

Queensland Energy and Telecommunications Industry Skills and Workforce Development Report 2012



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Energy Skills Queensland
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Energy Skills Queensland (ESQ) is the Industry Skills Body promoting career pathways, jobs and workforce development for Queensland's energy and telecommunications industries. Energy Skills Queensland is at the forefront of developing solutions to help industry plan and develop their workforce, and providing opportunities for organisations and individuals to improve workforce skills by brokering training funding.

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CONTENTS

<i>Energy and Telecommunications</i>	5
Executive summary	5
CEO address	6
<i>Energy and Telecommunications Industry Skills Report</i>	8
Industry economic and labour market outlook	8
Queensland industry training profile	8
Energy Skills Queensland key achievements 2011 - 2012	9
Industry Based Workforce Planning	9
CSG to LNG Skills Formation Strategy	9
CSG Drilling Skills Strategy	10
Gladstone Workforce Skilling Strategy	10
Telecommunications New Entrant Program.....	10
Strategies to Increase Apprenticeships	10
Strategies to Up-skill Existing Workers	10
Electricity Supply Industry Electronic Skills Passport.....	11
Coal Seam Gas Generic Induction (CSG GI).....	11
Sustainable Energy Skills Formation Strategy.....	11
Skills for a Low Carbon Environment	11
Careers in Energy and Careers in Gas Websites	11
Critical issues facing the energy and telecommunications industries 2012 - 2017.....	11
Critical Issue One: Increase in demand of critical skilled roles to 2017	11
Critical Issue Two: Not enough electrical apprentices completing, in training or commencing	12
Critical Issue Three: Ageing population creating knowledge loss from industry.....	13
Critical Issue Four: Regional Impacts of the Energy and Resources Boom	13
Critical Issue Five: Occupational Detachment	13
Critical Occupations in Demand	13
Energy Skills Queensland's Skilling and Workforce Development Plan 2012 – 2013	17
Queensland Workforce Skilling Strategy	17
Strategies to increase the number of apprentices	17
Strategies to up-skill existing workers	18
Apprentice advisor project	18
Workforce planning	18
Key recommendations.....	19
Addressing the increase in demand for skilled workers.....	19
Increasing apprenticeship and traineeship numbers	19
Addressing the ageing population and potential occupational detachment of industry.....	20
Increasing VET trainer numbers in critical trade roles.....	20
<i>Workforce profile</i>	21
2011-12 industry workforce outlook.....	21
Changing workforce profiles.....	21
VET and higher education pathways	22
VET trainers	22
Apprenticeships and traineeships	23
Ageing population.....	30
Migration	31

Workplace culture and generational differences.....	34
Electrical industry survey results	34
Generational differences	35
<i>Energy and telecommunications sector breakdown.....</i>	37
Electricity and electrical services	37
Electricity generation.....	37
Electricity transmission.....	38
Electricity distribution.....	39
Electrical services.....	42
Queensland electrical contractors overview	43
Gas, including CSG/LNG	45
Sustainable and renewable energy	48
Telecommunications services	49
<i>Queensland and national overview</i>	53
The economic outlook	53
The energy sector update.....	54
Regulation and policy	56
Key Policy Changes	58
Skills reform	61
Major project update	62
Electricity generation.....	62
Resources.....	64
The National Broadband Network (NBN)	65
<i>References.....</i>	67

ENERGY AND TELECOMMUNICATIONS

EXECUTIVE SUMMARY

This annual report on the energy and telecommunications industries covers the developments of the past 12 months, and presents a five year workforce skills and development outlook for the industry. The immediate priorities for skilling and workforce development are included in this report, providing advice to inform government and industry investments in training and education for the energy and telecommunications industries.

Queensland, along with the nation, is undergoing a sustained period of prosperity with more than \$70 billion in capital investment made in Queensland in 2011. Investment in the construction and operation phases of new resources and mining projects presents many opportunities that, if quickly leveraged, can increase the skills and qualifications of many Queensland and Australian workers for decades to follow.

Currently, the energy and telecommunication industries in Queensland employ approximately 148,000 workers, an increase of 12,000 workers over the last 12 months. It is estimated that Queensland employment in these sectors will continue to grow to approximately 158,000 workers over the next 12 months, and potentially to 180,000 people by 2017 if current trends continue. With the planned energy and electricity projects for Queensland in the coming 5 to 10 years, a potential of 40,000 new jobs could become available over this period.

There are a number of key roles and skills sets that will continue to be in shortage over the next five years, and without further investment in apprenticeships and training, the capability and capacity demanded by industry will not be met. Energy Skills Queensland's research has identified the following roles and skills sets as critical:

Table 1: Critical Job Roles in the Energy and Telecommunications Sector

Instrumentation Control and Automation	Electrical Engineering Para-Professional
High Voltage Switching	Doggers and Riggers
Hazardous Areas	Drillers
VET Trainers and RTO Capacity	Well Servicing
Services and Maintenance Electricians	Electrical Fitter/Mechanic
Lead Hand/Supervisor Skills	Electrical Engineer
Estimators	Health, Safety and Environment Officers
Lineworkers, including Live Lineworkers	Fibre Network Designers

Queensland is going to see a shortfall of around 7,500 licensed electrical workers over the next five years. There are currently only 8,000 electrical apprentices in training in Queensland, and in real terms, only 1,500 apprentices on average complete each year. Energy Skills Queensland is of the opinion that unless industry significantly ramps up their employment of apprentices, the current system will not produce the number of tradespeople to meet this demand creating significant skills shortages, wage inflation and reduced productivity. This may put some major projects at risk due to the cost and availability of these skilled workers.

Drilling and well servicing are growth sectors in Queensland and there are a large number of entry level workers (Leasehands) moving into roles that can be given basic training off a rig. However, there is a shortage of higher level skills because these jobs require extensive experience on a rig and training using actual equipment, both of which are difficult to achieve outside of the workplace. Social inclusion is also a key theme of focus for this sector, with the Coordinator General encouraging the employment of underrepresented groups e.g. Indigenous and women.

These issues along with others facing the energy and telecommunications sectors are discussed in this report. Key recommendations for ongoing skills development are also made to enable government and industry to take full advantage of Queensland's ongoing economic prosperity in these sectors.

CEO ADDRESS



The energy and telecommunications industry in Queensland is entering an exciting but challenging period. Queensland is now experiencing what is perhaps the largest energy and resources boom in its history creating unprecedented demand for skilled workers.

Workforce projections indicate that there will be up to 40,000 new jobs created by these sectors with a peak workforce demand occurring in 2013/14 and continuing at similar levels until at least 2020.

The global financial crisis has had a negative impact upon the supply of skills. Apprentice and trainee commencements have experienced a significant decline over the last four years across all major trades and are still well below their peak in 2007/08. A high level of

attrition is also a major concern. Apprentice completions will continue to be low compared to the growing demand creating an increasing gap between demand and supply.

With a projected shortfall of 7,500 licensed electrical workers traditional skilling strategies such as apprenticeships, although very effective in the past, will not be able to meet the future demand for skilled workers. Industry either needs these skills too soon or in too greater quantity than the current system can supply. What the energy industry needs is new and innovative skilling strategies to meet these future needs. Industry and governments must work together to develop these innovative strategies to attract, train and develop, and retain the workforce for Queensland's future.

The energy industry requires both entry level workers and the up-skilling of existing workers to meet its skills needs. Energy Skills Queensland is addressing both needs through the following strategies:

- 1) Energy Skills Queensland's strategies to increase apprenticeships.
- 2) Increasing entry level workers through the Queensland Workforce Skilling Strategy
- 3) Up-skilling existing workers through industry and government partnerships

This energy and resources boom will create regional labour shortages as well specific occupational skill shortages. Labour shortages are likely to occur in the following resource rich regions and regional centres:

- Bowen Basin
- Surat Basin
- Galilee Basin
- Gladstone
- Mackay

Queensland also has a number of regional centres with high unemployment (skills surplus) areas. Queensland Government's Mining and Gas Jobs Expos held in late 2011 and early 2012 demonstrated that there are many Queenslanders in some of these regional Centres that want to work in the energy and resources industry. In excess of 40,000 people attended these expos, many possessing excellent skills, but for a range of reasons had difficulty gaining employment in these sectors.

What is needed are strategies to attract workers from these high unemployment regions of Queensland, provide them with some specialist skills training for the energy and resources sectors, and help them gain employment in these skill shortage regions utilising either re-location or fly-in fly-out/drive-in drive-out arrangements.

Energy Skills Queensland has developed the Queensland Workforce Skilling Strategy to achieve this outcome. In the 2012/13 financial year, Energy Skills Queensland will combine the successes of our industry focussed CSG Drilling Skills Program with our regionally focussed Gladstone Workforce Skilling Strategy to create the Queensland Workforce Skilling Strategy. This strategy will target up to 1,000 unemployed and under-employed people from high unemployment (skill surplus) regions of Queensland and provide them with work readiness and vocational skills training, with the aim of placing a minimum 65% of participants into employment in low unemployment (skill shortage) regions of Queensland.

With the right policies from business and government, informed by sound research and analysis, this industry can become the catalysts for major human capital investment with the potential to boost Queensland's future productivity and improve the sustainability of regional communities. With the right approach we can ensure that the efficient expansion of the energy sector supports new job opportunities across the whole state, avoiding the problems associated with a 'two-speed' economy and the worst impacts of skills shortages.

Energy Skills Queensland is proud to submit the Industry Skills and Workforce Development Report for the Energy and Telecommunications Industries and is confident that the information outlined within this document will help drive workforce development activity in the critical skills and regional areas in Queensland.

Glenn Porter
CEO – Energy Skills Queensland

ENERGY AND TELECOMMUNICATIONS INDUSTRY SKILLS REPORT

Energy Skills Queensland is pleased to present the key findings of our research conducted over the last 12 months, to 30 June 2012.

INDUSTRY ECONOMIC AND LABOUR MARKET OUTLOOK

- In the May quarter of 2012, an estimated 148,000 people were employed in the Queensland energy and telecommunications industries.
- It is estimated that Queensland employment in these sectors will grow to approximately 158,000 over the next 12 months and 180,000 people by 2017 if current trends continue.
- As at April 2012, 46,000 licensed electricians were registered with the Electrical Safety Office (ESO), of which 7,000 hold a restricted license (ESO, 2012). At the same time 8,500 licensed electrical contractors were registered, of which 700 hold a restricted electrical contractors license (ESO, 2012).
- The electricity generation sector is expected to generate revenue of \$20.85 billion in 2011-12, about 0.5% of Australia's GDP. The annual revenue growth over the past five years was 7.3%, and is expected to be 7.4% for the coming five years.
- The electricity transmission sector is expected to generate revenue of \$3.17 billion in 2011-12, about 0.2% of Australia's GDP. The annual revenue growth over the past five years was 5.5%, and is expected to be 3.1% for the coming five years.
- The electricity distribution sector is expected to generate revenue of \$50.9 billion in 2011-12, about 1.1% of Australia's GDP. The annual revenue growth over the past five years was 8.1%, and is expected to be 6.7% for the coming five years.
- The electrical services sector is expected to generate revenue of \$11.25 billion in 2011-12, about 0.5% of Australia's GDP. The annual revenue growth over the past five years was 2.3%, and is expected to be 3.0% for the coming five years.
- The combined gas and CSG/LNG sectors are expected to generate revenue of \$8.9 billion in 2011-12, about 0.2% of Australia's GDP. The annual revenue growth over the past five years was 5.1%, and is expected to be 6.4% for the coming five years.
- CSG projects are expected to stimulate an increase in Queensland's economy by \$3 billion annually once the projects are fully operational.
- The Australian Government's \$126 million Emerging Renewables Program will support promising new renewable energy and enabling technologies and reflects the Australian Centre for Renewable Energy (ACRE) Board's Strategic Directions.
- The telecommunications, electrical and electronic equipment wholesaling sectors are expected to generate revenue of \$26 billion in 20101-2012, about 0.6% of Australia's GDP. The annual revenue growth over the past five years was 1.6%, and is expected to be 2.4% for the coming five years.
- At the start of 2012, 26 electricity generation projects ranged from proposed stage to final investment decision in Queensland, generating 11,000MW with projected future employment for 12,500 people.
- At the start of 2012, 22 resources mining projects ranged from proposed stage to final investment decision in Queensland, with projected future employment for 78,000 people.

QUEENSLAND INDUSTRY TRAINING PROFILE

- Overall commencements in trainee and apprenticeships for the total energy and telecommunications industries in the first three quarters of 2011-12, has decreased by 8.5% compared to the first three quarters of 2010-11, with currently 7,750 apprentices and trainees in-training.
- In addition, over the past five years, approximately 7,500 persons a year applied for fee-for-service training in the energy and telecommunications industries.

- The apprentice and trainee contract completion rate in 2010 for the electrotechnology and telecommunications industries, for students commenced in 2005 and 2006, was on average 55%, whereas individual completion rates averaged at 67%¹.
- The average apprentice and trainee contract termination rate in 2010 for all training packages in the energy and telecommunications industries, for students commenced in 2005 and 2006, was 39%.
- Over the past five years, approximately 16,000 students' commenced apprentices or traineeships in the energy and telecommunications industries (see Table 2 Table 18), and approximately 10,000 completed.
- There is a critical shortage of technical trainers for the industry as training organisations are unable to compete with industry to recruit skilled tradespeople into training roles.

