech support), 10% will be required in the areas of engineering (network, design, infrastructure), planning and design (computer systems, networks, infrastructure) and 10% will be required in industry support roles.

The Electrotechnology Training Package includes a large number of competencies and 14 qualifications (4 x CII, 3 x CIII, 4 x CIV, 3 x AD) which will support the National Broadband Rollout. Additionally, a suite of 7 specifically tailored Skill Sets has been developed to accommodate industry's need for post-trade training to service the broadband rollout. However, a key concern for industry at the present time is sourcing labour, particularly given the current skills shortages and predicted losses due to retirement and movement of industry personnel to the resources sector.

Skills and Labour Shortages

a. Current Skills and Labour Shortages

Table 5 details workforce categories and occupations in the Australian ElectroComms industries that are currently suffering from skills shortages. Industry intelligence indicates that skills shortages will continue in the workforce categories and occupations identified. Table 5 also details the areas in which skill shortages are expected in the future. This detail has been generated from information provided, and validated, by industry and its training partners over the 12 months from February 2008 to February 2009.

b. Barriers to overcoming skills and labour shortages

Like many industries, the ElectroComms industries are suffering from skill shortages. The shortages are, however, more a factor of reluctance on behalf of employers to provide apprenticeship positions than lack of individuals willing to enter the industry. The current situation is the result of:

- Lack of applicants with the required aptitude and level of language, literacy and numeracy skills for entry into the industry. NECA reports that "the attainment of acceptable minimum mathematics skills is an ongoing problem with young applicants" (NECA, 2009).
- Competition and contracting arrangements within the industry leading to a lack of certainty amongst employers of their ability to provide an apprentice with ongoing employment for the nominal four year period
- Lack of employer knowledge and understanding of the apprenticeship system, the documentation that must be completed and the roles and responsibilities of the many agencies involved.

Additionally, employers in certain areas have reported that the re-emergence of activity in the resources sector is causing considerable movement of industry members away from certain jurisdictions. By means of example the NECA 2009 Workplace Projections Report reported "500 electricians leaving Victoria every month to overseas and other Australian destinations like Western Australia and Queensland".

c. Solutions and potential sources of labour

EE-Oz on behalf of the ElectroComms Industry, with the support of the Australian Government, through DEEWR, is currently developing a suite of training support resources for the Electrotechnology Training Package. The resources include: Competency

TABLE 5: CURRENT SKILL SHORTAGE WORK CATEGORIES & OCCUPATIONS

CURRENT SKILL SHORTAGE	E AREAS - ELECTROTECHNOLOGY
Retail	Electrical/Electronic Specialist sales
Appliance Service & Installation	Electronic appliance service personnel (requiring a restricted gas license)
	Broadband/Pay TV/Data installers
	Computer Hardware Installers
	Mobile phone/PDA repairers
Trades	Electricians (domestic, commercial & Industrial)
	Electricians with Electricity Supply Industry knowledge
	Rail Signalling Electricians
	Renewable Energy Electricians (specialists)
	Energy Efficiency Electricians (specialists)
	Remote area Generation infrastrucure (specialists)
	Electrician plus (Electricians with specialist/advanced technical maintenance skills & knowledge)
	Data Communication Technicians
	Telecommunication Technicians (incl. Wireless & Fibre Optics - Broadband)
	Electronic Security System Technicians
	Electronic Fire Protection System Technicians (especially personnel with electrical installation skills/knowledge)
	Consumer Electronics
	Lift Technician
	Instrumentation Technicians (PLCs, Automation, Robotics)
	Air Conditioning Refrigeration Mechanics (especially; manufacturing & installation, commercial, industrial , natural refrigerants & marine)
Technical Officers	Research & Development Officers
	Design
	Testing
	Drafting
	Installation
	Maintenance & System Integration
	Network & infrastructure planning (especially in the telecomms sector)
Engineers	Electronics Engineers
	Computer Systems & Software Engineers
	RF Engineers
	Mechtronic Engineers
	Control Engineers (Electrical/AC Refrigeration)
Inspection	Electrical Inspectors (industry requires 20-25% increase in Electrical Inspector numbers)
Management	Project Managers
Trainers	Trade, post-trade, up-skilling, Engineering, Industrial Trainers

IDENTIFIED WORKFORCE DEVELOPMENT NEEDS

TABLE 5: CURRENT SKILL SHORTAGE WORK CATEGORIES & OCCUPATIONS CONTINUED

EMERGING SKILL SHORTAGE AREAS - ELECTROTECHNOLOGY

- Installation of smart metering systems
- Design and installation of grid connected photovoltaic (solar) systems
- Wind energy systems
- Renewable Energy technology specialists
- Renewable Energy component manufacuturers
- Remote area Generation infrastrucure (specialists)
- Co-generation and local generation
- Energy efficiency management and auditing
- Energy efficient lighting

Development Plans (CDPs), Learning and Assessment Plans (LAPs) and Task Books (refer Section 5).

Work has commenced on the development of materials against the key 'high volume' qualifications in the Training Package. The work will be extended to the other qualifications, in priority order, over coming months.

A range of Electrotechnology Training Package qualifications have been included on the Australia Government's Priority Qualifications List for the Productivity Places Program. These include:

- Certificate III in Electrotechnology Electrician
- Certificate III in Refrigeration and Air Conditioning
- Certificate III in Data and Voice Communications
- Certificate III in Computer Systems Equipment
- Certificate III in Appliance Servicing
- Certificate III in Wireless Communications
- Certificate III in Security Equipment
- Certificate III in Fire Protection Control
- Certificate III in Instrumentation and Control
- Certificate IV in Electrotechnology Systems Electrician
- Certificate IV in Electrical Data and Voice Communications
- Certificate IV in Electrical Instrumentation
- Certificate IV in Electrical Air Conditioning Systems
- Certifcate IV in Electrical Rail Signaling
- Certificate IV in Energy Management and Control
- Certificate IV in Renewable Energy

- Domestic integrated energy management systems
- Commercial/industrial energy management systems integration
- Electrical Engineering
- Instrumentation Technicians (PLCs, Automation, Robotics)
- Signalling
- Trade, post-trade, up-skilling & engineering programTrainers
- Drafting
- Communications
 - Certificate IV in Electrical Fire Protection Control
 - Certificate IV in Electrical Lift Systems
 - Certificate IV in Electrical Installation Inspection and Audits
 - Diploma of Research and Development
 - Advanced Diploma of Electrical Engineering
 - Advanced Diploma of Industrial Electronics and Engineering
 - Advanced Diploma of Electronics and Communications Engineering
 - Advanced Diploma of Refrigeration and Air Conditioning Engineering

These qualifications cover all the work categories/ occupations identified as suffering skills shortages in Table 5 above.

SECTION 3: CURRENT IMPACT OF TRAINING PACKAGES

The following sections provide information on the uptake and utilisation of the EE-Oz suite of Training Packages and the applicability of the Training Packages to industry's workforce development needs. Information is also included on current EE-Oz initiatives to ensure continued responsiveness of the Training Packages to the broad range of influencing factors, from regulatory to learner requirements.

3.1 EE-OZ TRAINING PACKAGE UPTAKE & CLIENT SATISFACTION LEVELS

(Source: National Data Collections, supported by EE-Oz Statistics & Intelligence)

NCVER data for *Commencements by Industry Skills Council for the 12 months ending 30 September, 2009* ranks EE-Oz Training Standards fourth, with 9,300 commencements against Training Packages in the EE-Oz suite.

THE ELECTROTECHNOLOGY TRAINING PACKAGE (UEE07)

The UEE07 Electrotechnology Training Package, incorporating changes to address the NQC's conditions of endorsement and 'Category 2' changes to maintain pace with technological advances and changes in work practice within the industry, was endorsed by the NQC on 27 December 2007. Version 2 of the Training Package was endorsed in June 2009. This Version incorporates new Skills Sets and amended qualifications required by industry to respond to the Federal Government's policies and initiatives to increase energy efficiency and reduce Australia's carbon footprint.

Delivery of the UEE07 Training Package commenced amongst a small number of RTOs in Semester 2, 2008. A larger number of RTOs commenced delivery against the Training Package in Semester 1, 2009 and as at February 2010, 141 RTOs are now delivering from the Training Package (NTIS, 2010).

The EE-Oz 2009 client base survey identified that 7% of clients believe the UEE07 Training Package to be 'Excellent', 57% believe the Training Package to be 'Good', 26% believe it to be 'Fair' and 10% believe it to be 'Poor'. The two primary reasons for clients rating the Training Package 'Fair' or 'Poor' were:

- **1.** The Training Package does not adequately cover a particular sector.
- 2. The Training Package is too complex.

EE-Oz is considering the opportunities for improvement identified as part of its Training Package Continuous Improvement processes.

Included below is a summary of NCVER and EE-Oz statistics regarding take up of the UEE07 Training Package.

NCVER STATISTICS ON TAKE-UP

The UTE99 Training Package was consistently listed in the NCVER's 'Top 20' Training Packages. The UEE07 has continued this trend, with the latest available NCVER data (September quarter 2009) indicating the Training Package to be ranked 5th in regard to 'numbers in training' and 12th in regard to 'commencements' by State/Territory.

In the 12 months to 30 September 2009, there were 1,400 commencements in Electrotechnology Training Package qualifications (UTE and UEE). 9,400 of these commencements were in the category of 'Electrotechnology and communications trades workers'. EE-Oz Training Standards data indicates that the majority of these commencements were in the Certificate III Systems Electrician qualification, with the Certificate III in Refrigeration and Air Conditioning and the Certificate III in Data Communications also experiencing significant take-up.

OTHER RTO DELIVERY

The large majority of Electrotechnology Training Package-based training is delivered by the public provider network (ie; TAFE). There is, however, a number of private industry-specific skills centres, registered as RTOs, also delivering Traineeship (Certificate II) and Apprenticeship (Certificate III) qualifications from the Training Package and 'short course' programs on an as needs basis. There is a private Electrotechnology Industry Skills Centre operating in each State and Territory.

The principal private RTOs registered to deliver from the Electrotechnology Training Package are: ElectroGroup Training (QLD), ElectroSkills Centre (NSW & ACT), VICTEC/TASTEC (VIC & TAS), PEERTEC (SA), NECA College of Electrical Training (WA) and Advanced Training International (NT). As at February 2010, enrolments in these RTOs were close to 3000 with over 1000 businesses being serviced. Approximately 80% (2400) of the enrolments are Electrotechnology apprentices.

It is also worthy of note that, in light of the current skills shortages and federal government initiatives to address same, EE-Oz Training Standards has noticed increased interest in the Training Package from RTOs who have had no prior history in Electrotechnology training delivery.

THE ENERGYUTILITIES SUITE OF TRAINING PACKAGES (UET06, UEP06 & UEG06)

The latest available statistics from NCVER do not include summaries for the ESI-Transmission, Distribution & Rail, ESI-Generation or Gas industry Training Packages.

This is not surprising, as EnergyUtilities industry organisations generally train 'in-house', with only a small amount of training outsourced to the public sector. Similarly, many enterprises do not report the numbers in training nor do they access public funding for the training provided. For this reason, even if statistics were publically available from the NCVER, they may not be completely indicative of the level of training occurring in the sector.

Based on EE-Oz's current knowledge of training effort within the sector, the ISC would estimate that Australia's major utilities, namely; ETSA (SA), Transgrid, Western Power, Horizon Power, Country Energy, Energex, Aurora, ActewAGL, Integral, Ergon Energy, Energy Australia, Snowy Hydro, Hydro Tasmania, NT Power & Water and Powercor, will collectively enrol well over 1000 Lineworker and Electrical apprentices in the 12 months to June 2010. Major contractors to the Utilities are expected to enrol no less than an additional 100 apprentices and the Rail sector is expected to enrol approximately 250 apprentices under the ESI-TD&R and Electrotechnology Training Packages.

In regard to ESI-TDR client satisfaction with the UET09 Training Package, the 2009 EE-Oz client base survey identified that 72% of clients believe UET09 to be 'Excellent' (13%) or 'Good'(59%), 26% believe it to be 'Fair' and 1 client believed it to be 'Poor'. The two primary reasons for clients rating the Training Package 'Fair' or 'Poor' were:

- 1. The need for the Essential Knowledge and Skills in the Training Package to be reviewed
- **2.** The need for the pre-requisites in the Training Package to be reviewed.