Table 2: Apprenticeship and trainee data by region for the Queensland energy and telecommunications industries (based on Skills Queensland data)

Apprenticeship and Trainee data Queensland for the energy and telecommunications industries by region	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012*
Commencements					
Central Queensland	500	400	400	500	500
Darling Downs South West	200	200	200	200	200
Far North Queensland	300	200	200	200	200
Metropolitan	1400	900	900	1100	900
North Coast	600	500	400	500	300
North Queensland	400	300	200	300	300
South East	1100	700	500	700	500
Total	4,400	3,100	2,800	3,500	2,800

*Numbers for 2011/2012 are ESQ forecasted numbers based on the existing data of the first three quarters.

ENERGY SKILLS QUEENSLAND KEY ACHIEVEMENTS 2011 - 2012

Industry Based Workforce Planning

Energy Skills Queensland has completed a number of highly successful industry funded research and workforce planning projects to identify future skilling issues and shortages. These include the following;

- Electrical Contractors Industry Workforce Plan
- Electricity Supply Industry Environmental Scan
- Renewable Energy Industry Workforce Plan
- Skills for a Low Carbon Economy Report
- CS Energy Workforce Plan - Callide

This research has enabled Energy Skills Queensland to work with these industry sectors to assist them to develop their workforces to meet future demand.

CSG to LNG Skills Formation Strategy

In 2009 Energy Skills Queensland embarked upon the CSG to LNG Skills Formation Strategy. As part of this strategy, Energy Skills Queensland worked closely with the four principal gas proponents (Arrow, Origin, QGC and Santos) to establish the CSG/LNG Skills Taskforce. Energy Skills Queensland and the CSG/LNG Taskforce

¹ The 2005 and 2006 cohorts are used as they are the latest cohorts available with a full completion of apprenticeship and traineeship as these cohorts have completed in 2009/2010.

has developed and implemented numerous workforce planning and workforce development strategies for this industry including the following;

- CSG/LNG Operations Workforce Plan
- CSG/LNG Construction Workforce Plan
- CSG/LNG Training Program
- CSG Drilling Skills Program
- Gladstone Workforce Skilling Strategy
- Queensland Workforce Skilling Strategy
- CSG Generic Induction

CSG Drilling Skills Strategy

This program was designed by Energy Skills Queensland and the Drilling Industry Leaders Group to attract and train suitable new workers to the growing Coal Seam Gas Drilling Industry. To date, 158 participants have been trained (approximately 50% indigenous) and 125 participants have been placed into jobs.

Gladstone Workforce Skilling Strategy

This program was designed by Energy Skills Queensland and local employers in the Gladstone region to attract and train local Gladstone people for the emerging opportunities created by the LNG industry. To date, 172 people have been trained (approximately 25% indigenous) and 104 have been placed into jobs.

Telecommunications New Entrant Program

This program was designed by Energy Skills Queensland and the telecommunications industry to attract and train 130 people in the Ipswich/Logan and Toowoomba regions and place them into employment and further training in the telecommunications industry. Of these participants, 44 have been placed into employment to date with more to be placed over the next three months.

Strategies to Increase Apprenticeships

Though our industry engagement process Energy Skills Queensland is in the process of developing a number of strategies to increase the number of apprentices in Queensland. Current strategies include;

- Electrotechnology Pre-Apprenticeship Program (provides training in Certificate II in Electrotechnology and then works with employers to place participants into electrotechnology apprenticeships).
- Apprentice Incubator Program (designed to stimulate large energy and mining companies into employing 1st year apprentices by hosting them with an electrical contractor for the first two years to reduce the safety, supervisory, accommodation and travel burden for the energy or mining company).

Strategies to Up-skill Existing Workers

- Productivity Places Program – Training in high demand skills for over 3,000 existing workers and 1,000 job seekers in the energy and telecommunications industries.
- CSG/LNG Training Program – Training in high demand skills for up to 1,000 existing workers in the CSG/LNG industry.
- Energy Skills Solutions – An energy industry version of Skilling Solutions Queensland designed to promote skill recognition and gap training for energy workers.
- Electrician to Electrical and Instrumentation Technician Program – Target 115 existing licensed electricians and up-skill them in the Certificate IV in Instrumentation to enable them to become dual trade qualified.
- Electrician to Lineworker Program - Target 70 existing licensed electricians and cross skill participants in the Certificate III in Electricity Distribution to enable them to become dual trade qualified.
- Transmission Lineworker Training for Riggers - Energy Skills Queensland in partnership with Balfour Beatty UGL have developed a program to up-skill transmission tower riggers into transmission Lineworkers.

Electricity Supply Industry Electronic Skills Passport

Energy Skills Queensland is working with all 19 Electricity Network Operators across Australia to develop and operate the Electricity Supply Industry (ESI) Skills Passport Database. This web based database centrally stores a range of information and training records for all skilled workers in the electricity transmission and distribution industry.

Coal Seam Gas Generic Induction (CSG GI)

Energy Skills Queensland, in partnership with the four main gas proponents, is developing a Coal Seam Gas Generic Induction for contractors working in the industry. The CSG GI will provide a generic safety induction for all contractors working on coal seam gas sites. The aim of this training program is to improve the overall safety knowledge associated with the coal seam gas industry, as well as minimise duplication of induction across the industry.

Sustainable Energy Skills Formation Strategy

Heralded as one of Queensland's most successful skills formation strategies, the Sustainable Energy Skills Formation Strategy has achieved many positive outcomes. In June 2009 the strategy established the Queensland Energy Efficiency Industry Leaders Group (QEEILG). The mission of this industry group is to develop the capacity and ongoing capability of Queensland's sustainable energy in the built environment industry workforce, to help Queensland achieve a low emissions future.

Skills for a Low Carbon Environment

This project has focussed upon developing key training and assessment resources for the sustainable energy industry and provides professional development for trainers delivering these specialist training programs. Energy Skills Queensland has partnered with SkillsTech Australia and the QEEILG to deliver this important project.

Careers in Energy and Careers in Gas Websites

These two websites have been developed to provide a range of career advice and information to people seeking to enter the energy industry or existing workers seeking to further develop their careers. The websites also have a jobs board facility with many jobs available in the energy and resources industries.

CRITICAL ISSUES FACING THE ENERGY AND TELECOMMUNICATIONS INDUSTRIES 2012 - 2017

Critical Issue One: Increase in demand of critical skilled roles to 2017

The ongoing investment in Queensland by the mining and resources sectors has increased the forecasted need for skilled labour across the state. A number of critical roles, which typically have long education and training times i.e., four + years, will require the greatest investment from both the government and the private sector to ensure that the "boom" can continue productively and sustainably.

The increase in demand for skilled labour is likely to impact regional centres most, in particular in Central Queensland and the Darling Downs and Fitzroy areas, where there is a lot of activity from mining and coal seam gas projects. The need to find not just skilled labour, but also the correct number of workers is likely to pose the biggest challenge to business involved in, and affected by, the increased activity. Further details of the critical skills sets are listed in the next section of this report.

Critical Issue Two: Not enough electrical apprentices completing, in training or commencing

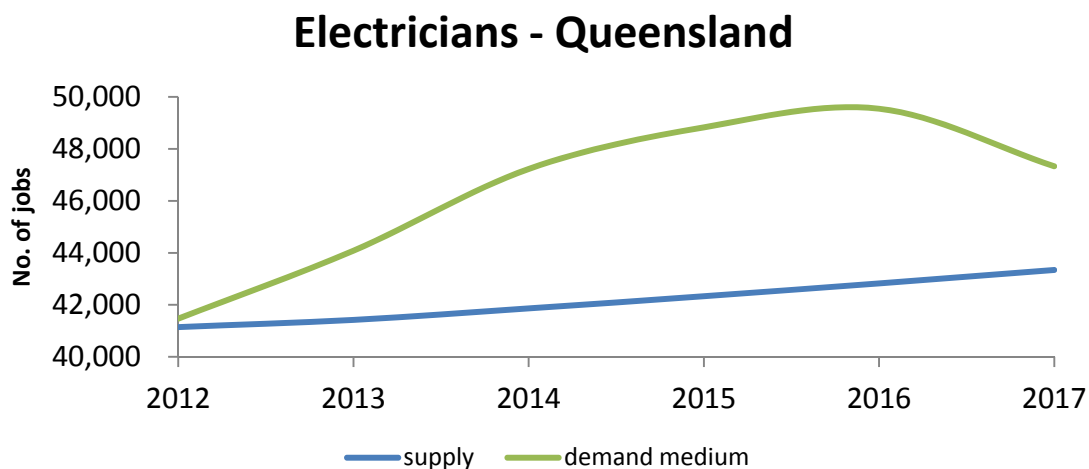


Figure 1: Energy Skills Queensland forecast of supply and demand of electricians for Queensland

As shown in Figure 1, Queensland is going to see a shortfall of around 7,500 licensed electrical workers over the next five years. With only 8,000 apprentices currently in training, in real terms only 1,500 apprentices complete each year when completion rates are factored in. This number has already been taken into account when forecasting the supply, as well as retirement and industry attrition. It therefore indicates the sheer numbers of shortfall of future trained electrical workers. It is expected this shortfall will impact all licensed electrical trade roles.

There is some contention around the current completion rate percentage, with different data sources reporting between 64% and 80% (NCVER and DET respectively). Regardless of which is the 'correct' calculation, the number of apprentices completing each year has remained steady at an average of 1,500 new electricians per year, over the last 5 years. This number is calculated into the supply line in the 5 year forecast and indicates the numbers of apprentices completing will not be enough to meet expected demand.

Large mining and resources companies tend not to employ large numbers of apprentices in terms of electrician to apprentice ratios. There are many reasons cited for this, including safety concerns for inexperienced workers operating on a mine site. However, the greatest barrier is the lack of productivity of a first and second year apprentice when compared to the extra cost of travel, accommodation and supervision on a remote mine site.

Because of this, there is a practice in the mining and resources sectors where larger organisations "poach" apprentices from smaller contractors in the third and fourth year of their apprenticeship. It is clear from Energy Skills Queensland's research that small/medium sized enterprises employ a higher percent of apprentices when viewed as a percentage of business size. This does not help the broader industry develop skills and has the potential to cause contraction of apprenticeship numbers as smaller contractors become increasingly disillusioned with employing and training apprentices. More must be done by larger organisations to increase apprenticeship numbers, especially in years one and two of the apprenticeship.

Cost of training apprentices has also been cited as a major barrier to employing more electrical apprentices. This is further exacerbated by smaller business not able to compete on wages with larger resource and mining organisations.

Critical Issue Three: Ageing population creating knowledge loss from industry

It is well known in the industry that there is an ageing workforce of licensed electrical workers. With approx 45% of the electrical workforce eligible to retire in the next ten years, it is the “middle” career workers currently aged 35 – 45 who will be needed to fill those roles. Movement of this group into the managerial and para-professional roles is also likely to impact the number of experienced blue collar workers in the field. This could have both productivity and health and safety implications. Since there is a dip in workers of the 35 – 45 age grouping, it can be assumed that there will not be enough knowledge to fill both experienced blue collar and managerial/para-professional roles needed to operate in the industry when retirements increase.

More action is needed at industry and enterprise level to transition knowledge from ‘individual’ to ‘institutional’ power. This transition could be in the form of, for example, increased training numbers, improved mentoring and coaching schemes, or development of interactive industry case studies.

Critical Issue Four: Regional Impacts of the Energy and Resources Boom

The impacts of the increased investment in Queensland will be most keenly felt by regional areas such as the Bowen Basin, Surat Basin, Galilee Basin, Gladstone and Mackay. Growth in these areas will provide great opportunities and potential threats which need to be addressed to ensure there are positive outcomes for local people and businesses. Impacts of increasing populations, fly-in fly-out (FIFO) and drive-in drive-out (DIDO) workers, reduced access to skilled labour, and under-developed infrastructure require forward planning and investment by regional councils, local businesses, and energy and resources companies moving into the regional centres.

Critical Issue Five: Occupational Detachment

Occupational detachment through the loss of skilled workers, particularly tradespersons to other occupations, together with the ageing demographic are the significant contributors to the high level of replacement demand seen across the energy and telecommunications industries. Many regional tradespeople, especially those working in the domestic sector, are reducing the number of apprentices they are employing, or leaving the trade altogether. This is due to the downturn in the domestic and commercial markets as well as increasing wage competition from the resources sector drawing apprentices and trade qualified workers away from traditionally lower salaried roles.

The telecommunications industry is over reliant on the sub contractor model. Once trained an individual has to become a self employed business if they seek work for Austar, Optus, Telstra and associated service providers. The maturity of new entrant trainees is not sufficient for this to occur in most cases without appropriate support.

The ability for already skilled i.e. licensed workers, to gain up skilling in critical areas is key to the increasing skills capability, engagement, and knowledge transfer across the energy and telecommunications industries.

CRITICAL OCCUPATIONS IN DEMAND

There are number of occupations that are deemed to be critical to the energy and telecommunications sectors. Criticality is determined by a number of factors including numbers required, length of time required to train and develop skills, and the availability of appropriately skilled labour. Energy Skills Queensland has identified the following qualifications and skill sets, shown in Table 3, to be critical over the next five years:

Table 3: Critical occupations in demand and their barriers

Critical Skills	Skill or Job Type	Criticality and Current Barriers
Instrumentation Control and Automation	Person competent in install, set up, test, fault find, repair and maintain systems and devices for measurement and recording of physical/chemical phenomenon and related process control.	Defined as critical due to the shortfall in number of electricians required who have these skills and the inadequate numbers currently in training. Currently there is a lack of up-skilling initiatives being marketed to business.
High Voltage Switching	Electrical workers with skills to switch high voltage networks.	Defined as critical due to the shortfall in numbers of trained workers required to meet the demands of the resources boom, particularly in the construction phase of many projects. Must be on the job training which makes it difficult for contractors who are trying to move into this area to obtain experience. The lack of on the job experience in turn influences the ability to successfully tender for work.
Hazardous Areas	Licensed electrical workers can gain specific skill-sets within the field of Electrical Equipment in Hazardous Areas (EEHA). EEHA is a unique environment and often a full qualification is not required. Registered Training Organisations (RTO's) in this environment are often specialists in discrete areas of EEHA and do not offer full qualifications.	Defined as critical due to the shortfall in numbers of trained workers required to meet the demands of the resources boom. Currently there are a limited number of RTO's offering Hazardous Areas training in Queensland as many of the larger proponents run this in-house e.g. Bechtel, John Holland, etc. Without additional investment in this particular skill set, it will be difficult for electrical contractors to successfully tender for work.
VET Trainers and RTO Capacity	Teacher of one or more subjects specific to the electrical trades at TAFE or other training institute, to tertiary students, for vocational education and training purposes.	Defined as critical due to the shortfall in numbers and age profile of the current cohort of qualified VET trainers. Currently, salaries offered are not competitive with on-the-tools occupations. While there are several non-financial benefits such as increased paid leave, this job role is not seen as an attractive career path for practicing electricians. As well as the shortage of VET Trainers, there is also concern over RTO's capacity to increase numbers of apprentices being trained. This is driven by the limited number of RTO's offering the apprenticeship courses.
Services and Maintenance Electricians	Service and maintenance are required to program maintenance, condition monitoring, audits and planning.	Defined as critical due to organizations unable to attract workers into this role due to wage pressures. Services and maintenance roles are one of the lowest paid sectors of the electrical industry. Because of this, retention and attraction into these roles have become increasingly difficult.
Fibre Network Designers	Fibre Network Designers are responsible for the design of telecommunications networks using fibre optic cables.	High risk due to lack of available resources to the increased need driven by the National Broadband Network rollout. This role will remain critical over the next 18 months.

Critical Skills	Skill or Job Type	Criticality and Current Barriers
Estimators	Estimators are responsible for scoping projects and providing a cost analysis of time, equipment and resources, based on which quotes and tenders are made.	Defined as critical due to the specialized nature of the role and the lack of formal development opportunities available. Currently there is a limited number of training courses suited to the electrical industry for the development of Estimators. There is an Estimators course for the building and construction industry which could be adapted for use in the electrical industry.
Lineworkers, including Live Lineworkers	Installs, maintains, repairs and patrols electrical sub-transmission and distribution systems.	Over the next five years there is an expected short fall of approx 3,000 Lineworkers in Queensland. In the longer term to 2021, it is likely this trade will be affected by changes in control technology, and therefore it can be assumed that Lineworkers will need additional skills to perform their duties.
Electrical Engineering Para-Professional	Designs, selects, installs, commissions, maintains and carries out repairs on electronic equipment and systems used in manufacturing, entertainment and defence situations. Equipment includes medical, analogue, digital and communications.	Roles are typically held by experienced 'blue collar' workers who have gained further education e.g. Advanced Diplomas or have progressed through workplace based opportunities. The development of this type of worker is reliant on a strong pipeline of experienced 'middle career' blue collar workers. It therefore can be assumed that recruiting and retaining these roles will become more difficult as competition increases.
Doggers and Riggers	Doggers - Role required for the CSG/LNG industry who are required to select or inspect lifting gear, safely sling a load, or direct a crane or hoist operator in the movement of a load when the load is out of the operator's view. Riggers – Required to assemble and install rigging gear such as cables, ropes, pulleys and winches to lift, lower, move or position machinery, structural steel and other heavy objects.	The increase of well work brought about by the CSG/LNG industry will increase the required numbers of trained Doggers and Riggers, especially across the Surat Basin.
Drillers	Required to move and set up drilling rigs and related equipment, and assist drillers to drill holes for such things as oil, natural gas and water, building foundations, minerals exploration and site investigation.	The increase of well work brought about by the CSG/LNG industry will increase the required numbers of trained and qualified Drillers, especially across the Surat Basin where there is expected to be approximately 30,000 wells sunk over the next seven to ten years. This industry is facing additional pressure with a lack of shared understanding as to what the skill sets and competencies are required for each job role and training inconsistencies exist.
Electrical Engineer	Degree qualification in the application of electricity, including power, electronics, control systems, signal processing and telecommunications.	High risk due to gap created from low supply and high demand across a number of industries in Queensland, the Eastern Seaboard and Western Australia.

Critical Skills	Skill or Job Type	Criticality and Current Barriers
Electrical Fitter/Mechanic	Installs, tests, connects, commissions, maintains and modifies electrical equipment, wiring and control systems.	High risk due to gap created from low supply and high demand across a number of industries in Queensland, the Eastern Seaboard and Western Australia.
Well Servicing	The maintenance procedures performed on an oil or gas well after the well has been completed and production from the reservoir has begun. Well service activities are generally conducted to maintain or enhance the well productivity, although some slickline and coiled tubing applications are performed to assess or monitor the performance of the well or reservoir. Slickline, coiled tubing, snubbing and workover rigs or rod units are routinely used in well service activities	The increase of well work brought about by the CSG/LNG industry will increase the required numbers of operators in Well Servicing, especially across the Surat Basin where there is expected to be approximately 30,000 wells sunk over the next seven to ten years.
Health, Safety and Environment Officers	Responsible for occupational health and safety, environmental management of an organisation.	Whilst numbers of required Health, Safety and Environment Officers are expected to increase slightly, the regional demand of these types of roles has the greatest impact in determining criticality.
Lead Hand/Supervisor Skills	The common directive of this job-role is to coordinate day-to-day production requirements. The Lead Hand will accomplish this through directing the work flow and communicating with the other supervisors and staff to deliver the products/projects on time. Lead Hands need to respond with the appropriate urgency and provide solutions, be responsible to ensure safe work practices are followed, and will train employees in this regard as well.	Defined as critical due to the lack of formal development opportunities for workers at this level. The current training program available is too generic for the electrical industry and is state registered course (not in a national package) which means it does not qualify for funding in State or Federal skilling programs. The training required could include project costing, people management, project management, and risk assessment as an example.

ENERGY SKILLS QUEENSLAND'S SKILLING AND WORKFORCE DEVELOPMENT PLAN 2012 – 2013

Queensland Workforce Skilling Strategy

In the 2012/13 financial year, Energy Skills Queensland will combine the successes of our industry focussed CSG Drilling Skills Program, with our regionally focussed Gladstone Workforce Skilling Strategy to create the Queensland Workforce Skilling Strategy. This strategy will target up to 1,000 unemployed and under-employed people from high unemployment (skill surplus) regions of Queensland and provide them with work readiness and vocational skills training with a minimum target of 65% participants to be placed into employment in low unemployment (skill shortage) regions of Queensland.

The vocational skills training will be performed in skill shortage areas that have been identified by our research and industry engagement and may include the following:

- CSG Drilling
- Well Workover and Servicing
- Electrotechnology
- Engineering
- Camp Operations
- Asset Maintenance
- Construction

The participants will be attracted from the identified skill surplus regions which may include the following:

- Cairns
- Rockhampton
- Bundaberg
- Gympie
- Fraser Coast
- Sunshine Coast
- Ipswich/Logan
- Brisbane
- Toowoomba

The employment opportunities will predominantly be targeting the energy and resources industries located in the identified skill shortage regions which may include the following:

- Surat Basin
- Bowen Basin
- Galilee Basin
- Gladstone
- Mackay

Strategies to increase the number of apprentices

Due to the projected shortfall of 7,500 electrotechnology tradespeople by 2016, Energy Skills Queensland, in partnership with industry, will develop and implement a range of strategies to increase the number of commencing and completing apprentices. Energy Skills Queensland expects that these strategies could include the following:

- Apprentice Incubator Program – This program is designed to stimulate large energy and resources companies into employing 1st year apprentices by hosting them with an electrical contractor for the first two years to reduce the safety, supervisory, accommodation and travel burden for the energy or mining company).
- Competency Based Progression Model - Energy Skills Queensland proposes to work with national industry skills council, EE-OZ Training Standards, and key industry stakeholders to implement an effective method of enabling electrotechnology apprentices to progress through their apprenticeship as they become competent at the various stages, rather than a time based process.

- Electrotechnology Pre-Apprenticeship Strategy – Energy Skills Queensland seeks to continue this highly successful model in 2012/13. This strategy recruits high quality candidates, provides training in Certificate II Electrotechnology and then works with employers to place participants into electrotechnology apprenticeships).
- Alternative Apprenticeship Pathways – Energy Skills Queensland seeks to work with the energy industry, governments and key industry stakeholders to explore and pilot alternative apprenticeship pathways in an attempt to significantly increase the number of apprentices being trained in Queensland.

Strategies to up-skill existing workers

Due to the need for energy companies to develop the specialist skills of their existing workforce, Energy Skills Queensland will continue to be involved in the following up-skilling activities;

- Drilling Industry Skills Upgrade Program – This program will work with drilling companies to assist them to up-skill their workforce to improve safety, productive and supervision of inexperienced workers. This program will also allow participants to progress up the occupation classification structure to enable more “greenhands” to enter the industry at the lower classification levels.
- Electrician to Electrical and Instrumentation Technician Program – Due to the impending shortage of instrumentation technicians Target 120 existing licensed electricians and up-skill participants in the Certificate IV in Instrumentation to enable them to become dual trade qualified.
- Electrician to Lineworker Program – Due to the impending shortage of lineworkers in Queensland this program will target 70 existing licensed electricians and cross skill participants in the Certificate III in Electricity Distribution to enable them to become dual trade qualified.
- Energy Skills Solutions – An energy industry version of Skilling Solutions Queensland designed to promote skill recognition and gap training for energy workers.
- A dual refrigeration - electrical trade qualification with the aim to list as a declared apprenticeship to meet the needs of the refrigeration and heating, ventilation and air-conditioning industry in Queensland.

Apprentice advisor project

In 2012/13, Energy Skills Queensland, in partnership with Master Electricians Australia will deliver the ApprenticeConnect Australia Apprentice Advisors project. This project is designed to provide career advice to people seeking to gain an apprenticeship in the energy and telecommunications industries. Energy Skills Queensland’s established Careers in Energy website and jobs board will be the basis of this strategy with a range of promotional and social media components targeting young people seeking to enter the industry. This will be achieved through extensive promotion at careers expos and school visits by Advisors to promote energy apprenticeships.

Workforce planning

Energy Skills Queensland will seek to complete a number of important industry and enterprise based workforce planning projects in the 2012/13 financial year.

The CSG drilling industry is one sector that needs a much better understanding of its current and future workforce needs, required skill sets, skills demand and supply analysis and recommendations regarding future workforce development strategies needed by the industry.

A series of workshops on the delivery of workforce planning has also been planned for delivery in 2012-13 and aims to up-skill small to medium business in delivering effective plans which respond to increasing skills shortages.

KEY RECOMMENDATIONS

The culmination of Energy Skills Queensland's research and industry engagement over the last 12 months has produced the following recommendations:

Addressing the increase in demand for skilled workers

- Prioritise funding for vocational education and training for skills that are in high demand and essential to the development of Queensland's economy. Continue to provide funding for workforce development activities on a demand driven model, with funding available for strategic intervention programs where major emerging skill shortages have been identified e.g. Strategic Investment Fund.
- Planning and mapping of future skills requirements is critical for organizations to truly leverage the benefits of the boom in Queensland. This is particularly true for regional Queensland where there is expected to be even greater levels of skills scarcity. Energy Skills Queensland recommends that funding and support should be made available to enable small and medium sized businesses to develop appropriate workforce planning strategies to address the urgent skills needs.
- Currently, there is a large amount of 'big' picture research that indicates the potential shortages in the industry, but there is no 'big' picture approach especially when it comes to apprenticeship training and up skilling of current electricians. Energy Skills Queensland recommends a task force be established with representation from industry, government and Energy Skills Queensland, with the prime target of increasing apprentice numbers.
- Stronger industry engagement and input into skilling strategies at senior levels is needed to ensure that Energy Skills Queensland, along with other industry bodies deliver a whole of sector approach to the skills shortages. Broader representation from all sectors is needed to ensure that the continuous improvement process of our competencies and skills development align to training packages, with the aim of improving skills sets and productivity within the workforce.
- Investment in the development of a drilling and well servicing workforce plan to address the critical issues of increasing workforce numbers, increasing consistency of qualifications and skills sets required, and improve specific induction for CSG drilling to decrease the risk of ongoing health and safety incidences.
- There is also a need to establish a CSG training facility that enables trainee drillers to gain practical training on an actual drill rig to develop these skills in a safe, simulated environment.
- Further investment in creating opportunities for unskilled workers is required through investment in programs which deliver job ready people with entry level skills sets, to reduce the initial burden on employers.
- The loss in productivity due to pulling workers away from on the job delivery is a key driver for the under-development of the current electrical workforce in Queensland. More support is needed to help employers up skill current workers in key roles such as lead hands and supervisors, estimators, and advanced diplomas in electrotechnology.
- Greater focus on employment and training programs that train new workers from skill surplus regions, and place them into jobs in skill shortage regions e.g. Queensland Workforce Skilling Strategy.
- Funding such as Skills Queensland's Strategic Investment Fund (SIF) should continue as it is critical to encouraging organisations to develop a skilled workforce to deliver the resources boom.