Both of these aspects are already being addressed as part of the Training Package Continuous Improvement process.

For the Gas Industry, 83% of Gas industry respondents considered the Gas Training Package to be 'Excellent' (60%) or 'Good'(23%), 17% considered it 'Fair' and one respondent considered the Training Package to be 'Poor', identifying that a larger number of sector-specific competencies are required.

Due to the very small number of respondents from the Generation Industry, reliable satisfaction level statistics could not be generated for the Generation Training Package.

In regard to the Gas and Generation industries, as detailed above, these sectors are experiencing considerable difficulty in accessing training due to a lack of RTOs servicing the sectors; a situation that can be directly attributed to critical mass and a lack of training support resources. EE-Oz is currently address the need for training support materials.

3.2 EE-OZ TRAINING PACKAGE UTILISATION

3.2.1 UTILISATION FOR ASPECTS OTHER THAN TRAINING DELIVERY

The EE-Oz suite of Training Packages are used extensively by industry and its training partners for the following activities:

- Traditional training and assessment towards qualifications/statements of attainment
- Recognition of Prior Learning/Current Competency
 processes
- Workforce development (job role modelling)
- Workforce re-structuring
- Industrial Relations

In light of the above, EE-Oz's industry-specific National Technical Advisory Group and Committee meetings are attended by representatives from RTOs servicing the industry as well as representatives from enterprises utilising the Training Packages for not only training purposes.

Through attendance at the meetings, industry and its training partners receive information on their Training Package, its use and implementation by other organisations and any pending Category 2 changes which may affect the Package's utilisation, for whichever purpose, into the future. The meetings are also utilised by EE-Oz Training Standards to receive feedback from stakeholders on current and emerging industry workforce development and training needs and resultant opportunities for improvement of the Training Packages.

The current membership of EE-Oz's National Technical Advisory Groups and Committees is detailed in Appendix B. The membership numbers are indicated in Table 6 below. The numbers confirm that RTOs servicing the industry are not the only users with a serious interest in the Training Packages, rather there are many enterprises also using the Training Packages for reasons other than Training delivery.

TABLE 6: CURRENT EE-OZ NATIONALTECHNICAL ADVISORY GROUP (NTAG)MEMBERSHIP

EE-OZ INDUSTRY NTAG	FEB 2009	FEB 2010
Electrotechnology NTAG & TACs	72	83
ESI-TD&R NTAG & TACs	192*	194*
Gas NTAG	15	20
Generation NTAG	37*	44*

*some overlap between organisations, but representatives come from different sections within the organisation (eg; Training, Operations, Business Services, HR etc.)

3.2.2 UTILISATION FOR TRAINING DELIVERY

Table 7 details the number of RTOs currently registered as having scope to deliver against the EE-Oz suite of Training Packages.

EE-OZ TRAINING PACKAGE	RTOS WITH PACKAGE ON SCOPE			
	FEB 2008	FEB 2009	FEB 2010	
Electrotechnology UEE07	38	102	141	
(Electrotechnology UTE99)	(121)	(92)	(49)	
ESI-TDR UET09			16	
ESI-TDR UET06	21	37	44	
(ESI-TDR UTT98)		(28)	(20)	
Gas UEG06	7	12	12	
ESI-Generation UEP06	24	39	47	

TABLE 7: RTOS WITH EE-OZ TRAINING STANDARDS TRAINING PACKAGE ON SCOPE.

The small numbers of RTOs registered to deliver against the Gas and Generation Training Packages has traditionally been a key issue discussed at EE-Oz NTAG, Sector Council and Board level. It appears, however, that the number of RTOs now registering to deliver against the Generation Training Package is increasing, with an additional 8 RTOs registering to deliver against the Generation Training Package in the 12 months to February 2010.

Anecdotal evidence suggests that the old '*Certificate* of *Technology*' and internal '*Diploma*' and '*Associate Diploma*' training programs that were relatively commonplace within the Generation sector, are gradually being replaced with National Training Package qualifications at the Diploma and Advanced Diploma level. Similarly, suitably qualified Certificate III level tradespeople in Linework and Electrical areas are up skilling in the specific Generation competencies required by the enterprise.

These statistics are pleasing, however, RTOs servicing the industries are continuing to call for resources and materials to support their training delivery and assessment activities against the Training Packages.

The Electrotechnology industry has a long history of training provision predominately through the public sector. Hence, up until recently, the State and Territory TAFE systems traditionally funded the development of comprehensive training materials to support the delivery and assessment of Electrotechnology programs within their institutions. These materials were then sold to other training institutions under commercial arrangements. In recent years, however, an increasing number of TAFE systems have reduced or completely disbanded their training resource development functions. The upkeep and currency of available support materials is now beginning to suffer as a consequence.

In the EnergyUtilities industries (ESI-TD&R, Generation and Gas), the majority of training has, and continues to be, provided by enterprises themselves, with only a small amount outsourced to the public sector. As can be appreciated, individual enterprises do not have sufficient resources (financial, temporal or manual) to devote to broad-scale development of training and assessment support materials.

Consequently, whilst industry is supportive of the Training Package, the take-up and delivery of Training Package-based training, has been hamstrung by a lack of available support resources for RTOs servicing, or wanting to service, the industry.

EE-Oz Training, in consultation and cooperation with DEEWR, industry and its training partners, is currently devoting considerable effort to the development of high quality, nationally consistent, training and assessment support materials for utilisation by RTOs across Australia. These activities are detailed in Section 5 below.

SECTION 4 FUTURE DIRECTIONS FOR ENDORSED COMPONENTS OF TRAINING PACKAGES

4.1 RESPONSES TO INDUSTRY'S WORKFORCE DEVELOPMENT PRIORITIES

EE-Oz Training Standards is assisting the Australian ElectroComms and EnergyUtilities industries respond to their workforce development and training priorities through the ongoing development and amendment of units of competency, qualifications and skill sets inside the national suite of EE-Oz Training Standards Training Packages, namely;

- UEE07 Electrotechnology Training Package
- UET09 ESI Transmission, Distribution & Rail Sector Training Package
- UEP06 ESI Generation Sector Training Package
- UEG06 Gas Industry Training Package

In 2009, in addition to the range of continuous improvement activities necessary to maintain pace with technological advances and changing work practices, considerable attention was devoted to the development and amendment of Units, Qualifications and Skills Sets to assist the Industries support the Governments' policies and initiatives to increase Australia's energy efficiency and reduce its carbon footprint.

This work will continue into 2010, however, it will be undertaken against the backdrop of the NQC's requirements for:

- Increased flexibility within Training Packages, as detailed in the National Quality Council's Communiqué.
- The embedding of 'GreenSkills' in all Training Packages.

These requirements and the Industries' workforce development priorities have informed the bodies of continuous improvement work to be undertaken on each Training Package during 2010. This work is comprehensively detailed in the *EE-Oz Training Standards Continuous Improvement Plan - 2010 Update*.

4.2 BARRIERS IN THE VET SYSTEM THAT NEED TO BE OVERCOME

LACK OF STATE/TERRITORY GOVERNMENT INCLUSION OF SPECIFIC ENERGY INDUSTRY QUALIFICATIONS ON STATE/ TERRIORY PRODUCTIVITY PLACES PROGRAMME (PPP) LISTS.

EE-Oz Training Standards and the other ISCs, have provided the Australian Government with industrybased advice on the key qualifications to be included on the National Priority Occupations and Qualifications list for the Productivity Places Programme (PPP).

Whilst the State and Territory Governments are cognisant of the national list, many have chosen to develop State/Territory specific lists to best meet their jurisdictional requirements for the PPP. While this is entirely appropriate, it would appear that the establishment and amendment of State/Territory lists is causing industry frustration for a number of reasons, namely;

- Local industry training needs cannot be funded due to the required qualification being omitted from the State/Territory list, despite being on the national list.
- Local industry training needs cannot be funded because a qualification is not on the national list, yet the State/Territory requires it be added to the national list before it can be included on the State/ Territory list. This is a difficult situation in that a very pertinent jurisdictional need may not necessarily be a national need, hence the reason for the relevant qualification(s) not being included on the national list. EE-Oz has been asked by organisations in two States and one Territory to approach DEEWR with

view to amending the National list. The resultant DEEWR advice is that there is no requirement for the States/Territories to seek changes to the national list prior to amending their own lists. This inherent confusion does not assist in meeting industry's training needs.

STATE ACCREDITED COURSES

In 2009, the ISCs, on behalf of all industry, collectively provided a response to Government regarding state accredited courses. The following is an extract from the response:

Industry at large welcome competition as a means of encouraging greater flexibility and quality of delivery. But competition is not about the development of locally accredited courses, indeed many argue that the notion of a 'local' market is increasingly obsolete given the nature of industry is globally driven. Quite simply, industry's nationally agreed 'criteria' for skills and knowledge are precisely that, and are not the subject of competition.

Implications of this practice go way beyond wastage of resources, or even the lack of recognition by industry of local programs or the implications for a learner's portability of skills. More broadly this is about the apparent contradiction of a system designed to respond to the greater economic needs of Australian industry and the 'VET industry', an industry which is increasingly geared towards lucrative export markets and fee for service activity based on "a distinguishing product".

Not surprisingly, the notion of contestability and competition place pressure on practitioners to look at the issue of product design through their lens of running a business. It is without doubt a highly charged and sensitive issue but one which must be openly discussed to ensure it does not distort the design of any new model for training products.

Australia's energy industries have only recently emerged from a State accredited model and have now fully embraced national standards and qualifications. The push for State accredited courses is seen as a significant step backwards and ultimately detrimental to national consistency in training, work practice and safety.

UNCERTAINTY AROUND THE DIRECTION OF VET TRAINING PRODUCTS FOR THE 21ST CENTURY

The NQC has long recognised the policy implications for the National Skills Framework of the COAG reform agenda. In November 2006, the NQC provided advice to the MCVTE on suggested policy priorities for the National Skills Framework to support the second stage of the COAG human agenda reforms. This advice included that 'consideration be given to providing greater flexibility and adaptability within the next generation of Training Packages'

In mid 2008 a Joint Steering Committee of the National Quality Council and the COAG Skills and Workforce Development Sub Group was established to bring the work together in a joint project *VET Training Products for the 21st Century'*.

The first *VET Training Products for the 21st Century'* Consultation Paper was released later that year, with

Mr Peter Noonan, Project Consultant, presenting the feedback recieved at the Joint NQC/COAG Steering Committee Meeting on the 28th of January 2009.

A second 'VET Training Products for the 21st Century' Consultation Paper was subsequently compiled and released in February 2009. In the paper, the Joint Steering Committee confirmed its ongoing commitment to an industry led VET system.

Throughout 2009, the ISCs, including EE-Oz Training Standards continued to participate in discussions around '*VET Training Products for the 21st Century*', with view to ensuring that the needs of industry remain at the forefront of considerations.

As evidenced in this Environmental Scan, industry supports, in principle, the simplification of Training Packages. However, industry warns that care must be taken to ensure that simplification does not jeopardise the necessary reflection of technical, OHS and regulatory standards in the Training Packages.



"UTURE DIRECTIONS FOR NON-ENDORSED COMPONENTS SUPPORTING TRAINING PACKAGES

SECTION 5 FUTURE DIRECTIONS FOR NON-ENDORSED COMPONENTS SUPPORTING TRAINING PACKAGES

5.1 RESPONSES TO INDUSTRY'S WORKFORCE DEVELOPMENT PRIORITIES

REQUIREMENT FOR NATIONALLY CONSISTENT DELIVERY AND ASSESSMENT SUPPORT MATERIALS

As detailed in Section 3, research conducted by EE-Oz and other research agencies working in the VET space have identified that the take-up of Training Packages is directly influenced by the availability, accessibility and quality of delivery and assessment materials and resources supporting the qualifications within a Package.

The Australian Government has also acknowledged the importance of high quality support materials and, to its credit, has provided funding to the ISCs (through the current 2008-2011 Service Agreement) for the development of same.

DEVELOPMENT OF COMPETENCY DEVELOPMENT PLANS, LEARNING AND ASSESSMENT PLANS AND TASK BOOKS.