Increasing apprenticeship and traineeship numbers

- Discussion is needed to establish whether the electrical trade should remain at Certificate III, or if it should be increased to Certificate IV requirements. This issue has been raised by industry and suggests the current Certificate III level does not contain enough competencies to meet the demands and needs of industry.
- Further investment/initiatives are needed in secondary schools to increase awareness of the benefits of completing an electrical trade and working in the electrical industry. Raising the profile of the electrical trade in Queensland is an important component of attracting quality applicants into the sector.
- Provision of additional subsidies is required to incentivise small to medium enterprises to train more apprentices. The aim is to increase the pipeline of trade qualified people entering the resources industry to assist in both the construction and operation phases of development. It is clear that industry has under-invested in apprenticeship over the last five years, and more involvement from all parties is needed to address this critical need.

- The current apprenticeship system will not meet the needs of projected demand given the current growth within the mining and resources sector and further innovation is required to meet the upcoming skills needs for Queensland. While the system works well, and should continue its current form, a number of different pathways are required to build apprenticeship numbers and increase the pool of quality applicants.
- Better industry support of competency based progression of electrotechnology apprenticeships is needed to encourage apprentices to complete at their own pace.
- Review of apprenticeship training pathways to allow training organisations to enrol persons in apprenticeship competencies outside of an apprenticeship. These would be competencies that do not require on the job training.

Addressing the ageing population and potential occupational detachment of industry

- Increased investment in building flexible pathways to retirement is critical. There is a lot of analysis and understanding of this issue however not enough action is undertaken within the energy and telecommunications sectors to mitigate this risk.
- Mature age pathways into the mining and resources sectors need to be improved. The process for workers, who have skills which can be accessed through Recognition of Prior Learning (RPL), needs to be more clearly defined. The lack of simplicity is currently forming a barrier to entry of skilled and semi-skilled labour e.g., for light vehicle mechanics to upgrade to heavy diesel mechanics.
- Increased investment in training and development of mature age workers e.g. training and assessment certifications is needed to increase the effectiveness of knowledge transfer from these workers. This could also keep skilled workers contributing to the trade for longer.

Increasing VET trainer numbers in critical trade roles

- A critical review of current remuneration options for technical trainers is urgently needed to encourage a broader pool of applicants and to increase employer options in employment decision making.
- As with remuneration, more flexibility in employment options for technical trainers should be available, including part-time, secondment arrangements and contract based employment.
- As a recommendation to address the difficulty in attracting more technical trainers, Energy Skills Queensland suggests providing more information and training to tradespeople between the ages of 40 and 55. Energy Skills Queensland's research indicates this age group is when tradespeople are most likely to consider moving into a training role.

WORKFORCE PROFILE

2011-12 INDUSTRY WORKFORCE OUTLOOK

Changing workforce profiles

The energy and telecommunications industries in Queensland currently employ 148,000 people and this number is expected to grow by 6% over the next 12 months as can be seen in Figure 2, similar to the national employment as shown in Figure 3.

Some of this anticipated growth can be directly attributed to the expected growth in Queensland's resource-led recovery with significant new investments and Final Investment Decisions (FID) into mining, minerals, gas and other energy projects increasing the demand for skilled workers.

The energy and telecommunications industries in Queensland are experiencing high replacement demand. Australia has an ageing workforce and with the current pension age of 65 years and increasing life expectancy, the federal government has already implemented a structure for increasing the pension age to 67 years by July 2023. However, many of the more physical jobs, particularly in the technical and trades profession, will experience lower retirement ages. Occupational detachment through the loss of skilled workers, particularly tradespersons to other occupations, together with the ageing demographic are the significant contributors to the high level of replacement demand seen across the energy and telecommunications industries.

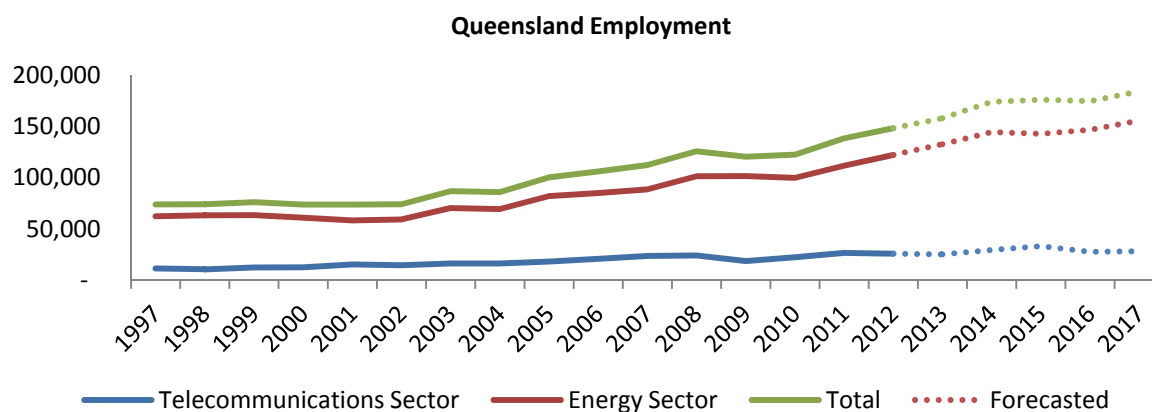


Figure 2: Employed persons for the Energy and Telecommunications Industry for Queensland

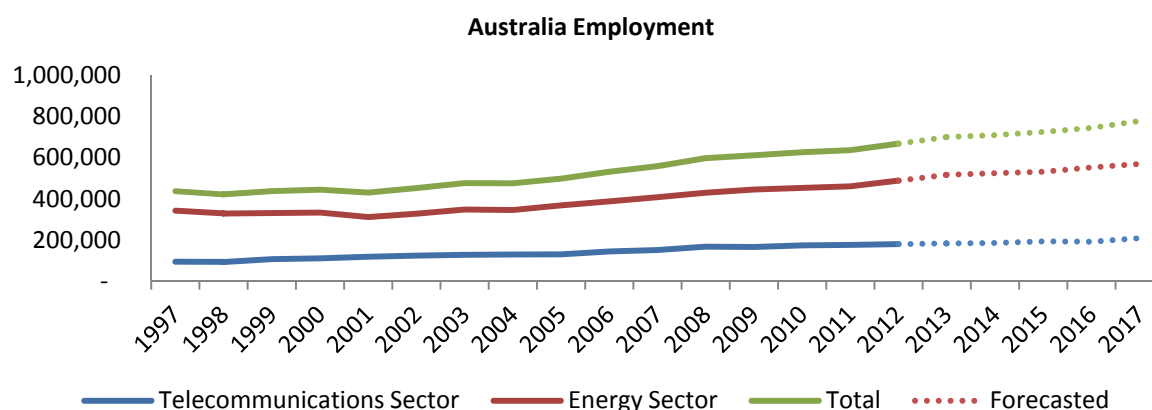


Figure 3: Employed persons for the Energy and Telecommunications Industry for Australia

VET and higher education pathways

Better engagement of higher education providers is needed in training package development, along with better alignment of VET qualifications and higher education qualifications – particularly where there is certification and regulation, practice and theory. These alignments are expected to help the industries access target groups for participation, especially women returning to work who have higher education awards and who need up-skilling to contemporary technical specifications and methodologies.

It has also been suggested that there are inadequacies in Queensland's regional training centres with a lack of synergy between the training offered and the skill sets required in the short and long term. The strategic direction of many of these institutions, in terms of what needs to be offered in the now and into the future, is not always in line with the needs of existing and emerging industry, which is further impacted by the lack of technically qualified trainers.

For example, Energy Skills Queensland has been working unsuccessfully for some time to get the Certificate IV in Instrumentation and Control delivered in regional centres such as Gladstone and Townsville. A definite lack of capability in these regional centres further complicates the development of these high demand skills. Energy Skills Queensland supports greater collaboration between training organisations in regional centres to build training capability where it is needed.

Energy Skills Queensland strongly supports the development of the foundation skills as complementary to the development of vocational skills and continues to promote the necessary levels of language, literacy and numeracy (LL&N). EE-Oz Training Standards reports that students who have achieved the required levels of LL&N have roughly 75% fewer non-completions (EE-OZ, 2012).

VET trainers

The need to up-skill existing trades and technicians into trainers to deliver and assess qualifications is critical to ensuring students complete with contemporary skills and knowledge in technologies and applications and to assure the industry that quality training is being delivered.

Strong competition amongst employers for energy sector skills is preventing RTOs from recruiting experienced practitioners into technical training roles. This is affecting the ability of training organisations to increase capacity in key qualifications for which skills shortages have been identified and in areas of emerging skill demand.

Publicly funded training organisations in particular, report that pay scales which do not distinguish between the technical skills of trainers, fail to acknowledge the reality that VET trainers operate as dual professionals; required to maintain both technical and pedagogical skills. While RTO trainer remuneration fails to keep pace with the market demand for technical skills, RTOs will be unable to selectively recruit. This negatively affects the perception of training roles, the quality of new entrants into the field and outcomes for students.

Technical trainers within RTOs also advise that there is a huge learning curve from full time technical work to full time teaching, which discourages industry practitioners from pursuing training roles. Many advise that a lack of support at this time is a cause of discomfort, which drives many new trainers back into technical roles. Given the difficulty in recruiting new entrants and the demonstrable advantages in terms of training outcomes of establishing higher level teaching skills, this is a problem that has to be addressed.

A survey undertaken by Energy Skills Queensland in 2012, and previously in 2009, has given some insight in the reasons why current tradespersons are, and are not, interested in becoming a VET trainer. In 2009, only 3% of respondents who were leaving their current role intended on becoming a trainer, with this figure reducing to 2% in 2012. This critical skill pipeline is one that further investigation to fully understand the training skills shortages in the electrical industry. A shortage in this area could severely impact the number of new apprentices that can be trained to enter the electrical industry both in Queensland and across Australia.

The survey also addressed the question whether or not respondents had ever considered becoming a trainer. The response in 2009 was 43% for 'yes', while in 2012 this reduced to only 38% responded 'yes'. The overwhelming reason given by respondents who do not want to become a trainer was that they wouldn't like the job, or believed the job wouldn't suit them (46%). The second and third reasons were that respondents believed they did not possess the required knowledge to become a trainer (20%) and that the wages were too low (19%).

As a recommendation to address the difficulty in attracting more technical trainers, Energy Skills Queensland suggests looking at the option to provide more information and training to tradespeople between the ages of 40 and 55, as well as critically reviewing the remuneration options for technical trainers.

Greater flexibility of employment arrangements are also recommended, particularly using the option of employing trainers under external contractor agreements. This would encourage more technical practitioners into part-time training roles while still working in their technical profession.

Apprenticeships and traineeships

Completions, for both traineeships and apprenticeships, are used as a performance indicator for the national VET system, and low completion rates have been of concern for many years. In 2011, the NCVER examined the impact of wages on the probability of completion. They found that differences between the training wage, the wage in alternative employment and the wage on completion had a limited effect on completion (Karmel & Mlotkowski, 2011).

For apprentices it was the premium attached to becoming a qualified tradesperson upon completion that mattered. The NCVER 2010 Annual Report² (NCVER, 2011) on apprentices and traineeships shows positive trends generally. The results include:

- Overall commencements increased from 2009 to 2010 by 15.7%, with trade commencements up 21.9%.
- The completion rate for contracts of training commenced in 2005 was 46.2% for trade apprentices and trainees and 52.2% for non trade apprentices and trainees.
- Attrition rates from contracts within the first twelve months for apprentices and trainees have remained steady between 2003 and 2009, ranging from 30.5% to 32.9%.
- 30.1% of trade apprentices and trainees completing at certificate III and above in 2010 finished their training in two years or less, compared with 20.8% in 2000.

There are a large number of significant projects simultaneously occurring both in Australia and overseas which is increasing both national and international competition for skilled workers with many overseas projects reporting the same skills shortages as those demanded in Australia. Where demand is allowed to outstrip supply, labour costs will increase as will the incidence of poaching key personnel, eventually resulting in projects performing poorly beyond planned budgets and timescales, or failing to be realised at all.

The reduction of the available workforce, due to retirement, has been further exacerbated by the increasing cancellation and withdrawal numbers of apprenticeships and high cancellation numbers. For example, there has been a steady decline of electrotechnology apprentices over the past three years. Apprentice commencements in 2009, 2010 and 2011, were approximately 30% lower than 2008. The impact of this will be that 30% less apprentice completions will occur during 2012, 2013 and 2014. This will also coincide with the peak workforce demand from the energy and resources boom, creating a significant shortfall between the demand and supply of tradespeople.