For many years, RTOs servicing the Australian ElectroComms and EnergyUtilities industry utilised national modules to support training delivery against the 'UT' suite of EE-Oz Training Packages. With the endorsement of the 'UE' suite, Learning Specifications and Work Performance Specification were implemented to support delivery.

The introduction of AQTF 2007 ushered in the need for the next evolution of EE-Oz Training Package support materials, namely; the development of Competency Development Plans (CDPs), Learning and Assessment Plans (LAPs) and Task Books.

Competency Development Plans (CDPs) provide RTOs with a detailed compliance document for each unit of competency in the given Training Package. The CDP provides details of the required knowledge, skills and experience in the form of a knowledge and skills specification, a work performance specification, and a mapping of the performance

criteria, critical aspects of evidence and assessment details, including Tables of Specification. All CDPs are developed to support a blended learning approach to delivery and assessment by RTOs.

The assessment details and table of specifications are used to ensure consistency of assessment.

Learning and Assessment Plans (LAPs) can be used as a training guide by teachers/trainers. The content clearly identifies knowledge and skills required to be covered.

Topic Resources cover aspects such as; topic overviews, topic learner activities, topic skills practice exercises, topic technical summaries and topic review questions. The resources concentrate on educationally sound theoretical and practical activities; theory delivered with the support of commercially available texts, and; contain links to web sites and other student support information available via the web.

As at 30 December 2010, 60 CDPs (Electrotechnology and Gas), 18 LAPs (Electrotechnology and Gas) and 70 Topic Resources (Electrotechnology and Gas) are available on the EE-Oz Resource Navigator. CDPs supporting the Certificate III Lineworker qualification in the UET09 ESI-TDR Training Package have been completed and will be uploaded in the near future. 63 industry organisations and RTOs from across Australia have registered with EE-Oz to use this bank of support resources.

IMPLEMENTATION OF BLENDED LEARNING ARRANGEMENTS IN THE INDUSTRIES UNDER EE-OZ'S COVERAGE

Members of the EE-Oz network, and their training partners, have a growing interest in integrating blended learning arrangements into their training regimes. There is also strong interest in collaboration between industry organisations in regard to developing and implementing 'shared' e-learning programs.

At industry's request: *EE-Oz Training Standards has* taken a leading role in coordinating a national industry strategy for the development and implementation of 'blended learning' approaches to training delivery and assessment. The following structures, documents and forums are the direct result of industry collaboration to implement blended learning since October 2008:

1. Formal structures to facilitate collaboration

- Blended Learning Standing Committee (cross-sector)
- Blended Learning Consultative Committee (ESI-TDR sector)
- Blended Learning Consultative Committee (Electrotechnology sector)
- Blended Learning AFLF ProjectWorking Group (ESI-TDR sector)

2. Guideline Document

The Industry has developed a comprehensive industryspecific document to assist organisations considering integrating e-learning in their training and assessment regimes.

3. Collaborative development of a specifications document to inform the development of a shared e-learning resource

The Industry developed a comprehensive specifications document to guide the development of the first e-learning resource under a Australian Flexible Learning Framework Industry Integration Project.

4. Development of the first e-learning resource under the Australian Flexible Learning Framework Project

An e-learning resource has been collaboratively developed in accordance with the agreed specifications. The resource supports the Certificate IV in Substations qualification in the UET09 Training Package. It has been made available for utilisation by all ESI organisations via the Australian Government's LORN repository.

5. Inaugural EE-Oz Training Standards Best Practice in E-learning Forum

At the 2009 EE-Oz Annual Conference, in recognition of the considerable developments that had occurred in blended learning over the proceeding 12 months, Industry and its training partners requested EE-Oz host a forum to showcase best practice in blended learning in the Australian ElectroComms and EnergyUtilities Industries. The Forum was held on the 23rd of February, 2010 and was followed by BLCC meetings for both the ESI-TDR and Electrotechnology sectors.

6. Additional evidence of the integration of e-learning in Industry training regimes as a result of collaboration

Since the establishment of the BLSC, BLCC and BLWG structures, EE-Oz has observed an increased sharing of information about authoring systems and learning management systems amongst industry members.

Industry members recognise the need for SCORM compliance in authoring tools and Learning Management Systems (LMS) so that members can run each others' programs.

Similarly, there is a growing acceptance that whilst the need for uniformity between LMS systems is not a necessity, there are considerable benefits to be gained in using common authoring tools, particularly where members wish to customise programs to their own requirements.



RECOGNITION OF PRIOR LEARNING

As detailed in Section 1, under the Australian Government's 'Skilled Migration' and 'Skilling Australia for the Future' policies, it now necessary for RTOs to re-align their strategic directions to respond to increasing Government and Industry emphasis on, and demand for, RPL/RCC and associated gap training activities.

In this light, EE-Oz Training Standards requires the confidence that it has done all it can to ensure the RTOs servicing its industries:

- Are fully briefed on, comfortable with, and implementing necessary changes to embrace the new service provision demands that will flow from the 'Skilling Australia for the Future' and 'Skilled Migration' policies.
- **2.** Have access to a suitable, industry relevant, 'best practice' change management model
- Have access to a suitable, industry relevant, RPL/ RCC model.

EE-Oz Training Standards is undertaking activities related to point 1 as part of its current body of work against its 2008-2011 Service Agreement with the Australian Government. Points 2 and 3, while not current components of the Service Level Agreement, will be necessary if the ElectroComms and EnergyUtilities industries are to reap full benefit from the 'Skilled Migration' and 'Skilling Australia for the Future' policy initiatives.

In this light during 2009, EE-Oz with the support of DEEWR, through the Strategic Intervention Programme (SIP) of the National Skills Shortages Strategy (NSSS)

has provided industry's RTOs with a range of exemplar models, support materials and avenues for assistance. A key outcome of the project has been an increased number of skilled migrants, existing workers and re-entrants who have accessed the RPL/RCC and gap training services provided by the industry specific RTOs, being engaged by industry.

RECOGNITION OF PRIOR LEARNING FOR NEW ENTRANTS TO AUSTRALIA

It is widely acknowledged that overseas skilled workers deemed technically equivalent by the VETASSESS Consortium¹ and who seek to migrate to Australia and deploy their skills in Australia, have a predetermined training gap known as the 'Minimum Australian Context Gap' (MACG), which must be addressed when the worker reaches Australia.

Late in 2006, the then Department of Employment and Workplace Relations (DEWR), in consultation and cooperation with the then Department of Education, Science and Technology (DEST) contracted EE-Oz Training Standards to produce a benchmark resource outlining the 'Minimum Australian Context Gap' for the following Training Packages:

- Electrotechnology (UEE06)
- ESI Transmission Distribution and Rail Sector (UET06)
- Metals and Engineering (MEM05)

With focus on the following Electrotechnical trade occupations:

- Electrician
- Electrical Fitter
- Refrigeration and air conditioning tradesperson
- Electrical lineworker
- Electrical cable jointer

The Departments identified that the target audience for the resource would include government agencies, policy setters, regulators, industry stakeholders, Registered Training Organisations (RTOs) and prospective learners. EE-Oz Training Standards subsequently compiled a comprehensive report entitled:

"Minimum Australian Context Training Gap" advice for selected Electrotechnical CIII qualifications covering the following Occupations:

- Electrician
- Electrical Fitter
- Refrigeration and A/C Trade
- Electrical Lineworker
- Electrical Cable Jointer"

The Report was well received by both DEWR and DEST.

In 2008, the newly formed Department of Education, Employment and Workplace Relations (DEEWR) contracted EE-Oz Training Standards to expand on the detail within the Report, specifically in terms of the development of training delivery and assessment resources (training course documentation) and support mechanisms (support manuals and profiling cards) to assist RTOs address the 'Minimum Australian Context Training Gaps' identified for the above detailed occupations.

Consequently, during 2009, EE-Oz Training Standards developed the following resources:

- 1. Exemplar training delivery and assessment resources (training course documentation) to address the identified 'Minimum Australian Context Training Gap' (MACTG) for the following occupations:
 - Electrician
 - Electrical Fitter
 - Refrigeration and Air conditioning Trade
 - Electrical Lineworker
 - Electrical Cable Jointer

The resources are based on the information contained in the Final Report and detail:

- delivery and assessment content for the on-the-job component of training
- delivery and assessment content for the off-the-job component of training
- training provision and assessment advice

2. Manuals to assist RTOs in their preparation for delivery and assessment of training to meet the MACTG. A dedicated manual has been developed for each of the five occupations.

The Manuals are also based on the information contained in the Final Report and provide RTOs with all necessary information regarding:

- a. Establishment of the Training Plan, outlining:
- what learning is to be undertaken
- what work experiences/practices are to be undertaken

¹ The assessing authority gazetted by the Minister for Immigration and Citizenship, which undertakes trade skills assessments under the General Skilled Migration Program (GSM) for selected countries and trade occupations.

- when it is to be undertaken
- how it is to be undertaken
- the duration of the program, and
- the expectations of the learner in the program
- what contract of training will apply
- b. Confirmation of the MACG Training Program with the learner
- c. Confirmation of access to the learner's workplace
- d. Confirmation of the learner's supervision requirements
- e. Conduct of the training and assessment, including;
- Essential Knowledge
- Work experience/performance To be undertaken in the workplace/s over no less than a 12 month period, under the relevant provisional license noted on the VETASSESS website, issued by the relevant regulatory authority and practiced under appropriate supervision that is in accordance with the requisite regulatory/industry policy and recorded in an approved workplace recording system (eg.profiling)

f. Verification

Completion of a compliance assessment that is in accordance with the relevant regulatory and industry policies and verifies the safety and compliance of work performed autonomously and to the appropriate standards and in the Australian context.

g. Confirmation of completion of training and assessment & Issuance of Certification

Confirmation of completion of training and assessment from evidence confirming competence and issuance of a Statement(s) of Attainment and/or Qualification.

- 'Profiling' cards to assist RTOs record and monitor the on-the-job skills development of MACG learners. 'Profiling' is the industry and regulator-preferred method for recording learners' on-the-job competency development. Five specifically designed cards have been developed to support RTO management of the MACG process for the five occupations.
- 4. Manuals to assist MACG learners upon their arrival in Australia. A dedicated manual has been developed for each of the occupations.



The manuals provide MACG learners with all necessary information regarding what they should expect, what they need to do and who they need to contact upon their arrival in Australia. To further assist the MACG learners, full contact details of all key stakeholders in the 'post-arrival' process are being incorporated in the Manual, including, but not restricted to; VETASSESS, EE-Oz Training Standards, E-Profiling, Industry Regulatory Authorities and Registered Training Organisations servicing the ElectroComms and EnergyUtilities Industries in each State and Territory. Other agency details are also being included in accordance with State and Territory arrangements.

EE-Oz Training Standards enjoys a strong working relationship with VETASSESS and will seek VETASSESS's assistance to provide the correct Manual to individuals upon successful completion of their overseas assessment.

UP-SKILLING THE EXISTING WORKFORCE IN SKILLS FOR SUSTAINABILITY

With Australian Government support, EE-Oz is working closely with the National Electrotechnology and Communications Association to 'roll-out' 400 training places for Renewable Energy Skills Development across the Australian Electrotechnology industry.

PRODUCTIVITY PLACES PROGRAM & THE ENTERPRISE BASED PRODUCTIVITY PLACES PROGRAM

During 2009 and 2010 EE-Oz has been working closely with Origin and Theiss Services to implement arrangements under the Australian Government's National Productivity Places Pilot Program to train 80 Electricity Supply Industry workers and 115 Gas industry workers.

Additionally, between November 2009 and January 2010, EE-Oz Training Standards, in consultation and cooperation with industry, worked to compile and submit to DEEWR 26 Expressions of Interest and 19 confirmed applications for funding for 2100 places worth a total of \$8.4 million in response to the Australian Government's Enterprise Based Productivity Places Program initiative.

WORKPLACE ENGLISH, LANGUAGE AND LITERACY (WELL)

Early in 2009, the Australian Government's Workplace English Language and Literacy (WELL) Program was expanded, with funding allocated for an additional 1500 WELL places in 2009/10 to assist employers to improve the language, literacy and numeracy skills of employees aged 25 and over; and 6000 places, over four years, for Indigenous Employment program participants.