Electrical supply industry (ESI) organisations, Ergon and ENERGEX play a vital role in training electrical apprentices in Queensland. If both organisations were to train external apprentices in a training organisation capacity, the funding available to both companies would increase under the current funding structures. With Ergon discontinuing the training of external apprentices, it has placed added pressure on the number of apprentices who can be trained as lineworkers in Queensland. SkillsTech Australia, in partnership with ENERGEX EsiTrain, will commence training of ESI apprentices in 2012. However, this is still likely to lead to a

² The NCVER 2011 Annual Report has not been released yet, however Energy Skills Queensland analysis shows no significant change for these numbers over 2011.

reduced supply of qualified trade workers due to cost and available places. For the ESI contractors to train apprentices through this partnership, there is an indication that there will be increased costs without a guarantee of places being available for training. This could act as a deterrent for smaller ESI contracting organisations to train apprentices in Queensland.

If Ergon and ENERGEX were to discontinue their training organisation status, and act as the employer only, it can be assumed there will be a serious impact on the number of apprentices who will complete, and therefore impact the future supply of qualified tradespeople.

Energy Skills Queensland's forecasts indicate that there will be a major shortage of professionals and paraprofessionals in the engineering, electrotechnology and construction trades, estimating that the energy and telecommunications industries alone will need approximately 40,000 new employees over the next five years. If these were to come from training alone, the current attrition rate of roughly 40% would mean approximately 49,000 apprentices across all related trades will have to enrol in the coming years. In the past five years, 16,000 students commenced apprentices or traineeships, and 10,000 completed. If the industry is to meet the projected workforce requirements, a significant uptake of apprentices and trainees is required.

A potentially discerning trend is visible in the telecommunications industry (see Table 4) as commencements have dropped from 900 in 2007-08 to 100 in 2010-11. This drop however is not an effect of actual reduced interest from students, but the effect of a reformulation of the ICT training packages, and the move of certain qualifications to the ICA and ICB training packages. The major impact comes from the superseded ICT40102 and ICT30102 that are no longer present under the ICT training package after 2009.

Though overall completions for the electrotechnology sector have increased over the past years, commencements have been reduced, and as a result completions are expected to drop in the following years.

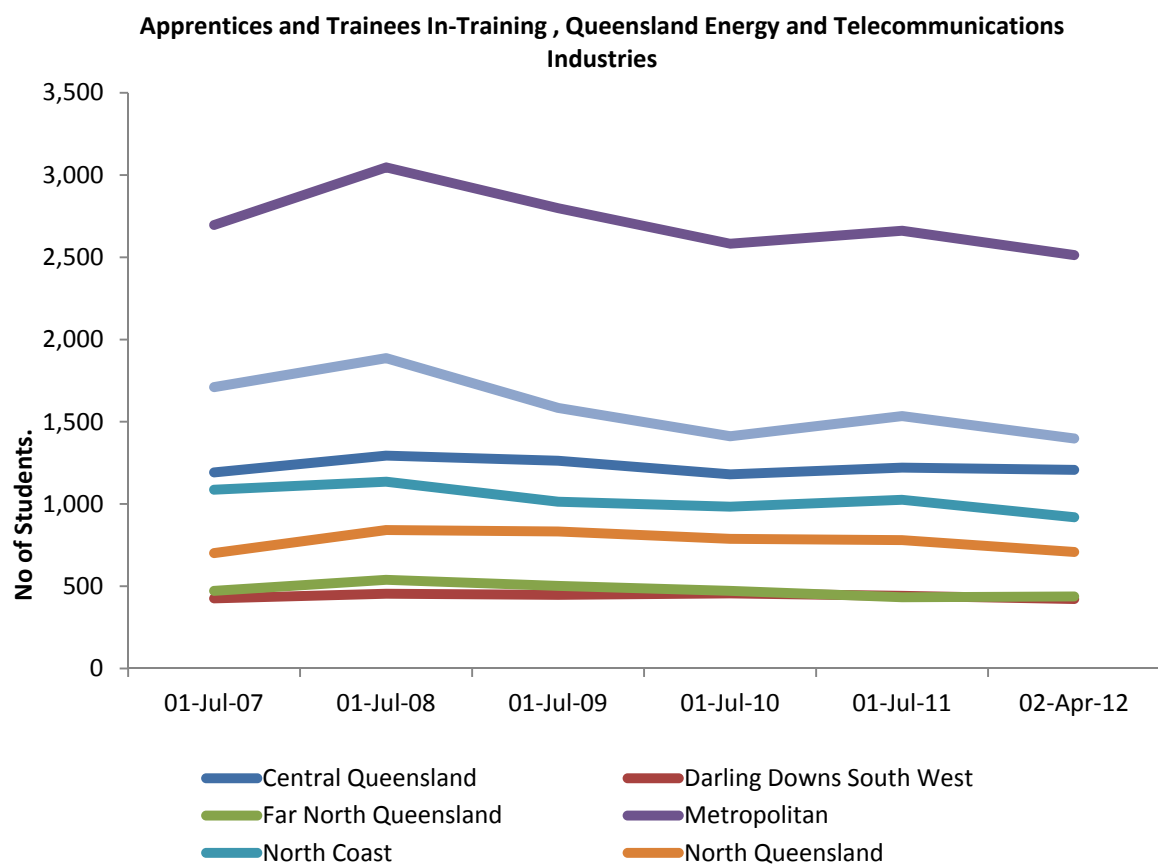


Figure 4: Apprentices and trainees in training in Queensland by region (based on Skills Queensland data).

Table 4: Apprenticeship and trainee data by industry for the Queensland energy and telecommunications industries (based on Skills Queensland data)

Apprenticeship and trainee data Queensland for the energy and telecommunication industries by industry sector	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012*
Commencements					
Communications - General	900	600	100	100	100
Utilities - Electrotechnology	3400	2400	2600	3300	2500
Utilities - Gas	0	0	0	0	0
Utilities - General	200	100	100	100	100
<i>Total</i>	<i>4,400</i>	<i>3,100</i>	<i>2,800</i>	<i>3,500</i>	<i>2,800</i>
Cancellation/Withdrawal/Contract expiry					
Communications - General	500	400	100	0	0
Utilities - Electrotechnology	1200	1200	1100	1200	1100
Utilities - Gas	0	0	0	0	0
Utilities - General	0	0	0	0	0
<i>Total</i>	<i>1,700</i>	<i>1,700</i>	<i>1,200</i>	<i>1,200</i>	<i>1,200</i>
Completions					
Communications - General	500	400	200	100	0
Utilities - Electrotechnology	1200	1700	1800	1900	2100
Utilities - Gas	0	0	0	0	0
Utilities - General	100	100	100	100	100
<i>Total</i>	<i>1,700</i>	<i>2,200</i>	<i>2,200</i>	<i>2,100</i>	<i>2,200</i>
In-Training					
As at	1-Jul-08	1-Jul-09	1-Jul-10	1-Jul-11	14-Sep-34
Communications - General	600	300	100	100	200
Utilities - Electrotechnology	8100	7600	7300	7500	7000
Utilities - Gas	0	0	0	0	0
Utilities - General	500	500	500	500	500
<i>Total</i>	<i>9,200</i>	<i>8,400</i>	<i>7,900</i>	<i>8,100</i>	<i>7,600</i>

*numbers for 2011/2012 are ESQ forecasted numbers based on the existing data of the first three quarters

Table 5: Apprenticeship and trainee data by region for the Queensland energy and telecommunications industries (based on Skills Queensland data)

Apprenticeship and trainee data Queensland for the energy and telecommunication industries by region**	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012*
Commencements					
Central Queensland	500	400	400	500	500
Darling Downs South West	200	200	200	200	200
Far North Queensland	300	200	200	200	200
Metropolitan	1400	900	900	1100	900
North Coast	600	500	400	500	300
North Queensland	400	300	200	300	300
South East	1100	700	500	700	500
<i>Total</i>	<i>4,400</i>	<i>3,100</i>	<i>2,800</i>	<i>3,500</i>	<i>2,800</i>
Cancellation/Withdrawal/Contract expiry					
Central Queensland	200	200	100	100	200
Darling Downs South West	0	100	100	100	100
Far North Queensland	100	100	100	100	100
Metropolitan	500	500	300	400	300
North Coast	300	300	200	200	200
North Queensland	100	100	100	100	100
South East	500	500	300	300	200
<i>Total</i>	<i>1,700</i>	<i>1,700</i>	<i>1,200</i>	<i>1,200</i>	<i>1,200</i>
Completions					
Central Queensland	200	300	300	300	300
Darling Downs South West	100	100	100	100	100
Far North Queensland	100	100	100	100	100
Metropolitan	600	700	700	700	800
North Coast	200	300	200	200	200
North Queensland	100	200	200	200	200
South East	400	500	400	400	500
<i>Total</i>	<i>1,700</i>	<i>2,200</i>	<i>2,200</i>	<i>2,100</i>	<i>2,200</i>
In-Training					
As at:	1-Jul-08	1-Jul-09	1-Jul-10	1-Jul-11	2-Apr-12
Central Queensland	1300	1300	1200	1200	1200
Darling Downs South West	500	400	500	400	400
Far North Queensland	500	500	500	400	400
Metropolitan	3000	2800	2600	2700	2500
North Coast	1100	1000	1000	1000	900
North Queensland	800	800	800	800	700
South East	1900	1600	1400	1500	1400
<i>Total</i>	<i>9,200</i>	<i>8,400</i>	<i>7,900</i>	<i>8,100</i>	<i>7,600</i>

*numbers for 2011/2012 are ESQ forecasted numbers based on the existing data of the first three quarters

** For regions see figure 5

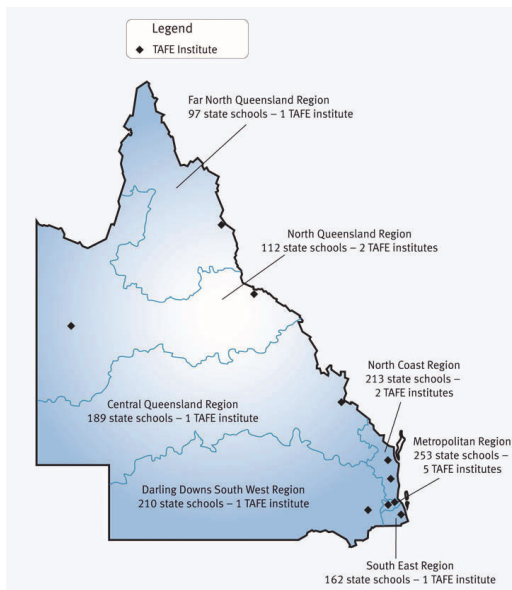


Figure 5: Department of Education and Training regions as referred to in table 4 and 5 (DET, 2011)

Note: The metropolitan region only has one institute delivering technician and trade related programs. There are a number of private training organisations delivering programs within the energy and telecommunications industries.

Figure 6 represents the age distribution of apprentices in Queensland, for all of the trade job roles in this report. Although the majority of apprentices falls in the <25 age grouping (65%), there has been a noticeable increase in the number of apprentices entering as mature age (35%), especially when compared to 2006 apprentice numbers. These figures indicate that mature age apprenticeship pathways are a viable option for employees wanting to make a career change into electrotechnology and related industries. A qualitative assessment has been that most mature age apprentices enter into Lineworker and Cablejointer trades.

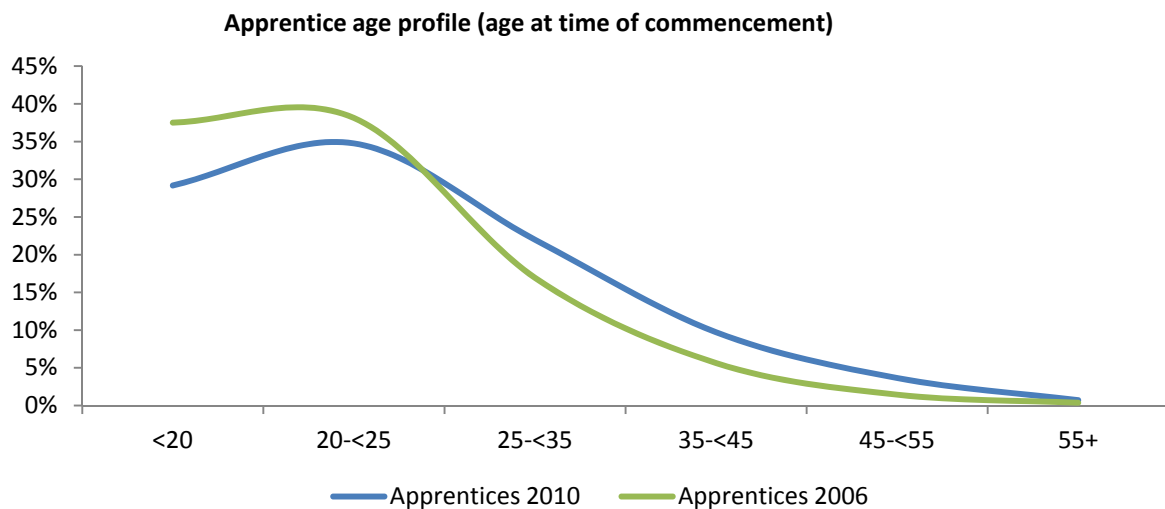


Figure 6: Queensland apprentice age profile

In December 2011, Energy Skills Queensland, in coordination with the Electrical Trades Union, conducted a survey to better understand and anticipate the future needs for electrical employees operating in the electrical industry in Queensland. The research indicates that 56% of the responding businesses employed apprentices in 2011 (see Figure 7), with an average of apprentices employed per business.

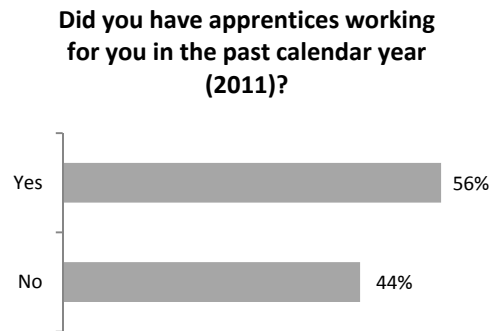


Figure 7: Businesses taking on apprentices

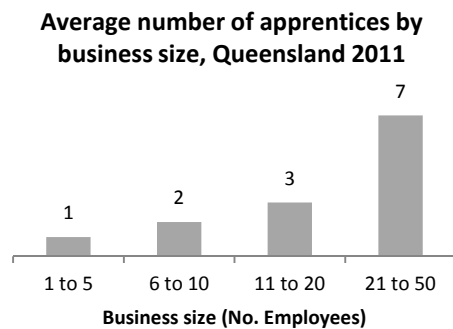


Figure 8: Average number of apprentices in businesses

Understandably, smaller businesses take on less apprentices compared to larger businesses (see Figure 8). However, the percentage of apprentices per employee drops significantly as the business size grows (Figure 9). Within those smaller businesses that take on apprentices (sized 1 to 5 employees), apprentices make up 42% of the business size, compared to only 16% in larger businesses (sized 21 to 50 employees).

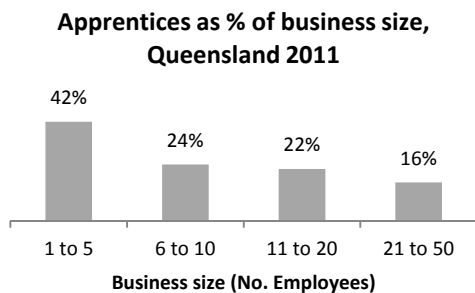


Figure 9: Apprentices as a percentage of the business size

The respondents were asked the main reasons for deciding to take on apprentices. As this was an open question, the answers had to be qualitatively assessed. Tables 3 and 4 display the three main reasons given by respondents for either taking on or not taking on apprentices. The reason mentioned most to take on apprentices (43%) was because the company was experiencing growth, followed by the belief that in-house training improves the quality of workers (21%). The third main reason was the belief that taking on an apprentice is a good investment for the future of the business.

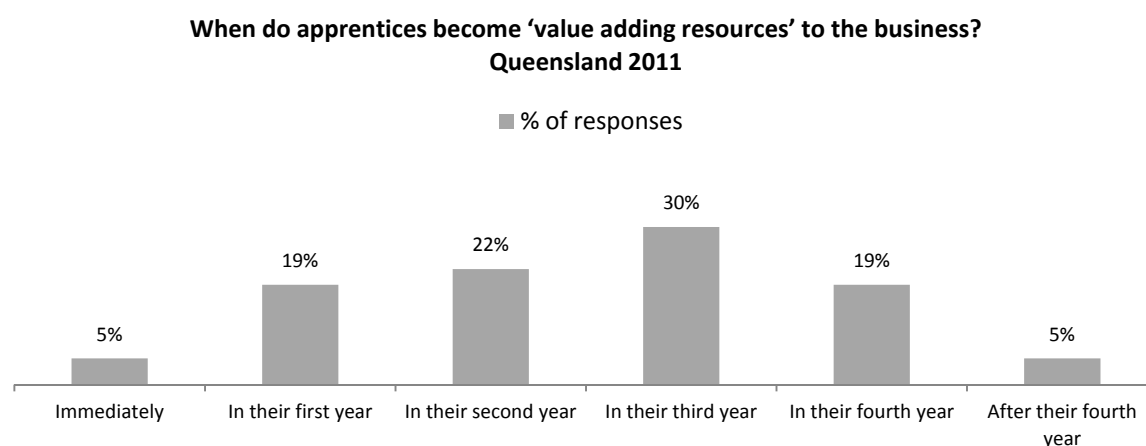
Table 6: Three main reasons for taking on apprentices (QLD, 2011)

	%
The company is experiencing growth	43%
Training your own employees results in better quality workers	21%
Training apprentices is a good investment for the future of the business	14%

Table 7: Three main reasons for NOT taking on apprentices (QLD, 2011)

	%
The organization does not have enough work to put on apprentices	41%
The 1-to-1 tradesman to apprentice ratio limited their ability to put on more apprentices	18%
The business structure does not suit training apprentices	11%

The main argument given for not taking on apprentices (41%) is that there is not enough work available to put on apprentices. By comparing the two main arguments for and against, it is clear businesses make the decision to take on apprentices based on the amount of work they are experiencing at that moment. This is an obvious approach to managing training, however it will potentially lead to the under-investment in apprenticeship training in Queensland and will therefore heavily impact the supply of qualified electrical trade's people entering the workforce. Respondents were also asked when they perceive apprentices to become 'value adding resources' to the business. The responses are collated in Figure 10.

**Figure 10: Value of apprentices to the business**

The responses above indicate that the almost a quarter (24%) believes that apprentices already become 'value adding' before the end of the first year, with an additional 22% who believe the apprentice becomes 'value adding' in their second year. In all, 76% of the respondents believe the apprentice has been a valuable addition to the business before the end of the third year.

Reasons reported by employers for apprentices leaving their businesses are ranked in Table 8. The main reason given (31%) was that apprentices did not enjoy the work they were training in. This indicated that the perception of working in the electrical industry did not match actual experience of gaining a trade

Table 8: Reasons for apprentice cancellations (Queensland, 2011)

	%
They didn't like the work	31%
They were disappointed in their wages	22%
They weren't suited for the work	19%
There was no work available	19%
Moved town	6%
They left without a reason given	3%
Total	100%

Ageing population

Queensland's population is projected to age caused by longer life expectancy and low birth rates. Under the medium series projections, the median age of the population is expected to increase from the current 36 years to 38 years by 2021, reaching 43 years by 2056 (OESR, 2011). All local government areas in Queensland can expect an increase in their population's median age.

Almost one-third (32%) of the projected increase in population from 2006 to 2031 will be in the age group 65 years or more. Part of this increase in the numbers in the older ages is a result of the large baby boomers generation moving into the retirement ages. In 1981 the baby boom generation were young adults aged 16-35 years; in 2006 they were aged 41-60 years and in 2031 they will be aged 66-85 years.

In the main working ages of 20-64 years, the future growth is expected to remain the same as the past. However, the big difference is the much larger increase projected in the number of people aged 65 years and older - the projected increase in the 25 years to 2031 of 796,000 is almost three times that recorded in the past 25 years. As the population ages, people in the older age groups will represent a much larger share of the total population. By 2031, it is projected that approximately one in every five Queenslanders (20%) will be aged 65 years or older.

Figure 11 illustrates the ageing profile of electrical workers in Australia (ESO, 2012). A large proportion is nearing retirement age. It is more than likely many of these older workers will choose to withdraw from the industry over the next five years. Therefore it is vital that we develop strategies to attract and retain apprentices in order to address future skills shortages. It is also important that the industry keeps as many older workers by up-skilling them into training/mentoring roles

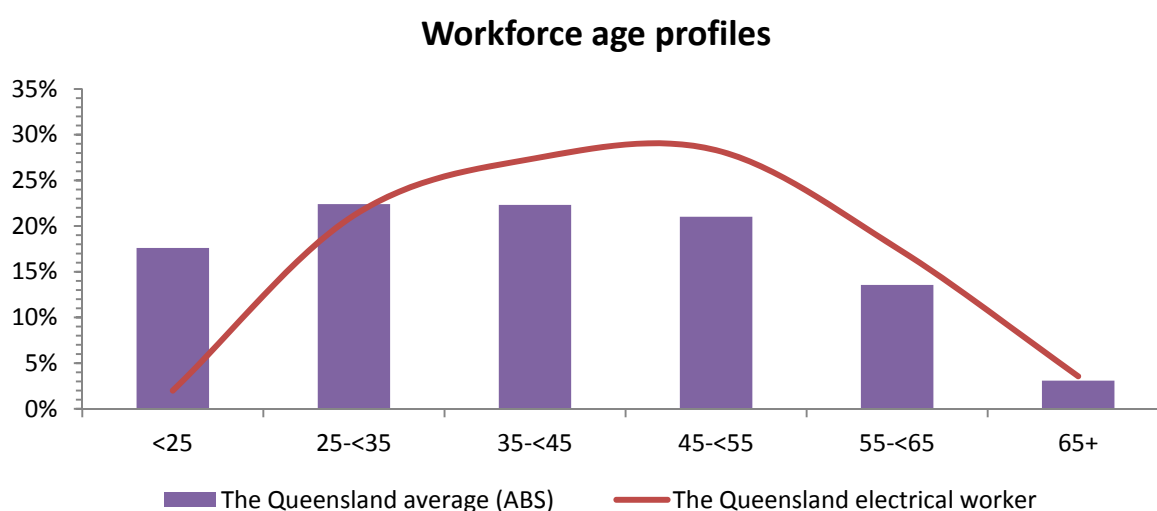


Figure 11: The Queensland age profile, comparison between Queensland working average and the Queensland electrical worker, Feb 2012 (Electrical Safety Office, 2012)

Migration

Migration policies in Australia are undergoing changes toward delivering a better migration program. Prior to February 2010, the Department of Immigration and Citizenship (DIAC) applied the Migration Occupations in Demand List (MODL) to immigration applications. Applications for visas would receive credit based on a points system, which would determine whether the applicant was successful in obtaining a visa. The most commonly-applied for visa is the Temporary Business (Long Stay), Standard Business Sponsorship visas, otherwise known as 457-visas. This visa allowed employers to sponsor overseas workers to work in Australia on a temporary basis.

The MODL was rescinded on 8 February 2010, following a review which found that it had not effectively contributed to delivering a general skilled migration program that met the future skills needs of Australia. The review recommended a more targeted Skilled Occupations List (SOL) to better meet the skills needs of Australia's labour market. The SOL would be based on advice from Skills Australia, a panel established by the Federal Government to provide expert and independent advice regarding Australia's current, emerging and workforce skills needs.

In July 2010, the Skilled Occupation List (SOL) was announced. The list included fewer occupations than its predecessor, and was aimed to deliver a General Skilled Migration (GSM) program focused on high-value skills to assist in meeting Australia's medium to long term skill needs. The introduction of this SOL was part of a package of reforms that reflects the Government's commitment to a labour market demand-driven Skilled Migration Program. The use of migration as a method to address skills shortages requires such efforts as these to ensure that the skilled workers entering Australia will be matched with the requisite occupation. In many cases, where employers hire for specific positions, either directly or through agencies, foreign workers will generally be recruited for jobs that match. However, where workers tend to act on their own initiative, as happened on a huge scale with young people after the opening of the European Union to eight eastern European nations in 2004, they can end up in jobs for which they are over-qualified.

There is also an opportunity for partners of skilled migrants to be placed into employment. The Gladstone region has shown that many partners of skilled migrants are highly-qualified but have not undertaken the 'skills recognition' process. The trades relevant to the energy and telecommunications industries on the SOL list are:

- Electrical powerline tradesperson
- Electrical (special class)
- Electronic equipment tradesperson
- General communications officer
- General electrician
- Lift mechanic
- Refrigeration and air-conditioning mechanic

Queensland 457 visa trends to March 2012

Changes to the 457 visa scheme to expedite the hiring of overseas workers into Australia have been welcomed by some parties in the industries. The Department of Immigration and Citizenship Report 2010-2011, indicates the number of 457 visas granted for skilled workers.

Table 9: Number of primary applications granted in 2011-12 to 31 March 2012 by Electricity, Gas, Water and Waste Services industry, Queensland (DIAC, 2012)

	2010-11 to 31/03/2011	2011-12 to 31/03/2012	% Change from 2010-11	2011-12 as % of Total
Electricity, Gas, Water and Waste Services	70	190	162.2%	2.3%

Table 10: Top 15 nominated occupations for primary applications granted in 2011-12 to 31 March 2012, QLD (DIAC, 2012)

ANZSCO	Description	2010-11 to 31/03/2011	2011-12 to 31/03/2012	% Change from 2010-11	2011-12 as % of Total
139999	Specialist Managers nec	110	260	139.3%	3%
253111	General Medical Practitioner	210	250	19.2%	2.9%
511112	Program or Project Administrator	90	240	171.3%	2.8%
234411	Geologist	120	230	91.6%	2.7%
233211	Civil Engineer	130	220	73.6%	2.6%
242111	University Lecturer	130	220	67.4%	2.6%
351411	Cook	50	200	286.5%	2.4%
253112	Resident Medical Officer	240	190	-19.4%	2.3%
253999	Medical Practitioners nec	100	170	65.00%	2%
224711	Management Consultant	80	140	89.5%	1.7%
312512	Mechanical Engineering Technician	40	140	291.7%	1.7%
351311	Chef	40	140	263.2%	1.6%
133111	Construction Project Manager	80	140	78.9%	1.6%
-	Skilled Meat Worker	30	130	309.4%	1.5%
133211	Engineering Manager	90	130	43.8%	1.5%

Enterprise Migration Agreement - EMA

On 10 May 2011, the government announced the implementation of Enterprise Migration Agreements (EMAs)—a new temporary migration initiative to help address the skill needs of the resources sector. EMAs are a custom-designed, project-wide migration arrangement for large scale resource projects. EMAs will help ensure peak workforce needs are met, easing capacity constraints and ensuring economic and employment benefits are realised.