To support these initiatives, five Industry Skills Councils (ISC's) were chosen to broker WELL projects across Australia. EE-Oz Training Standards was one of the chosen ISCs. EE-Oz has been contracted by the Australian Government, as represented by the Department of Education, Employment and Workplace Relations (DEEWR) to work with the Australian Electricity Supply Industry to establish WELL projects.

In the initial stages of the project, EE-Oz met with all Electricity Network Operators to explain the project. The organisations subsequently identified three areas of particular need, namely:

- transitioning operatives from below-trade to tradelevel occupations;
- transitioning trade-level operatives to technical officer and para-professional occupations, and;
- assisting operatives to develop the IT skills necessary to successfully participate in blended learning arrangements.

EE-Oz, in consultation and cooperation with the industry, has developed template applications to address these defined areas of need. EE-Oz is now working with individual industry organisations to finalise applications for funding under the WELL initiatives.



ENVIROSCAN

APPENDICES

APPENDIX A: REPORT ON CONTINUOUS IMPROVEMENT ACTIVITY

In the 12 months to November 2009, considerable improvements were made to all four Training Packages in the EE-Oz suite.

The status of the Training Packages, as at 1 February 2010, is as follows:

- UEE07 (Version 2) fully endorsed. This version incorporates Skills Sets required by industry to support Government initiatives for Photovoltaic system design and installation.
- UET09 (Version 2) fully endorsed. This version incorporates the suite of Refresher Training Units and Skills Sets required by industry to support Government priorities for rapid, efficient and effective responses to national and natural disasters.
- UEG06 (Version 2) Currently with the State Training Authorities for consideration and comment.
- UEP06 (Version 2) currently undergoing a complete review, due for completion June 2010.

APPENDIX B: METHODOLOGY AND BIBLIOGRAPHY METHODOLOGY

EE-Oz Training Standards has an extensive and comprehensive formal consultative structure. This consultative structure comprises the EE-Oz Board of Directors, General Standing Committees of the Board, three industry-specific Sector Councils supported by four industry specific National Technical Advisory Groups (NTAGs) and fourteen sector-specific Technical Advisory Committees (TACs). National Project Steering Committees and other committees of regional, state, national and international significance also contribute to EE-Oz's intelligence base.

Between 2009 and 2010 EE-Oz Training Standards has actively collected industry intelligence from a number of key stakeholder consultation forums, namely;

- 1. National Workshop Series
- 2. Annual EE-Oz Conference and associated meetings
- 3. Specific Industry/Sector Meetings

EE-Oz Training Standards utilised these forums to collect 'grass-roots' intelligence, gauge national client satisfaction levels and identify opportunities for improvement of the ISC's products and services from stakeholders in each State and Territory. The EE-Oz Annual Stakeholder Survey and Survey to inform the Environmental Scan are key mechanisms for formal data collection.

Both surveys are distributed to all National Workshop, Conference and EE-Oz Meeting participants. The surveys are also distributed by the EE-Oz network of State and Territory ITABs, posted on the EE-Oz Training Standards website, included in the EE-Oz Magazine releases of the EE-Oz E-bulletin in late January and early February 2009. The magazine and E-bulletin is distributed to over 3000 EE-Oz Training Standards clients.

EE-Oz Training Standards is very fortunate to have strong working relationships with the network of State and Territory Industry Training Advisory Bodies servicing the ElectroComms and EnergyUtilities industries across Australia. EE-Oz Training Standards has formally engaged the ITAB network to provide industry intelligence and has utilised the various ITAB reports to Government to inform this 2010 Environmental Scan.

As a conservative estimate, well over 500 individuals have actively contributed to EE-Oz Training Standards 2009/2010 intelligence gathering processes. These individuals hail from small, medium and large industry organisations, industry representative bodies (ie; unions, employer associations), Registered Training Organisations, State and Territory Industry Training Advisory Bodies, industry regulatory bodies, Training Authorities and VET support agencies.

The sections below comprehensively detail the activities undertaken by EE-Oz to inform the Environmental Scan and the individuals who have provided feedback and information.

1. NATIONAL WORKSHOP SERIES

The National Workshop Series was held between April and June, 2009. A full-day workshop was held in the capital city of each State and Territory. Additionally, at DET NSW's request, five additional workshops were held in regional centres across NSW. Over 300 individuals participated in the workshops and included representatives from industry enterprises (small, medium & large), industry bodies (Unions, Employer Associations), Registered Training Organisations (public, private and enterprise), State/Territory Training Authorities, State/Territory Industry Training Advisory Boards and Regulators. Tables B1 and B2 detail the Workshop Agenda and the Participant List respectively.

TABLE B1: NATIONAL WORKSHOP SERIES – AGENDA 2009

AGENDA		
TIME	ACTIVITY	AUDIENCE
9.00 – 12.00	WORKSHOP 1 - TRAINING AND ASSESSMENT A	AGAINST AN EE-OZ
	 Industry Specific Workshop for each EE-Oz Package. In each workshop, presenters will cover: Advice for efficient and effective implementation Suggestions for overcoming common difficulties The extensive range of systems, resources 	RTO TRAINERS & - Industry members - Industry Rep bodies - STAs - ITABs
	and materials EE-Oz has available to support implementation of the Training Packages.	- RTO management
12.00 – 12.30	LUNCH	ALL
12.30 – 2.00	WORKSHOP 2 - TRAINING PACKAGE CONTINU	OUS IMPROVEMENT
	 Industry Specific Workshop for each EE-Oz Package: to consider: The range of Continuous Improvement activities currently being undertaken on the Package The mechanisms available for involvement in these activities, ie; feedback registers, TACs, NTAGs, Consultative Committees etc. 	 Industry members Industry Rep bodies STAs ITABs RTOs
2.00 – 2.15	AFTERNOON TEA	ALL
2.15 – 4.00	STA RTO AUDITOR & INDUSTRY REGULATOR M	IEETING
	Meeting with all STA RTO Auditors and Industry Regulators to explain the new Competency Development Plans (CDPs) and delivery and assessment tools for RTOs.	- STA RTO Auditors - Industry Regulators

TABLE B2: NATIONAL WORKSHOP SERIES – PARTICIPANTS

STATE	NAME	ORGANISATION	STATE	NAME	ORGANISATION
NSW	Rex Davies	North Coast TAFE		Aidan McCann	Western TAFE
	Frank Cahill	TAFE NSW		Rod Gunton	Integral energy
	Steve Parkinson	TAFE NSW		Sue Hillier	Energy Australia
	Peter Lamond	NECA NSW		Neil Denby	Energy Australia
	Kevin Inskip	Northern Sydney TAFE		Stan Rippon	Hunter TAFE
	Kerry Walls	Hunter V-Tec		Catorina Atkins	Western TAFE
	Glenn Byrne	Hunter V-Tec		Ron Harvison	AMP Control
	Ken Foote	Hunter Valley Training		Peter Henderson	Tomago Aluminum
		Company		Carey Hill	AMP Control
	Also Vergan	Integral Energy		Alan Turvey	Country Energy
	Danny Collins	Integral Energy		David Martin	Country Energy
	Sandra Dann	Integral Energy			

TABLE B2: NATIONAL WORKSHOP SERIES – PARTICIPANTS CONTINUED

STATE	NAME	ORGANISATION	STATE	NAME	ORGANISATION
	Peter Lema	South Western Sydney		Warren Rhoades	Skills Tech Australia
		TAFE		George Morrow	Skills Tech Australia
	Ken Postill	Sydney TAFE		Russell Zabel	Southern Qld TAFE
	Ken Morcom	Sydney TAFE		Matt Minkivitea	Australian Technical
	Brian Mobbs	Sydney IAFE			College
	John Zervos	Sydney IAFE		Jim Lougran	Southern Queensland
	Michael James	Sydney TAFE		Sue Sheppard	Skills Tech Australia
	Michael Moulton	Sydney IAFE		Tony Sinclair	BCC
	David Britten	Country Energy		Nadine Nevendorff	RCL
		Eporcofo Pty Ltd		Bob Little	Gold Coast TAFE
	Niek Plench			Joy Juster	GSIS
	Norm Cabill			Mick Dullahide	GSIS
	Rolinda Mol can	AST O & L HAD		Alb Carlton	Fisher & Paykel
	Dennua MicLean	4020		Grant Pearson	Fisher & Paykel
NT	Trevor Mitchell	CDU		Veronica Mauri	ECA
	Michael	CDU		Talia Carbis	eLearning Australia
	Kastellorizios	000		Gary Duell	Gold Coast TAFE
	Robyn Ellis	Centre for Appropriate		John Aston	
		Technology		Don Currell	J & P Richardson
	Blythe Warland	CDU			Industries
	Sean Guillier	Aurecon			
			SA	Jeff Levett	AGL
Qld	Peter Beatton	Skills Tech Australia		Colin Kavooris	ETSA Utilities
	Wayne Smith	Learning Systems Australia		lan Fleming	TAFE SA
	Jim Thornton	Powerlink Qld		Colin Osborn	IAFE SA
	Gabriella Bitmead	Energex		Rill Comboll	Peer veel
	Brenton Cairns	Energex		Graomo Pobrlach	
	Bruce McMahon	Ergon Energy			Poor Voot
	Patrick Scharf	Skills Tech Australia		Frank Annese	
	Eric Whittington	Queensland Rail		Peter Jolly	Peer Veet
	Rex Jorgensen	Queensland Rail		Ashley Smith	Peer Veet
	Jason O'Meara	Skills Tech Australia		Jess Chiemlowski	Peer Veet
	Mike Powell	Sunshine Coast TAFE		Larry Moore	NECA SA
	Graham Rodyers	eLearning Australia		Jan Ness	Peer Veet
	Mark Reilly	Sunshine Coast TAFE		Paul Skapin	TAFE SA (Regional)
	Peter Lees	Queensland Rail		Ron Laurence	TAFE SA (Regional)
	Glen Ferguson	Sunshine Coast TAFE		Bruno Colangelo	ATEC
	Mick Walsh	TAFE		5	
	John Ferguson	Southern Queensland	TAS	Gordon Greig	Roaring 40s
	Daving and			Michelle Morrisby	Roaring 40s
	Felschon	Skills Tech Australia		John	Hydro Tasmania
Ron Sherwood Skills Tech Australia		Karagiannakis	I haden Tanana '		
				Unuck Woolen	Hydro Iasmania

STATE	NAME	ORGANISATION	STATE	NAME	ORGANISATION
	Kathy Browne	Aurora Energy Training		Chris Dennis	CIT
		Pty Ltd			
	Warren Crichton	Workplace Standards	WA	Peter Codalonga	Swan TAFE
	Andrew Harris	Tasmania Polytechnic		Brendan Reeve	CEPU
	John Britten	Electrical Standards & Safety		Peter Taylor	Swan TAFE
	Peter Waite	Skills Tasmania		Joe Fiala	CEPU/ETU
				Mark Eatts	Public Transport Authority
Vic	Libby Neesham	APA Group		Andy Gough	Western Power
10	John Kouzaha	APA Group		Gordon Blyth	Western Power
	Dill Holdon			Mark Van Vuuren	Thiess Services
				Ron Baker	Western Power
				Stephen Beatly	Tenix
	Carlo De Martinis	Gippsland IAFE		Andrew Stewart	West Net Energy
	Joe Calabrese	Utilitrain		D Bryne	PTS
	Doug Prow	Comdain Gas		Frank Pileogi	Inttact Australia
	Stephen Walton	Bilfinger Berger Services		Trevor Mills	Rio Tinto Iron Ore
	Henry Biernacki	Jemena		Robyn Bock	Dalton Training Services
	A Leverenz	EWSB		Potor Droodowala	
	Kim Milne	Gippsland TAFE		Peter Drosdowsky	SWRU TAFE
	Alex Frazer	EPIC ITAB		John Britza	SWRC TAFE
				Rex Addison	SWRC TAFE
ACT	Keith Marchioi	CIT		Grahame Aldridge	Challenger TAFE
	John Burdett	CIT		Julie Quake	Challenger TAFE

TABLE B2: NATIONAL WORKSHOP SERIES – PARTICIPANTS CONTINUED

2. ANNUAL EE-OZ CONFERENCE AND ASSOCIATED MEETINGS

The EE-Oz Annual Conference was held between the 18th and 22nd of October, 2009. Participants totalled 208 and included representatives from industry enterprises (small, medium & large), industry bodies (Unions, Employer Associations), Registered Training Organisations (public, private and enterprise), State/Territory Training Authorities, State/Territory Industry Training Advisory Boards and Regulators. The Conference included Workshops in which participants were asked to provide intelligence on a number of key subject areas. Tables B3 and B4 detail the Conference Schedule (workshops highlighted) and the Delegate List respectively.