What is an EMA and how does it work?

An EMA will be negotiated with either the project owner or prime contractor of a resources project. The EMA will act as an umbrella migration arrangement for the project. Technically, the EMA will be a deed of agreement—a contract between the resources project and the government. The EMA will set out the number of overseas workers who can be engaged on the project, why they are required, and the training commitments that must be met by the project owner. Any concessions to the standard program must be negotiated at the EMA stage.

Contracting employers, with the endorsement of the EMA holder, will sign template labour agreements that sit under the EMA. This ensures that the direct employer of the workers will be responsible for the sponsorship obligations in relation to overseas workers.

What is the benefit of an EMA?

EMAs will take a project-wide approach to meeting skill needs. Rather than each sub-contractor having to negotiate their own labour agreement where semi-skilled labour is required, the bulk of negotiation will occur with the project owners. This means that project owners can plan their workforce needs from the start and there will be a straightforward process for sub-contractors to sign up to an individual labour agreement.

The department will aim to negotiate the agreements within three months from the time a project owner submits a complete request for an EMA. Labour agreements and visa applications associated with an EMA will also be subject to expedited processing.

Under an EMA, occupations that are not eligible for the standard 457 program can be sponsored provided the project can justify a genuine need that cannot be met from the Australian labour market. This will be critical for many resources projects, particularly during the construction phase.

Source: Department of Immigration and Citizenship (DIAC) website

WORKPLACE CULTURE AND GENERATIONAL DIFFERENCES

Understanding how generational workforce segments' characteristics, expectations, and behaviours are different, and developing strategies to match their varied needs, is a key strategic advantage when retaining and engaging any workforce. Pay, conditions and arrangements, Employee Value Proposition (EVP), flexibility and mobility and changes in technology all contribute to an employee's sense of value and engagement. Understandably, workers of different ages are likely to value different tangible and non-tangible benefits.

Electrical industry survey results

In 2012, Energy Skills Queensland repeated an industry survey with members of the Electrical Trades Union in Queensland, to better understand the key drivers for retention and skills development in the electrical industry. The survey was originally run in 2009 and there are comparisons listed where available.

The surveys focused on a number of issues including; employee profile and the ageing workforce, work intentions, views on the Industry, and training and professional development. These are outlined in this section.

Key benefits of working in the electrical industry

Understanding what employees perceive to be the greatest benefits of working in a particular industry enables employers to build a better value proposition for attracting and retaining critical skills. When the respondents of the Electrical Industry survey were asked what they perceived the top benefits of working in an Electrical Trade, there were 12 consistent responses in both years (listed in order of preference):

Table 11: Comparison of 2009 and 2012 surveys: key benefits

2012	2009
Benefits/conditions	Money/salary/pay
Challenging and varied work/job satisfaction	Job security
Job security	Good working conditions
Mateship/friendship	Challenging and varied work/job satisfaction
Money/salary/pay	Good opportunities
Work hours	Training/skills development
Good opportunities	Safe work environment
Safe work environment	Mateship/friendship
Training/skills development	Work hours
Technologically advanced	Travel opportunities and transferable skills
Industry is valued by family and friends	Good working environment and industry
Good working environment and industry	Good union

The findings in Table 11 indicate that salary/pay which was the key benefit in 2009, has slipped to 5th ranking in 2012, in favour of the benefits and conditions available in the industry. This may represent a change in expectations of working conditions as wages inflate i.e. companies that provide the best super, accommodation, training, etc will be viewed as more favourable employers. Job security still rates highly as one of the key benefits for all age groups working in the electrical industry. When analysing the responses there were some clear differences in perceived benefits across different age groups, and found there was an inverse relationship of the benefits when reviewed by age group i.e. Salary was rated as more important to young workers (29% of 15 -29 year olds) while job security becomes more important to workers over 35 (20% of over 35).

Three benefits; a safe work environment, the 'mateship' or friendship experienced on the job, and the job satisfaction, all become significantly more important to the workers over 55, compared to younger workers (combined, 31% of respondents over 55 feel these benefits are important). This is an indication that the working environment in the electrical industry can be a good reason for workers to keep going, even after the 'normal' retirement age.

Approximately 14% of respondents aged between 20 and 54 cited the challenging and varied work as a key benefit to working in the electrical industry. This was followed closely by the good opportunities in the industry and the ability to continuously train and develop (14% between 30 and 54).

Intention to leave

Understanding the drivers of your workforce's intentions to leave is critical to developing better retention HR policy and strategy. It is positive to see, according to the survey responses, that there are very low intentions to leave the electrical industry. In 2009, 55% of respondents were not planning to leave the industry. This number has dropped to 48% in 2012. Similarly, the number of respondents who indicated they do not plan to leave their current job dropped from 49% in 2009 to 33% in 2012. This is an indication that the increased competition for skills from employers makes it more beneficial for the employees to consider their options elsewhere, as wages and benefits might be higher in other industries (for example resources sector) or with another employer.

The results of the survey also showed that older workers have a greater intention to leave their current position. In 2009, of the respondents who were planning to leave the industry, 56% intended to retire in the next 10 years and in 2012, this number increased to 61%. This means that 22% of the total respondents intend to retire within 10 years. More importantly, 14% intend to retire within five years. However, of those respondents not planning to retire, but intending to leave the industry within 1 year, 36% indicated they wanted to work outside the industry and try something different. This result raises concern of dissatisfaction with the electrical industry as an employer of choice, and warrants further investigation to determine what is driving the attrition out of the Industry e.g., pay, training, working conditions, etc.

Generational differences

Research into generational differences

There is much debate around the concept of generational differences and of life stages and how they apply to attract, retain and engage a diverse mix of workers. There are many versions of the age groupings, years, and generation names. Table 12 below describes the generational breakdown (The New Generations at Work, McCrindle, 2011)

Table 12: Generational Descriptions (McCrindle, 2011)

Description	Born	Age	Population (mil)	% of whole
Builders	before 1946	61+	3.5	17%
Boomers	1946-1964	42-60	5.3	26%
Gen X	1965-1979	27-41	4.4	21.5%
Gen Y	1980-1994	12-26	4.2	20.5%
Gen Z	1995-2009	Under 12	3.1	15%

The same research surveyed more than 3,000 Australians, and identified four "big shifts" which have radically redefined the workforce and the impact they have on recruitment, retention, and training strategies. They are: the aging population, the transitioning generations, the increasing options for workers, and changing tenure. Of these four, the shift that is perhaps the newest to be called out is the impact of transitioning generations. McCrindle describes this as the process of the large cohort of Baby Boomers exiting the workforce over the next 15 years, leaving a very significant labour and management void.

These shifts will also impact the way employers communicate, attract, retain and engage their workforce over the coming years, and should inform key HR policy and strategy decision making when trying to address retention of older workers as well as younger ones.

Technology plays an ever-increasing role in Generation Y and Generation Z's day to day activities. For companies to compete for the talent of these generations, technology including websites, on-the-job tools, collaboration sites, etc will need to mirror those they use in their personal lives. This is increasingly important for "blue collar" industries to recognise to avoid being seen as outdated and not attractive employment options for younger workers.

Industry impressions of generation Y

Energy Skills Queensland manages an Electrical Supply Industry Steering Committee and an Electrotechnology Steering Committee on behalf of industry to ensure workforce planning and development strategies are being discussed at an industry level. Energy Skills Queensland's workforce planning team approached both committees to provide feedback on their main concerns with attracting, developing and retaining young people in the electrical industry. While this information is qualitative in nature, it does provide an understanding of the attitudes of key stakeholders currently working in the electrical industry. The two key themes discussed were education and wages.

Education

Based on feedback, only approximately 15% to 25% of applicants are passing the aptitude tests to become an electrician. The main barrier is perceived to be the level of mathematics skills obtained in secondary schools. There is some concern over the mismatch of skills preparation for those students interested in pursuing a trade. It was purported that trades are viewed to be "for the dumb kids" and therefore those who are interested in a trade are not encouraged academically, or those students who do show promise are guided into universities and tertiary education.

Wages

The low wages offered during an apprenticeship mean that high quality students perceive they have better earnings prospects as a university student. The ability to work part-time while achieving a university degree, with higher pay than individuals would earn in an apprenticeship, was seen as a barrier to both school leaver and mature age apprentices joining the electrical industry.

ENERGY AND TELECOMMUNICATIONS

SECTOR BREAKDOWN

Energy Skills Queensland is an Industry Skills Body promoting career pathways, jobs and training for the energy and telecommunications industry in Queensland. Energy Skills Queensland leads energy industry and government engagement on education and training, skills development and labour market issues.

As Energy Skills Queensland is responsible for a number of sectors, the following section of the report provides a breakdown of each of these industry sectors:

- Electricity generation
- Electricity supply and rail
- Electrotechnology
- Coal seam gas (CSG) to liquefied natural gas (LNG)
- Gas transmission and distribution
- Sustainable and renewable energy
- Telecommunications

ELECTRICITY AND ELECTRICAL SERVICES

The electricity industry is made up of four distinct yet interconnected sectors involved in producing electricity and delivering it to homes and businesses i.e., electricity generation, electricity transmission, electricity distribution, and retail. The Queensland electricity generation sector has a mixture of public and private ownership. The monopoly transmission and distribution assets are owned and operated by government-owned corporations, while the retail sector is entirely privately owned. The Queensland Government owns electricity assets worth about \$8 billion in generation, more than \$3.9 billion in transmission and more than \$13 billion in distribution (DEEDI, 2011). In addition, significant capital investment is being committed to transmission infrastructure (Powerlink) and distribution networks (ENERGEX and Ergon Energy) over the next five years.

Electricity generation

The electricity generation industry is expected to generate revenue of \$20.85 billion in 2011-12, an average annual growth of 7.3% from \$14.64 billion in 2006-07 (IBISWorld, 2011a). This positive performance is due to the combination of higher output and substantially higher prices (due mainly to higher fuel input costs). Industry revenue is expected to expand by about 11% in 2011-12, with electricity generation accounting for about 0.5% of Australia's GDP. The industry's net profit is forecasted to be about \$3.79 billion (IBISWorld, 2011a). Since Australia does not export or import electricity, the size of the local market matches output.

Although electricity generation is a capital-intensive activity, the industry nonetheless employs about 8,000 people and is expected to pay approximately \$1.0 billion in wages in 2011-12 (IBISWorld, 2011a). There are about 30 large firms involved in electricity generation, and numerous smaller ones that generate electricity for their own use and may also sell power into the public grid.

Total installed generating capacity is about 59,000MW (3,000MW up from last year), of which about 53,500 MW is located in major power generating plants. Smaller generators provided a further 5,500 MW of capacity, including about 2,700MW of co-generation (where electricity is a by-product of other processes). Total renewable electricity generating capacity amounted to about 9,900MW (300MW up from last year), the majority of which consists of hydro-electric plants (IBISWorld, 2011a).

Growth in the demand for electricity is expected to firm in 2011-12, despite as economic activity strengthens. Production is expected to continue rising over the next five years, although the introduction of a carbon tax in July 2012 is expected to crimp the demand for electricity from the level that would have otherwise prevailed (IBISWorld, 2011a). Brown coal-fired generators will find the introduction of the carbon tax particularly

challenging, since their carbon footprint is about 1.5 times that of black coal-fired power stations and more than twice that of gas-fired power stations (per unit of power produced).

Industry revenue is expected to expand at about 7.4% per year during the next five years, but net profit is expected to grow slower due to cost pressures, including the introduction of greenhouse gas abatement measures. Revenue is expected to reach \$29.86 billion in 2016-17 (IBISWorld, 2011a).

Queensland

Queensland currently has a generation capacity of more than 13,500MW. Since 1998, \$4.7 billion or 75% of new generation investment in the National Electricity Market (NEM) has occurred in Queensland. By 2015, about \$12 billion more will be invested in over 10,000MW of new generation capacity across the NEM. Given the high quality and low cost of Queensland fuel sources, and their proximity to load growth, a large proportion of this investment is expected to occur in this state (DEEDI, 2011).

Government-owned corporations have a stake in about 65% of the state's generation capacity, but the numbers of partially or fully privately owned power stations are increasing. The Queensland Government plans to reduce the share of the aggregate capacity the state owns or operates in Queensland to around 50%, primarily as a result of new capacity requirements being met by the private sector.

The government maintains outright ownership of power stations operated by Tarong Energy, Stanwell Corporation and CS Energy. It has undertaken joint ventures with private power generation companies (Callide C) and maintains power purchase agreements with privately owned power stations (such as Gladstone and Collinsville).

In 2009, the Queensland Government reviewed the structure and preparedness of the Government-owned corporation generators (Gencos) to meet the new challenges facing these businesses, particularly in respect of climate change policy responses and competition from large vertically integrated retailers. The review identified a number of benefits associated with moving from a three Genco structure (Tarong Energy, Stanwell Corporation and CS Energy) and on 1 July 2011, restructured into a two Genco structure (CS Energy and Stanwell).