TABLE B3: CONFERENCE SCHEDULE

TUESDAY, 13 OCTOBER – CONFERENCE DAY 1, MORNING		
6.30	BREAKFAST	
8.00	Registration & Morning Tea	
10.00	Welcome & Official Opening	
SESSION 1: KEYNOTE ADDRESSES - INTERNATIONAL & LOCAL INFLUENCES & RAMIFICATIONS FOR INDUSTRY TRAINING		
10.10	Minister for Energy	
10.50	International Guest Speaker	

TABLE B3: CONFERENCE SCHEDULE CONTINUED

SESSION 2A: TECHNOLOG REGULATION	AICAL ADVANCEMENT & CHALLENGES FOR INDUSTRY
11.30	Futurist – ElectroComms (energy management, efficiency assessments, 5 star suburbs, fibre optics, broadband etc, training & regulatory challenges)
12.00	Futurist – EnergyUtilities (RE/SE technologies, demand management, smart metres etc – training & regulatory challenges)
12.30	PANEL
12.45	LUNCH
SESSION 2B: TECHNOLOG	GICAL ADVANCEMENT & CHALLENGES FOR INDUSTRY
REGULATION	NAND TRAINING
13.45	Concurrent breakout sessions x 4 Industry-specific groups
14.45	AFTERNOON TEA
SESSION 3: 2009'S NATUR	AL DISASTERS - INDUSTRY & TRAINING RESPONSES
15.15	2009's Natural Disasters - Industry & Training responses
16.00	Closing Remarks
18.00	Pre-dinner Drinks
18.30	CONFERENCE DINNER
WEDNESDAY, 14 OCTOBE	R – CONFERENCE DAY 2
6.30	BREAKFAST
9.00	Introductory Remarks & Summary of Day 1
SESSION 1: ENHANCING F	PORTABILITY OF SKILLS ACROSS AUSTRALIA
9.10	COAG National Licensing initiative
9.40	The Importance of Training Packages to the national system
10.10	PANEL
10.30	MORNING TEA
SESSION 2: REPORT CAR	DS

11.00	EE-Oz Training Standards Report
11.25	Blended Learning Standing & Consultative Committee – Status Reports
11.50	Blended Learning in the Secondary School sector - Presentation
12.15	Training and Assessment Materials Development – Status Report
12.40	Futures Standing Committee – Status Report
13.00	LUNCH
14.00	Guest Speaker
SESSION 3: CONCURRENT	WORKSHOPS (4 PROFESSIONALLY FACILITATED SESSIONS)
1. Blended Learning	3. National Skills Portability
2. Disaster responses	4. Infrastructure development & implementation
15.30	Closing Remarks
15.40	AFTERNOON TEA

TABLE B4: CONFERENCE DELEGATE LIST

NAME	ORGANISATION
Agett, Charles	Career Employment Group
Andrews, Jonathon	Western Power
Arandt, Noel	MainCo Melbourne Pty Ltd
Awad, Robert	Railcorp
Bagley, Mark	Ergon Energy
Ballard, Ralph	University of Ballarat
Barbuto, Garry	SkillsTech Australia
Barry, Max	Yokogawa Australia
Baxter, Lindsay	Western Power
Bickhoff, Jodie	Queensland Rail
Bienert, Klaus	Box Hill Institute
Boyd, Kim	ENERGEX
Boyle, Graham	Swan TAFE
Bulle, Helen	SkillsTech Australia
Butt, Don	ACTEW AGL
Button, Dean	ARTC
Calabrese, Joe	UtiliTrain Pty Ltd
Campbell, David	Integral Energy
Carr, Wayne	Ergon Energy
Chapman, Graham	Graham Champman Advertising
Clarke, Rod	Western Power
Cooke, Gerard	SP Ausnet
Cornell, Steve	Transgrid
Cruice, Rod	DEIR QLD
Davies, Robert	Railcorp
Davies, Tania	Australasian Railway Association
Davis, Glen	Transgrid
de la Torre, Pilar	Holmesglen TAFE
DeGraaff, Mick	Gipps TAFE
Denby, Neil	Energy Australia
Denise Colledge	TAFE TAS
Dickie, John	DEWHA
Dinnen, Naomi	NSW U&E ITAB
Driver, Ken	ARTC
Emeleus, Tom	Energy Australia
Evelyn-Liardet, Peter	Rio Tinto
Faricy, Terry	Integral Energy
Fisher, Peter	Powercor
Flanagan, Brad	eProfiling
Foster, Syd	TAFE SA - Regency Campus
Frazer, Alex	EPIC ITB
Frew, Mike	Consultant

NAME	ORGANISATION
Fry, Russell	Western Power
Gilbert, Mark	Tamworth TAFE
Girratana, Sam	SP-Ausnet
Graham, Maurice	370 degrees group
Guest, Renee	DEEWR
Gunton, Rod	Integral Energy
Gustavsson, Maurits	eProfiling
Hassett, Jayne	Hazelwood International Power
Heath, Colin	Australian Workers Union
Hill, James	JES Electrical
Hills, Darryl	ACT ULMITB
Hogarth, Fiona	Power and Water
Holder, Darryl	Queensland Rail
Horne, Mike	ElectroSkills
Howells, Noel	SP Ausnet
Inglis, Brian	CS Energy
Ingram, John	CEPU
Italiano, John	Box Hill Institute
Jaeger, Greg	Energy Australia
Jeans, Shayne	Ergon Energy
Jones, Craig	NMIT
Jones, Wayne	Jemena
Kemel, Andrew	Gipps TAFE
Kilgariff, Michael	Energy Networks Assocation
Kirby, Paul	Power and Water
Kirkham, Tom	Box Hill Institute
Lamond, Peter	NECA NSW
Lang, Douglas	CIT
Laurie, Steve	Delta Electricity
LeCompte, Lindsay	NECA NSW
Leverenz, A J	EEEWSB
Lilley, William	CSIRO
Livingston, John	Integral Energy
Love, David	WAIEU-ITC
Lovell, Peter	Connell Wagner
Lowe, Bob	Customised Learning Solutions
MacLeod, Elizabeth	eProfiling
Marchioni, Keith	CIT
Martin, Nigel	AIG
Mauri, Veronica	ECAQ
McCallum, Alex	ETU - Victoria
McCarthy, Angela	eProfiling

TABLE B4: CONFERENCE DELEGATE LIST CONTINUED

McDougal, Oraig Thiess Services Sharma, Avvind RMT McEven, Melissa DEEWR Sharwaod, Ron SkillsTech Australia McGehan, Mike Consultant Sharwaod, Ron SkillsTech Australia McGehan, Mike Consultant Sharwaod, Ron SkillsTech Australia McMehan, Mike Consultant Siddal, Paul SkillsTech Australia McMann, Noel DEWMA Siddal, Paul SkillsTech Australia Minogue, Martin Country Energy Smith, Loyd ENERGEX Munkman, Noel TAFE NSW Smith, Loyd ENERGEX Oakley, Tony Oakley Training Services Smith, Kora EEEWSB Oldon, David Skills TAS Storlako, Nicolo Dr Consultant Oldon, David Skills TAS Storlako, Nicolo Dr Consultant Olson, Colin TAFE SA - Regency Campus Thomason, Carl Connell Wagner Pau, Jen TAFE NSW Thomason, Carl Country Energy Paut, En TAFE NSW Thomason, Carl Country Energy Pautor, Kovin SwanTAFE<	NAME	ORGANISATION	NAME	ORGANISATIO
McEwen, MelissaDEEWRShenwood, RonSkillsTach AustraliaMcGenar, MikeConsultantShuttieworth, PeterRalcoopMcIcan, GrogAustralian Sorvices UnionSidial, RaulSkillsTach AustraliaMcWilliam, JohnESITOSilocornbe, MarkRio TintoMingue, MartinCountry EnergySmith, LoydENERGEXMurkman, NoelTAFE NSWSmith, LoraEEEWSBNegri, DarylUniversity of BallaratSmith, MaganTAFE NSWOkley, TonyOakley Training ServicesSmothak, StanConnell WagnerO'Byrne, ShaneHorizon PowerStapleton, GeoffConsultantOlsen, MarkETSA UtilitiesStrackon, Nicole DrCacheora Institute of TechnologyO'Nell, PanPoewroorStazesvay, PaulRalcorpOsborn, ColinTAFE NSAThomas, RobTransend TransendPany, Peter370 degrees groupThornon, JimPowerlink OLDPaul, IanTAFE NSWThornon, JimPowerlink OLDPaedy, KevinSwanTAFEThornon, JimPowerlink OLDPoskus, GregEnergexWilter, BretrCharles Darwin UnitPoskus, GregEnergy Skills OLDWalker, PeterNational CEPUPuter, BobMTACWalker, PeterNational CEPUPoters, JohnACTEW AGLWilter, MathewANIETPouwhare, DougESITOWalker, PeterNational CEPUPoter, SobMTACConnell WagnerWilter, MathewANIETPoter, Sob	McDougal, Craig	Thiess Services	Sharma, Arvind	RMIT
McGehan, MikeConsultantShuttleworth, PeterRailcorpMcInerny, PatrickDEWHASiddal, PaulSkillsTech AustraliaMcWilliam, JohnESITOSiddal, PaulSkillsTech AustraliaMcWilliam, JohnESITOSiddal, PaulSkillsTech AustraliaMinogue, MarinCountry EnergySmith, LoyaENERGEXMunkman, NoelTAFE NSWSmith, LoraEEEWSBNegri, DarylUniversity of BallaratSmith, MeganTAFE NSWOakley, TonyOakley Training ServicesSmith, MeganConsultantOlden, DavidSkills TASStapleton, GeoffConsultantOlden, DavidSkills TASStapleton, GeoffConsultantOklen, DavidSkills TASStapleton, GeoffConsultantOsborn, ColinTAFE SA - Regoncy CampusTalamini, GarethCompetency TrainPay, GerynTAFE SA - Regoncy CampusThompson, CarlCountry EnergyPak, GergEnergy Skills OLDYan Den Bergen, BermarENERGEXPatta, ChrisBarrier Reef TAFEVilliars, BrentOharles Darwin UniPouher, BobMTACWalker, PeterElectroGroupPutner, JoConneel MagnerWilte, MitcheelTAFE SA - RegoncyP	McEwen, Melissa	DEEWR	Sherwood, Ron	SkillsTech Australia
Moherny, PatrickDEWHASiddall, PaulSkillsTach AustraliaMcWilliam, JohnESITOSicombe, MarkRio TintoMinogue, MartinCourby EnergySmith, LloydENERGEXMurkman, NoelTAFE NSWSmith, LoraEEEWSBNegri, DarylUniversity of BallaratSmith, LoraEEEWSBOakley, TonyOakley Training ServicesSmith, LoraConsell WagnerO'Byrne, ShaneHorzonStanlake, Nicole DrConsell MagnerO'Byrne, ShaneHorzonStanlake, Nicole DrConsell mattruto a TechnologyO'Neill, PamPoewroorStanlake, Nicole DrConsent Institute a TechnologyO'Born, ColinTAFE SA - Regency CampusFaasandCompeten Institute a TechnologyPau, JanTAFE NSWStanlake, Nicole DrConsent Institute a TechnologyPau, JanTAFE SA - Regency CampusThompson, CarlCountry EnergyPaul, JanTAFE NSWTalamini, GarethCountry EnergyPaul, JanTAFE NSWThompson, CarlCountry EnergyPatt, ChrisBarrer ReFTAFEVillers, BortCharles Darwin UniPatt, ChrisBarrer ReFTAFEVillers, BortCharles Darwin UniPournel, JoConnell WagnerViller, MathewANIBTPrunnell, JoConnell KagnerWite, MathewANIBTPiyle, LeanneGipps TAFEWiller, MathewANIBTPiyle, LeanneCouper Energy AustraliaWiller, TacleSiel A-RegencyPiyle, LoanneAustralian Te	McGehan, Mike	Consultant	Shuttleworth, Peter	Railcorp
McLean, GregAustralan Services UnionSimmons, CraigEPACMirogue, MarinCountry EnergySmith, LoydENERGEXMunkman, NoelTAFE NSWSmith, LoraEEEWSBMushman, NoelTAFE NSWSmith, MeganTAFE NSWOakley, TonyOakley Training ServicesSmoth, MeganTAFE NSWOkley, TonyOakley Training ServicesSmoth, MeganTAFE NSWOlden, DavidSkills TASStapleton, GeoffConsultantOlsen, MarkETSA UtilitiesStapleton, GeoffConsultantOsborn, ColinTAFE SA - Regency CampusThomas, RobTraetnalogyPaad, JanTAFE NSWThomson, CaliCountry EnergyPaul, IanTAFE NSWThomson, CaliCountry EnergyPachy, KovinSwanTAFEVillers, BrontCharles pawnich RUPoschy, KovinSwanTAFEVillers, BrontCharles pawnich RUPouter, BobMITACWalson, GraemeEIETOPournell, JoCornell WagnerWillers, GraemeEIETOPournell, JoCornell WagnerWiller, MatthewANIBTPyle, LeanneGipps TAFEWiller, MichaelTAFE SA - RegencyRichards, JohnErgon EnergyWiller, MichaelTAFE SA - RegencyRiggien, MarkAustralian Technical CollegeWiller, MichaelTAFE SA - RegencyRichards, JohnErgon EnergyWiller, MichaelTAFE SA - RegencyRiggien, MarkAustralian Technical CollegeWiller, MichaelTAFE SA - RegencyR	McInerny, Patrick	DEWHA	Siddall, Paul	SkillsTech Australia
McWilliam, JohnESITOSlocombe, MarkRio TintoMinogue, MartinCountry EnergySmith, LloydENERGEXMunkman, NoelTAFE NSWSmith, LoraEEEWSBNegri, DarylUniversity of BallaratSmith, LoraEEEWSBOlden, DavidSkills TASSmith, MeganTAFE NSWOlden, DavidSkills TASStepleton, GeoffConsultantOlden, DavidSkills TASStepleton, GeoffConsultantOlden, DavidSkills TASStepleton, GeoffConsultantOsborn, ColinTAFE SA - Regency CampusPaay, GenryTAFE SA - Regency CampusPaay, GenryTAFE SA - Regency CampusTalamini, GarethCompetency TrainitPaay, GenryTAFE NSWThomson, CarlCountry EnergyPaul, IanTAFE NSWThomson, CarlCountry EnergyPath, ChrisBarrier Reef TAFEValles, BrentCharles Darwin UniPoskus, GregEnergexValles, CaremeEETOPoskus, GregEnergy Skills OLDWalkor, PeterElectroCroupPyle, LeanneGipps TAFEWhite, MatthewANIBTPyle, LeanneGipps TAFEWilkinson, RodEnergy AustraliaRoberts, Bill & SuzanneConnelt MagnerWite, MichaelTAFE SA - RegencyRoberts, Bill & SuzanneConnet AssessWilkinson, RodEnergy AustraliaRoberts, Bill & SuzanneConnet AssessWilkinson, RodEnergy AustraliaRoberts, Bill & SuzanneConnet AssessWilliams, BrianGipps TAFE <td>McLean, Greg</td> <td>Australian Services Union</td> <td>Simmons, Craig</td> <td>ERAC</td>	McLean, Greg	Australian Services Union	Simmons, Craig	ERAC
Minogue, MartinCountry EnergySmith, LloydENERGEXMunkman, NoelTAFE NSWSmith, LoraEEEWSBNegri, DarylUniversity of BallaratSmith, MeganTAFE NSWOakley, TonyOakley Training ServicesSmolski, StanConsultantO'Byrne, ShaneHorizon PowerStalleton, GeoffConsultantOlden, DavidSkills TASStalleton, GeoffConsultantOlson, MarkETSA UtilitiesStalleton, GeoffConsultantO'Nelli, PamPoewcorStalleton, GeoffConsultantOsborn, ColinTAFE SA - Regency CampusTalamini, GarethCompetency TrainingPay, GenyTAFE SA - Regency CampusThomas, RobTransendPaul, IanTAFE NSWThomson, CarlCountry EnergyPaul, IanTAFE NSWTippe, PeterNational CEPUPatr, FoterSwanTAFEVan Den Bergen, BernadENERGEXPatr, ChrisBarrier Reef TAFEVallers, BrentCharles Darwin UnitPoskus, GregEnergy Skills OLDWatson, GraemeEEITOPutnell, JoConnell WagnerWite, MichaelTAFE SA - RegencyPyle, LeanneGipps TAFEWite, MichaelTAFE SA - RegencyRichards, JohnErgon EnergyWite, MichaelTAFE SA - RegencyRose, RobertPower and WaterWite, MichaelTAFE SA - RegencyRose, RobertOwer and WaterWite, MichaelTaFE A - RegencyRussell, AaronEnergy AustraliaWiter, RobTaFE NSW Hunter	McWilliam, John	ESITO	Slocombe, Mark	Rio Tinto
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O'Byrne, ShaneHorizon PowerStapleton, GeoffConsultantOlden, DavidSkills TASStenlake, Nicole DrCanberra Institute of TechnologyOlson, MarkETSA UtilitiesSzacsvay, PaulRailcorpOsborn, ColinTAFE SA - Regency CampusThomas, RobTransendPaay, GerryTAFE SA - Regency CampusThomas, RobTransendPary, Peter370 degrees groupThomas, RobTransendPaul, IanTAFE NSWThomas, RobTransendPetorff, MicEnergexTighe, PeterNational CEPUPatt, ChrisBarrier Reef TAFEVillers, BrentCharles Darwin UnitPoskus, GregEnergy Skills QLDWalker, PeterElectroGroupPotter, BobMITACWatson, GraemeEEITOPowhare, DougESITOWebb, SteveEnergy AustraliaPiglein, MarkAustralian Technical CollegeWhite, MichaelTAFE SA - RegencyRichards, JohnErgon EnergyWile, MichaelTAFE SA - RegencyPiglein, MarkAustralian Technical CollegeWile, NeillipEnergy AustraliaRoberts, Bill & SuzanneConnelt AssessWilkins, TedUniversity of BallareRoberts, Bill & SuzanneColnect AssessWilkins, NeilTracke University of BallareRussell, AaronEnergy CouncilWilkins, NeilTracke Workers UnitSaxon, JohnEloctricity, Training & DevelopmentWilkins, RealTrackes UnitSussell, MikeClean Energy CouncilWirck, MickTrade Workers	Oakley, Tony	Oakley Training Services	Smolski, Stan	Connell Wagner
Olden, DavidSkills TASStenlake, Nicole DrCanberra Institute of TechnologyOlsen, MarkETSA UtilitiesSzacsvay, PaulRalicorpOsborn, ColinTAFE SA - Regency CampusTalamini, GarethCompetency TrainiPaay, GerryTAFE SA - Regency CampusThomas, RobTransendPary, Peter370 degrees groupThomas, RobTransendPaul, IanTAFE NSWThomson, CarlCounty EnergyPetoff, MicEnergexThomson, CarlCounty EnergyPatt, ChrisBarrier Reef TAFEVilliers, BrentCharles Darwin UnitPoskus, GregEnergy Skills OLDWatson, GraemeEEITOPotter, BobMITACWatson, GraemeEEITOPouwhare, DougESITOWatson, GraemeEEITOPyle, LeanneGipps TAFEWile, MatthewANIBTPyle, LeanneConnell WagnerWile, MatthewANIBTRiggien, MarkAustralian Technical CollegeWiley, PhillipEnergy Skills OLDRoberts, Bill & SuzanneConnet AssessWilkins, TedUniversity of BallaraRoberts, Bill & SuzanneConnet AssessWilkins, TedUniversity of BallaraRoberts, Bill & SuzanneConnet AssessWilliams, NeilTartes Northerance Py LtdRussell, AkronEnergy AustraliaWilliams, NeilTartes Northerance Py LtdSansom, JohnECAQWirick, MickTade Workers Univ Worght, ArchieWiltaCSchipano, DominicCITTContral TAFE (ecerSchipano, Domi	O'Byrne, Shane	Horizon Power	Stapleton, Geoff	Consultant
Olsen, MarkETSA UtilitiesTechnologyO'Neill, ParnPoewcorSzacsvay, PaulRailcorpOsborn, ColinTAFE SA - Regency CampusTalamini, GarethCompetency TraininPaay, GerryTAFE SA - Regency CampusThomas, RobTransendPary, Peter370 degrees groupThomson, CarlCountry EnergyPaul, IanTAFE NSWThomoson, CarlCountry EnergyPatorff, MicEnergexVan Den Bergen, BernardENERGEXPlatt, ChrisBarrier Reef TAFEWalker, PeterElectroGroupPoskus, GregEnergy Skills OLDWalker, PeterElectroGroupPotter, BobMITACWalker, PeterElectroGroupPounnell, JoConnell WagnerWite, MatthewANIBTPyle, LeanneGipps TAFEWite, MatthewANIBTPyle, LeanneGopps TAFEWite, MithaelTAFE SA - RegencyRichards, JohnErgon EnergyWilgrall, LouiseLouise Wignall ConRichards, JohnElectricity, Training & DevelopmentWilkins, TedUniversity of BallareRoberts, Bill & SuzanneConnect AssessWilliams, BrianGipps TAFERoberts, Bill & SuzanneConnet AssessWilliams, BrianGipps TAFERose, RobertPower and WaterWilliams, BrianGipps TAFERussell, AaronEnergy AustraliaWilliams, BrianGipps TAFERussell, AaronEnergy CouncilWilliams, NeilTenix Maintenance Pry LtdSansom, JohnECAQWirk, Machael	Olden, David	Skills TAS	Stenlake, Nicole Dr	Canberra Institute o
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Scott, Bruce EDMAC Aust Pty Ltd Zanich, David Central TAFE (eCentral T	Schipano. Dominic	CITT	Wright, Paul	CIT
Shackleford, Rovel Optec Shang, Ling BMIT	Scott, Bruce	EDMAC Aust Ptv Ltd	Zanich, David	Central TAFE (eCent
Shang, Ling BMIT	Shackleford, Rovel	Optec		
	Shang, Ling	RMIT		

3. INDUSTRY/SECTOR MEETINGS

Specific Industry Sector Meetings are held throughout the year. These include: Sector Council Meetings, Board Standing Committee meetings, Industry-specific National Technical Advisory Group (NTAG) meetings, Sector-specific Technical Advisory Committee and Consultative Committee meetings and meetings required for other project related groups. Membership of the Committees and Groups includes representatives from industry enterprises (small, medium & large), industry bodies (Unions, Employer Associations), State/Territory Industry Training Advisory Bodies, Registered Training Organisations (public, private and enterprise). The State and Territory Training Authorities and Industry Regulators participate in the meetings as they deem necessary/appropriate.

Figure B1 details EE-Oz Training Standards' formal consultative structures; the following pages detail the membership of each Committee and Group.

FIGURE B1: EE-OZ FORMAL CONSULTATIVE STRUCTURES





OTHER COMMITTEES – NUELAC, STANDARDS AUSTRALIA COMMITTEES

ELECTROTECHNOLOGY TECHNICAL ADVISORY COMMITTEES

RAIL SIGNALLING T	AC
Mike Horne - Chair	Electro Skills
Dean Button	ARTC
Paul Szacsvay	RailCorp
Paul Fidler	P.T.A
Darryl Holder	Queensland Rail
Mike McGehan	Consultant
Ken Driver	ARTC
James Banks	Leighton's Contractors
John Shearston	EE-Oz Training Standards
Trevor Moore	ARTC
Peter Evelyn	Liardet
Henke van der Merwe	Rio Tinto
Jim Warwick	Vic Track
Paul Zammit	RailCorp
Mark Slocombe	Rio Tinto
John Towler	Vline Passenger

REFRIGERATION & AIR CONDITIONING TAC

Noel Munkman -Chair	TAFE NSW
Andrew Burtin	RMIT
Blythe Worland	NT Industry Skills Assesors
Graham Boyle	SWAN TAFE
Darryl Cox	Energy Skills QLD
Paul Wright (ACT)	CIT ACT
Steven Langley	CIT ACT
Reg Young	Deta QLD
Michael Kastellorizios	Charles Darwin University
lan Paul	Nepean Kingswood WSI
Anise Shaker	Holmesglen
Matthew White	ANIBT
Denis Henley-smith	Box Hill TAFE
Peter Matheson	RMIT
Phillip McMillan	Box Hill TAFE
Michael White	TAFE SA
Noel May	RMIT
Syd Foster	TAFE SA
Trevor Jenkinson	RMIT
Grant Mallett	Deta QLD
Phil Noble	Careersaustralia
Peter Moore	Skills Tech Australia QLD
Helen Bulle	Skills Tech Australia QLD
Chris Platt	Townsville TAFE QLD
Mark Gilbert	New England Institiure, NSW

Peter Lamond	NECA NSW
Sue Wood	Charles Darwin Uni, NT
Tom Kirkham	Box Hill TAFE
Sarah Martin	Shaftston Institure of Tech QLD
Cameron Lloyd	Shaftston Institure of Tech QLD
Andy Pang	ANIBT
Gary Jones	Box Hill Institute VIC
Deon Voltman	Box Hill Institute VIC
Nathan Dryzan	Box Hill Institute VIC
Len Raines	Box Hill Institute VIC
Yakov Elqart	Box Hill Institute VIC
Klaus Bienert	Box Hill Institute VIC
lan Whyte	Holmesglen
Richard Auld	Energy Skills QLD
Marty Burgess	Det NSW
Elizabeth Hellenpach	TAFE NSW
James Lang	CIT ACT
Malcolm Sergeant	Det QLD
Narayan	AICL
Natalie Scott	AICL
Gerry Paay	TAFE SA
Peter Hersom	CIT ACT
Dave smalldon	TAFE SA
Peter Taylor	SWAN TAFE
Tony Mckinlay	TAFE TAS
Ernie Wigzell	Regency TAFE
Robert Baker	Det NSW
Rodney Chant	Det NSW
Warren Cole	Det NSW
Rex Davies	Det NSW
Paul Grebert	Det NSW
Rod Guyer	Det NSW
Roy Hatfield	Det NSW
Warren Heydon	Det NSW
Aidan McCann	Det NSW
Geoff McDonald	TAFE NSW
Glenn Payne	Det NSW
Doug Ransom	Det NSW
Greg Riach	Det NSW
Glen Rudgley	Det NSW
Mark Sharp	Det NSW
Stephen Smith	TAFE NSW
Ross Thompson	Det NSW
Robbie Thornton	Det NSW
Bruce Treganowan	Det NSW

ELECTROTECHNOLOGY TECHNICAL ADVISORY COMMITTEES CONTINUED

Ronald Walet	TAFE NSW
George Whitehouse	TAFE NSW
Greg Williams	Det NSW
David Adams	TAFE NSW
Ali Alahmadi	TAFE NSW
John Callaghan	TAFE NSW
Glenn Campbell	TAFE NSW
Greg Cooke	Det NSW
Bruce Davison	TAFE NSW
Sam Doumanis	TAFE NSW
Mark F Edwards	TAFE NSW
Russell Farnham	TAFE NSW
Irfan Hai	TAFE NSW
Lewis Head	Det NSW
Edwin Hipwell	TAFE NSW
Darryl Magyar	Det NSW
Paul Magyar	TAFE NSW
Aleksandar Marton	Det NSW
Michael Mchugh	Det NSW
Ian McLean	Det NSW
Peter McQueen	Det NSW
Brain Mobbs	TAFE NSW
Glen Riddett	TAFE NSW
Andrew Russell	Det NSW
Raymond Sparks	TAFE NSW
Simon Stevens	Det NSW
Kerry Thresher	TAFE NSW
Fredrick Willemsen	TAFE NSW
Derek Wotherspoon	Det NSW
L. Raines	Box Hill TAFE

ELECTRONICS, COMMUNICATIONS & **COMPUTER SYSTEMS TAC**

Chair - David Zanich	Central TAFE WA
Steven Gale	Gordon Ins VIC
Klaus Bienert	Box Hill TAFE VIC
Arvid Sharwa	RMIT
Peter Bowd	TAFE NSW
Chris Zvirblis	TAFE NSW
Paul Hoad	TAFE NSW
Russell Healy	CIT ACT
Bob Taylor	EE-Oz Training Standards
John Shearston	EE-Oz Training Standards
Zane Jessup	South Bank Institute of Tafe
Antoaneta Barbulescu	Regency Institute of TAFE

George Adda	CMM
ELECTRICAL, INSTI	RUMENTATION, LIFTS &
DATA COMMUNICA	TIONS TAC
Peter Parry - Chair	370 Degrees Group
Veronica Mauri	ECA
Bob Potter	MITAC
Keith Marchioni	CIT
Andrew Murley	STC
Andrew Harris	TAFE Tas
Paul Siddall	SkillsTech
Greg Hill-Webber	CAIT
George Adda	CMM
Mike Frew	Consultant
Colin Osborn	TAFE SA
Leanne Pyle	GippsTAFE
Mychell Emmett	EPIC
Alex Frazer	EPIC & ITAB VIC
Klaus Bienert	CMM Eng
Bruce Kendall	RMIT
Geoff Warren	FPA
Norm Cahill	NSW Utilities & Electrotechnology ITAB
Glen Porter	EnergySkills Queensland (Qld ITAB)
Darrell Hills	ACT Utilities & Light Manufacturing ITB
Anthony John Leverenz	SA Electrotechnology, Energy & Water ISB
Archie Wright	NT Major Industries TAC (NT ITAB)
David Love	WA IEU ITC (WA ITAB)
Robert Stops	EE-Oz Tasmania
Ron Sherwood	Skillstech
Andrew Kemel	Gipps TAFE
Mark Gilbert	NSW TAFE
Ralph Ballard	Uni of Ballarat
Peter Walker	ElectroGroup QLD
Renewable Energy TAC	
Mike Russell - Chair	Clean Energy Council
Aussie Kanck	Regency TAFE SA
Chris Thorogood	Skills Tech Queensland
Chris Gilbort	TAFE NSW
Garry Barbuto	Skills Tech Queensland
Gary Brooker	TAFE NSW Muswell brook

ELECTROTECHNOLOGY TECHNICAL ADVISORY COMMITTEES CONTINUED

Geoff Stapleton	Global Sustainable Energy Solutions Pty Ltd
Gerry Cervasius	North Melbourne Institute of Technology
Gerry Paay	Regency TAFE SA
Glen Morris	Solarquip Pty Ltd
lan Dawson	ECS Perth
Ian Stirling	Box Hill
John Bowdery	Wodonga TAFE Vic
John Flanders	Chisholm TAFE Vic
John Paskulich	Central TAFE WA
John Sakalauskas	North Melbourne Institute of Technology
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Noreen Tocher	ETITO
Jatinder Ahuja	MOXI
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John Karznia	EE-Oz Training Standards
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John Shearston	EE-Oz Training Standards
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Michael Denton	Powerlink
Neil Williams	Tenix
Grant Palmer	Connell Wagner
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Peter Bell	Electrix
Robert Awad	RailCorp
Robert Stops	EE-Oz Training Standards

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Graeme Unicomb	Country Energy
Graeme Westrup	Energy Australia
Herbert Snide	Powerlink
Jeffrey James	Ergon
John Ingram	CEPU National
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John Livingston	Integral
John Richards	Ergon
John Karznia	EE-Oz Training Standards
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Michael Tame	Alinta
Mike Ahern	Ergon
Neil Denby	Energy Australia
Noel Howells	SP-Ausnet
Grant Palmer	Connell Wagner
Paul Dollisson	Country Energy
Paul Hartley	Westernpower
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Peter Shuttleworth	Railcorp
Peter Woods	Railcorp
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Pieter Oliver	Western Power
Robert Awad	Railcorp
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Robert Robinson	Integral
Robert Stops	Energyskills Tasmania
Rod Gunton	Integral
Rod Clarke	Westernpower
Ron Devitt	Railcorp
Chris Rowe	ETSA
Russell Fry	Western Power
Stewart Halliwell	CitiPower
Stan Smolski	Connell Wagner
Steve Webb	Energy Australia
Steven Cornell	Transgrid
Timothy Byrne	Powerlink
Terry Foxcroft	Snowy Hydro
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Jeffrey James	Ergon
John Ingram	CEPU National
John Johanesen	SP-Ausnet
John Livingston	Integral
John Richards	Ergon
John Karznia	EE-Oz Training Standards
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Ken Wyper	Transgrid
Lindsay Baxter	Western Power
Michael Denton	Powerlink
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Mike Ahern	Ergon
Neil Denby	Energy Australia
Noel Howells	SP-Ausnet
Grant Palmer	Connell Wagner
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Peter Woods	Railcorp
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Robert Awad	Railcorp
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Robert Stops	Energyskills Tasmania
Rod Gunton	Integral
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Russell Fry	Western Power
Stewart Halliwell	CitiPower
Stan Smolski	Connell Wagner
Steve Webb	Energy Australia
Steven Cornell	Transgrid
Timothy Byrne	Powerlink
Terry Foxcroft	Snowy Hydro
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John Richards	Ergon
Michael Denton	Powerlink
Grant Palmer	Connell Wagner
Paul Dollisson	Country energy
Peter Crooks	Ergon
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	TAS Department of Justice	Steve Laurie	Data Electricity
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Peter Claydon	Snowy Hydro	Tony Oakley	Oakley Training Services
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Joe Fiala	CEPU	Tony Saxby	Delta
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Robert Brennan	Energex	Graham Davey	Rail
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Brian Davis	CVM	Gerard Cooke	SP Ausnet
Bruce Scott	TAFE NSW	Greg Mclean	Aust Services Union
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Carl Thompson	NT Power & Water	Greaeme Watson	Electrical Electronic Industry
Craig Hobbs	CitiPower	Our energy like's surply	
Chris Cooper	Country Energy	Graeme Unicomb	
Chris Mellersh	Ergon	Graham Hannaford	ACTEW AGL
Craig McDougal	Thiess Services	Greg White	Iransgrid
Colin Sharp	Transend	Graham Roberston	Queensland Rail
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Craig Jones	NMIT	Gary Talbot	Rail, Iram & Bus Union - National
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David Black	Eastern Trees	John Ingram	CEPU -National
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Ken McGuinness	Energy Australia	Peter Littlewood	Transgrid
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Brian Margitich	Electra Net	Peter Gray	Powercor
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Mike Sadler	SP AusNet	Bob Buggy	Transgrid
Mike Frew	Consultant	Robert Davies	Rail Corp
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Michael McLean	Powerlink	Robert Thomas	Transend
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Neil Williams	Tenix	Rod Labourne	Yarratrams
Neville Betts	ETU NSW	Rolfe Brimfield	Aurora Energy
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	Association	Rob Irving	Bilfinger Berger
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Graeme Michell	Bilfinger Berger	Anthony Plevev	EE-Oz Training Standards
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Ashley Hartnell	Country Energy	Pam Oneil	Powercor
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Karen Seager	Ergon Energy	Melissa Mcewen	Deewr
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Jaye Hesse	Transgrid	Peter Parry	370 Degrees
Rosa Fellowes	Trasgrid	Peter Tuck	ECA
Glen Davis	Trasgrid	Jim Thornton	Powerlink
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Don Butt	ActewAGL	Grant Palmer	Novorail
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Stephen Darby	Integral Energy	Gidley McCullagh	Electrain
Carl Thompson	NT Power and Water Corp	Gregory Watts	Integral Energy
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John Ingram	CEPU – National	Philip Toner	University of New Castle
William Lilley	CSIRO Australia	Keith Spence	Skills Australia
Melissa McEwen	DEEWR	Shane Lovell	Australian Greenhouse Office,
Anthony John Leverenz	SA EEWTB		DEHA

STATE AND TERRITORY ITAB NETWORK

EXECUTIVE OFFICER	ORGANISATION
Brian Thomas	NSW Utilities & Electrotechnology ITAB
Glen Porter	EnergySkills Queensland (Qld ITAB)
Darrell Hills	ACT Utilities & Light Manufacturing ITB
Anthony John Leverenz	SA Electrotechnology, Energy & Water ISB

EXECUTIVE OFFICER	ORGANISATION
Alex Frazer	EPIC (VIC ITAB)
Archie Wright	NT Major Industries TAC (NT ITAB)
David Love	WA IEU ITC (WA ITAB)
Robert Stops	EE-Oz Tasmania



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TVET Australia, 2008, National Quality Council/Council of Australian Governments Joint Steering Council, VET Training Products for the 21st Century, Consultation Paper, 2009, Melbourne.

ADDITIONAL SOURCES OF INFORMATION:

1. The Websites of the following State Government Departments:

- NT Dept of Infrastructure
- SA Dept of Infrastructure & Planning
- Qld Dept of Infrastructure & Planning
- WA Dept of Planning & Infrastructure
- ACT Dept Lands & Planning
- Tas Dept Economic Development, Tourism and the Arts
- Vic Dept Primary Industries.

2. The following Conferences and Summits:

- NSW Infrastructure Summit 2009
- Energy 21C 2009
- 7th Annual Australian Energy & Utilities Summit 2009
- Big Skills Conference 2009

3. The following Industry Magazines:

- ECOgeneration September/October 2009
- ECOgeneration January/February 2010
- Gas Today November 2009
- Gas Today February 2010

CROSS-INDUSTRY

accommodated in the ACSO coding regime. EE-Oz has chosen not to utilise ANZCO coding, as these codes are even less reflective of the Energy Industries' occupational categories, with the entire Gas Note: Highlighted ASCO codes indicate the closest code available and may not necessarily describe the Industry occupation. Generally, the Gas and Electricity Generation sectors are not well Supply and Distribution Industry having been omitted. EE-Oz has brought this to the attention of the ANZCO administrators.

ACSO CODE & OCCUPATION TITLE	QUAL CODE	QUALIFICATION TITLE	TRAINING PACKAGE	JUSTIFICATION – SPECIFIC OCCUPATION(S) EXPERIENCING SKILLS SHORTAGES
ASCO=2222-11	UEE20607	Certificate II Wholesaling (to be developed)	Electrotechnology	Electrical/Electronic equipment specialist sales
Sales Representative (Industrial Products)				
ASCO=2422-11	UEE51007	Diploma of Electrotechnology - Technical Teaching (to	Electrotechnology	Technical Teachers (all sectors)
Vocational Education Teacher		be developed)		
ASCO=3294-11	UEE30207	Certificate III in Computer Systems Equipment	Electrotechnology	Computer Hardware Installers
Computing Support Technician				
ASCO=3122-11	UEG50106	Diploma of Gas Industry Operations	Gas	Gas Industry Operations
Civil Engineering Associates	UEG60106	Advanced Diploma of Gas Industry Operations	Gas	
ASCO= 3123-11	TBA	Qualifications in Energy Efficiency Auditing and/or	TBA	Energy Efficiency Auditors and/ or Energy
Electrical Engineering Associates		Energy Efficiency Management		Efficiency Managers

INDUSTRY-SPECIFIC

Note: Highlighted ASCO codes indicate the closest code available and may not necessarily describe the Industry occupation. Generally, the Gas and Electricity Generation sectors are not well accommodated in the ACSO coding regime.

JUSTIFICATION – SPECIFIC OCCUPATION(S) EXPERIENCING SKILLS SHORTAGES	Engineering Technicians, Distribution Designers,	Meter Technicians, Protection & Control Technicians, Protect Managers, System	Operators, Compliance Officers, Renewable	Energy system technicians	gy	GV	gy	gy	gy	gy	gy	GV	gy	GV	gy	gy Electrical/Safety Inspectors
TRAINING PACKAGE	ESI-TD&R	ESI-TD&R	ESI-Generation	ESI-Generation	Electrotechnolog	Electrotechnolog	Electrotechnolog	Electrotechnolog	Electrotechnolog	Electrotechnolog	Electrotechnolog	Electrotechnolog	Electrotechnolog	Electrotechnolog	Electrotechnolog	Electrotechnolog
QUALIFICATION TITLE	Diploma of ESI-Power Systems	Advanced Diploma of ESI-Power Systems	Diploma of ESI Generation (Systems Operations)	Diploma of ESI Generation (Electrical/Electronic)	Diploma of Electrical and Instrumentation	Diploma of Electrical and Refrigeration & Air Conditioning	Diploma of Electrical Engineering	Diploma of Refrigeration and Air Conditioning	Diploma of Renewable Energy Engineering	Diploma of Research and Development	Advanced Diploma of Electrical Engineering	Adv. Dip. of Refrigeration & Air conditioning Engineering	Adv. Dip. of Renewable Energy Engineering	Adv. Dip. of Automated Systems Maintenance Engineering	Adv. Dip. of Engineering – Explosion protection	Certificate IV in Electrical Installation Inspection and Audits
QUAL CODE	UET50106	UET60106	UEP50106	UEP50406	UEE50207	UEE50307	UEE50407	UEE50607	UEE50707	UEE50807	UEE60107	UEE60707	UEE60907	UEE61107	UEE61207	UEE40307
ACSO CODE & OCCUPATION TITLE	ASCO= 3123-11	Electrical Engineering Associates														ASCO=3123-13

UEP40506 Certificate IV in ESI Generation (Electrical/Electronic) ESI-Generation Electrical Technicians

Electrical Engineering Technicians

ACSO CODE & OCCUPATION TITLE	QUAL CODE	QUALIFICATION TITLE	TRAINING PACKAGE	JUSTIFICATION – SPECIFIC OCCUPATION(S) EXPERIENCING SKILLS SHORTAGES
ASCO=3124-11	UEE50107	Diploma of Computer Systems Engineering	Electrotechnology	Computer, Electronic, Electrical, Industrial
Electronic Engineering Associates	UEE50507	Diploma of Electronics and Communications Engineering	Electrotechnology	Electronics, Communications and Control technicians
	UEE50907	Diploma of Industrial Electronics and Control Engineering	Electrotechnology	
	UEE60207	Adv. Dip. of Electronics and Communications Engineering	Electrotechnology	
	UEE60407	Adv. Dip. of Computer Systems Engineering	Electrotechnology	
	UEE60607	Adv. Dip. of Industrial Electronics and Control Engineering	Electrotechnology	
ASCO=3125-11	UEP50206	Diploma of ESI Generation (Operations)	ESI-Generation	Commissioning & Protection Technicians
Mechanical Engineering Associates	UEP50306	Diploma of ESI Generation (Maintenance)	ESI-Generation	System Ops, Leakage survey, network control
	UEG60106	Advanced Diploma of Gas Industry Operations	Gas	
ASCO=3125-13 Mechanical Engineering Technician	UEP40206	Certificate IV in ESI Generation (Operations)	ESI-Generation	Operations Technicians
ASCO=4111-11	UEG20106	Certificate II in Utilities Industry Operations	Gas	Gas Transmission/Distribution network
General Mechanical Engineering Trades	UEG30106	Certificate III in Gas Industry Operations		maintenance operatives (including corrosion mitigation)
ASCO=4111-01	UEG40106	Certificate IV in Gas Industry Transmission Pipeline	Gas	Transmission Pipeline Operatives/ Supervisors
Supervisor, General Mechanical Engineering Tradespersons	UEG40206	Certificate IV in Gas Industry Operations		
ASCO=4311-11 General Flactrician	UEE30807	Certificate III in Electrotechnology Electrician	Electrotechnology	Electrician (all sectors)

INDUSTRY-SPECIFIC CONTINUED

ACSO CODE & OCCUPATION TITLE	QUAL CODE	QUALIFICATION TITLE	TRAINING PACKAGE	JUSTIFICATION – SPECIFIC OCCUPATION(S) EXPERIENCING SKILLS SHORTAGES
ASCO=4311-13	UEE40207	Certificate IV in Electrical - Data and Voice ComMs	Electrotechnology	Electricians with specialist/ advanced skills and knowledge (all sectors)
Electrician (Special Class)	UEE40407	Certificate IV in Electrical – Instrumentation	Electrotechnology	
	UEE40507	Certificate IV In Electrotechnology – Systems	Electrotechnology	
		Electrician	i	
	UEE41207	Certificate IV in Electrical – Rail Signaling	Electrotechnology	
	UEE41007	Certificate IV in Energy Management and Control	Electrotechnology	
	UEE41607	Certificate IV in Renewable Energy	Electrotechnology	
	UEE42009	Certificate IV in Electrical – Photovoltaic Systems	Electrotechnology	
	UEE41107	Certificate IV in Electrical – Lift Mechanic	Electrotechnology	
	UET40206	Certificate IV in ESI-Substations	ESI-TD&R	
		Skills Sets in:Photovoltaic DesignPhotovoltaic InstallationPhotovoltaic Design & Installation	Electrotechnology	
ASCO = 4311-15 Lift Mechanic	UEE30807	Certificate III in Electrotechnology Electrician	Electrotechnology	Lift Mechanics
ASCO=4312-11 Refrigeration & Air conditioning Mechanic	UEE31307	Certificate III in Refrigeration & Airconditioning	Electrotechnology	Air conditioning Mechanics
ASCO=4313-01	UET40109	Certificate IV in ESI-Power Systems	ESI-TD&R	Electrical powerline trades supervisors, specialist
Supervisor, Electrical Distribution Tradesperson	UET40309	Certificate IV in ESI-Network Infrastructure		live line workers, specialist cable-jointers, specialist rail traction technicians, network operators

ACSO CODE & OCCUPATION TITLE	QUAL CODE	QUALIFICATION TITLE	TRAINING PACKAGE	JUSTIFICATION – SPECIFIC OCCUPATION(S) EXPERIENCING SKILLS SHORTAGES
ASCO=4313-11	UET30109	Certificate III in ESI-Transmission	ESI-TD&R	Electrical powerline tradespeople (transmission,
Electrical Powerline Tradesperson	UET30209 UET30309	Certificate III in ESI-Distribution Certificate III in ESI-Rail Traction		uistribution à raily meter installers
		Skill Sets: • Q Rafrashar Training Inits and 17 Skill Sats		
ASCO=4313-13	UET30409	Certificate III in ESI-Cable Jointing	ESI-TD&R	Cable-jointers
Cable Jointer				
ASCO=4314-11	UEE31207	Certificate III in Instrumentation & Control		Instrumentation & control technicians (all sectors)
General Electronic Instrument Tradesperson				
ASCO=4314-13	UEE40407	Certificate IV in Electrical - Instrumentation	Electrotechnology	Instrumentation & Control with and without an
Electronic Instrument Tradesperson (Special class)	UEE41007	Certificate IV in Energy Management & Control		electrical license
ASCO=4315-11	UEE31407	Certificate III in Security Equipment	Electrotechnology	Security & Fire Protection system technicians,
Electronic Equipment tradesperson	UEE31007	Certificate III in Fire Protection Control	Electrotechnology	Appliance servicing technicians (requiring a restricted das license) deneral electronics
	UEE30507	Certificate III in Appliance Servicing		tradespeople
	UEE30907	Certificate III in Electronics & Communications		
ASCO=4316-13	UEE30407	Certificate III in Data and Voice Communications	Electrotechnology	Data Communications Technicians, Broad-band,
Communications Linesperson				ray i v and Data Installers
ASCO=4316-11	UEE31607	Certificate III in Wireless Communications -to be	Electrotechnology	Telecommunications Technicians (incl. wireless
General Communications Tradesperson		developed		technologies and ribre optics)

INDUSTRY-SPECIFIC CONTINUED

ACSO CODE & OCCUPATION TITLE	QUAL CODE	QUALIFICATION TITLE	TRAINING PACKAGE	JUSTIFICATION – SPECIFIC OCCUPATION(S) EXPERIENCING SKILLS SHORTAGES
ASCO=4988-11 Power Generation Plan Operator	UEP30106	Certificate III in ESI Generation (Operations)	ESI - Generation	Power Plant Operators
ASCO=4988-01	UEP50106	Diploma of ESI Generation (Operations)	ESI – Generation	Senior Power Plant Operators
Supervisor, Power Generation Plant Operator				

EE-Oz Training Standards

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