Electricity transmission

The electricity transmission industry operates the high-voltage electricity network, linking electricity generators to the distributors that operate the low-voltage electricity supply system. The industry operates 63,712 circuit kilometres of high-voltage electricity transmission lines; all but 837 circuit kilometres are overhead lines. The industry is expected to transmit 238,800 gigawatt hours of electricity in 2011-12 (IBISWorld, 2011b).

The industry is expected to generate revenue of \$3.17 billion in 2011-12, up from \$2.43 billion in 2006-07. This is an average annual increase of 5.45% over the past five years, and is mainly due to increased transmission volumes. Industry revenue is forecast to grow by 3.8% in 2011-12, and the industry will account for about 0.2% of Australia's GDP. The industry's net profit is estimated to be \$1.48 billion in 2011-12 (IBISWorld, 2011b).

Electricity transmission is a capital-intensive activity and the industry employs only 2,962 people, paying \$313.9 million in wages in 2011-12 (IBISWorld, 2011b). Only a small number of firms are involved in electricity transmission, and they have an average of two establishments each. The number of firms involved in the industry has remained static since 2006-07, and is expected to be unchanged through 2016-17 (IBISWorld, 2011b).

Over the next five years, industry revenue is expected to grow by 3.1%, to \$3.69 billion in 2016-17 (IBISWorld, 2011b). However, transmission volumes are forecast to increase by only 1.6%, reflecting higher prices. Price rises will be necessary to cover higher levels of spending on infrastructure.

Queensland

Powerlink Queensland, a government-owned corporation, manages the transmission of electricity in Queensland. Powerlink is licensed to operate more than 13,000 kilometres of Queensland's high-voltage transmission network, transporting electricity from the generators to the distribution networks, and directly to large customers such as aluminium smelters (Powerlink Queensland, 2011).

Powerlink has the largest capital works program in the electricity transmission sector in Australia and undertook 475.2 million in construction work across Queensland in 2010/2011 to meet growing demand (Powerlink Queensland, 2011).

Most of the Queensland power stations in the east coast network are directly connected to the Queensland transmission system. Electricity also flows between Queensland and New South Wales via the large-capacity Queensland - New South Wales Interconnector (QNI) and the smaller Terranora interconnector.

Impacts of green and renewable energy on the future electricity workforce

Green energy and renewable energy will play an important role in the future of the electricity supply industry, and the introduction of a Carbon Tax in 2012 by the Australian government further highlights the importance of developing and improving clean energy sources. The Carbon Tax will be introduced in Australia on 1st July, 2012. Initially this will mean that the top 500 polluting organisations will pay \$23 per tonne of carbon emissions, with households being compensated for extra costs through tax cuts and increased benefits.

The emerging area of energy efficiency, and the assessment and auditing of small to medium enterprises, is also adding to the need for skilled workers. The removal of State government "climate smart" program, opens business opportunities for electrical contractors across the state to fill this need pushed by the Carbon Tax.

Research into, and consideration of, green and renewable energy is not new to the energy sector, and there is a growing acknowledgement that a new type of worker, the 'green' collar worker, is required to assist the implementation of green and renewable technologies in the energy sector. Because of the introduction of the carbon tax it is expected that the green collar worker may be in high demand faster than previously expected. The recent increase in photovoltaic installations by private customers in Queensland has shown that uptake of green technology is being embraced by domestic consumers.

Network engineers with specialist skills will be required to manage these changes. They require knowledge of the traditional function of the energy network, and will also have to be able to plan for an increase of green and renewable energy sources e.g. private photovoltaic installations. A critical capability required for network management is the ability to deal with peak demand. As peak demand grows more rapidly than the network capacity, alternative measures to dealing with peak demand will be required, such as developing ways to increase energy storage.

Like most other industry sectors, the energy sector is increasingly relying on IT and electronics, such as the 'smart meters', to deliver their core business. The biggest challenge with this type of 'black-box' technology is that existing workers need up-skilling to be able to understand the new technology and its applications. As more advanced electronic systems are likely to be the common tool of the future energy worker, this skill-set is quickly becoming increasingly important.

Electricity distribution

The industry is expected to generate revenue of about \$50.9 billion in 2011-12, up from about \$34.5 billion in 2006-07 (representing average annual growth of 8.1%) (IBISWorld, 2012a). The gain reflects a combination of higher sales volumes and prices. Industry revenue is expected to expand by about 11.7% in 2011-12, mainly due to higher prices, and the industry is expected to account for about 1.2% of Australia's GDP (IBISWorld, 2012a).

Electricity distribution is the most labour-intensive of the electricity industries (which comprise generation, transmission and distribution). This industry employs about 29,600 people and pays wages amounting to approximately \$3.0 billion in 2011-12. There are 26 enterprises involved in distributing or retailing electricity. Some electricity distributors not only operate the low-voltage electricity distribution network, but they also

sell electricity. Electricity retailers sell electricity and pay a fee for the use of the distribution network; some of these retailing firms also generate electricity.

Firms in the industry sell most of the electricity generated in Australia, although some power is lost in transmission and distribution. The volume of electricity generated in 2011-12 is expected to be about 239,868 gigawatt hours, compared with 225,929 gigawatt hours in 2006-07. Electricity output is expected to expand by about 1.6% per year over the five years through 2016-17, slightly up from the 1.2% per year for the past five years through to 2011-12 (IBISWorld, 2012a). The main negative factor for electricity consumption over the next few years will be the introduction of a carbon tax in July 2012, followed by an emissions trading scheme in July 2015. The associated increase in the price of electricity will limit growth in demand for power.

Over the next five years, the industry will benefit from firmer demand and higher prices. Revenue is expected to grow by about 6.7% per year to reach \$70.5 billion by 2016-17 (IBISWorld, 2012a). A considerable part of this expansion will reflect measures to expand and improve the distribution network, and the introduction of a price on carbon. As a result, profit will grow more slowly than revenue.

Queensland

Electricity is supplied to most Queensland customers via an electricity distribution system, which connects the high-voltage transmission system to individual premises. Queensland has over 1.9 million industrial, commercial and domestic consumers of electricity. These consumers are serviced by ENERGEX (supplies customers in South East Queensland), Ergon Energy (supplies rural and regional Queensland) and Essential Energy (a NSW distributor, formerly known as Country Energy, whose supply area extends over the border near Goondiwindi).

Queensland's electricity distribution networks are extensive, with a total line length of about 200,000 kilometres. ENERGEX has a distribution area of 25,000 square kilometres, which includes:

- more than 50,000 kilometres of powerlines
- over 600,000 power poles
- 43,000 transformers
- Almost 300,000 streetlights

Ergon Energy's network consists of more than 150,000 kilometres of powerlines and 1 million power poles and covers an area 6 times the size of Victoria (DEEDI, 2011).

Electricity Supply Industry (ESI) Passport description of workforce

In September 2010, the Electricity Supply Industry (ESI) Passport was launched with the aim to allow ESI workers to move between the Australian states. The Passport provides evidence of a person's currency of refresher training and authorisations and encourages standardisation of training in the ESI. So far over 14,600 licenses have been issued and this document falls in line with the NOLS framework. A description of the workforce registered by worker category is listed in Table 13.

Table 14 shows the distribution of persons who have signed up to the ESI passport by state. Victoria has the greatest number of participants, with over double the amount of registrations of other states. It is believed in the ESI Industry in Queensland, which has taken a lead role in developing this project, that currently the main motivation to sign up to the passport is driven by the recent natural disasters which have plagued Australia. The floods in Queensland, and bushfires in NSW and West Australia, have driven registrations by qualified ESI workers wanting to donate their time and expertise in recovery programs.

As the passport is more widely used across Australia, it is expected that this will lead to an easier path for internal migration of skilled labour. Although this is not expected to be a real pathway in the near term, it is important to mention that as ease of internal migration increases due to greater alignment of training and legislation across the Australian states, this in turn will make it easier for poaching across state borders to occur.

Table 13: The ESI Worker Profile

Worker Category Name	Description	% of total
Lineworker Distribution	Lineworker engaged in working on distribution and sub transmission assets up to 66kV.	25%
Electrician	Electricians working on ESI network infrastructure, including work in distribution, transmission, zone substation or terminal stations, and a generation environment.	12%
Technical Worker	Includes all types of design, Scada Tech, Telecommunications, Technician	10%
Team Leader / Supervisor	Team Leader / Supervisor not actively engaged in field work.	9%
Support Worker	OHS Coordinator, Trainer, Managers, Auditor	8%
Electricity Supply Worker - Non Trade	A person with no electrical qualification working on ESI infrastructure e.g., cable layer, Plant Operator, meter reader, Rigger, civil workers	7%
Engineer	All streams i.e., Civil, electrical working in the ESI.	5%
Vegetation Worker	Engaged in vegetation control work for ESI network infrastructure – elevated or on ground.	5%
Non Electrical Worker	A person with no electrical qualifications who works in an ESI environment. e.g., Cleaner, maintenance workers, fire services technician, labourer, gardener, stores person, and driver.	4%
Tester, Protection, Control & Cables	Includes testing protection and control circuits associated with Transmission & Distribution and stations. Includes field protection devices & cables.	3%
Asset Inspector	Engaged in asset inspection, pole testing and data capture.	2%
Cable Jointer	Jointing & laying HV &/or LV cables.	2%
Electrical Inspector	Engaged in compliance inspections of customers HV and/or LV installations.	2%
Lineworker Transmission	Lineworker engaged in working on transmission assets above 66kV.	2%
Meter Technician	Engaged in the installation of direct, C/T and/or HV metering installations.	2%
Switching Operator	Describes a person whose duties are primarily operating networks even though they may be qualified in other areas. Includes all operating to be defined by the authority in the passport, Transmission, Distribution, Stations	2%
Trade Worker	Tradespersons working in a non electrical area, e.g., painter, plumber, concreters, carpenter, mechanic etc	2%
Total		100%

(Source Energy Skills Queensland - ESI Passport database)

Table 14: Persons signed up to ESI Passport as of 2012

VIC	7,200
QLD	3,600
TAS	2,100
WA	1,300
SAA	1,000
ACT	400
NSW	10
NT	-
Total	15,500

(Source: Energy Skills Queensland - ESI Passport database)

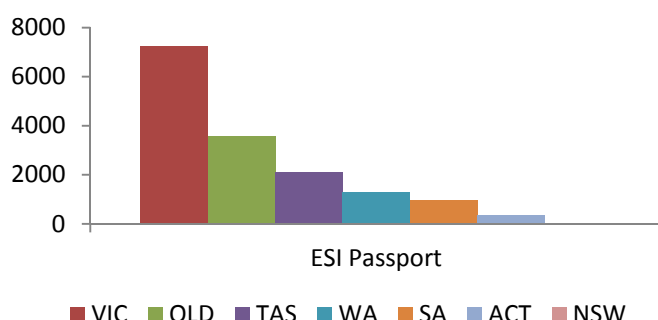


Figure 12: Persons signed up the ESI Passport by State

(Source Energy Skills Queensland - ESI Passport database)

Electrical services

The electrical services industry is the largest of the building and construction contracting trades, accounting for about one-seventh of the gross product, revenue and employment in the construction trade services sector. Industry activities span across all building, infrastructure and industrial markets. Services provided include the installation of new electrical, electronic, communications and industrial equipment; the installation of wiring and cabling; and the repair and maintenance of existing electrical equipment and fixtures (IBISWorld, 2012b).

The industry currently generates revenue totalling \$11.25 billion, a 2.6% decline on 2010-11, about 0.5% of Australia's GDP in 2011-12 (IBISWorld, 2012b). Revenue is expected to grow by an annualised 2.3% per annum over the five years through 2011-12, exceeding the pace of annualised GDP growth of 2.6% and underpinned by growth in the value of total construction (3.9%). The industry's medium to long-term performance has been boosted by work resulting from the emergence of new technologies, particularly broadband communications cabling. Electrical contracting activity in Queensland is currently subject to the one-off stimulus resulting from the devastating floods in January 2011. Initially, this boosted demand for electrical inspections and reconnections, and over the longer term supports demand for rewiring on existing buildings and infrastructure, and installation work on new replacement buildings and structures.

Industry employment totals about 70,000 people in 25,500 establishments in 2011-12, half the firms are non-employer establishments, principally acting as independent contractors or subcontractors. The industry comprises many small-scale operators employing four to five people per establishment on average, including working proprietors and partners. The four largest enterprises together generate less than 20% of annual industry revenue. The industry's major players include Norfolk Group, Downer EDI, UGL Limited, Transfield Services, and Stowe Australia. The industry is forecast to record cyclical annualised growth of 3.0% over the next five years to reach \$13.05 billion in 2016-17, just behind the pace of GDP growth (3.2%), supported by the solid cyclical expansion in the downstream building markets and the continued spread of electrical and electronic technology. (IBISWorld, 2012b).

Demand management skills

To ensure that distribution capacity is available to meet Queensland's peak electricity demand each year, there is not only a need to increase the distribution capacity, but there is an additional necessity for on-going and increased investment in demand management skills. Demand management is a complex area as it relates to technology, technology introduction, and to its availability i.e. it must be available at the time of need, and willingness from the community.

Initiatives such as embedded generation, fuel switching, energy efficient appliances and alternative network options (e.g. new transmission support) are all part of demand management. The ability for network operators to turn-off non-essential appliance, such as pool pumps and air-conditioning units is an often talked about part of peak demand management. Demand management is going to be an essential skill for the energy sector in the future.

The lack of knowledge by contractors on the tariffs available for use in Queensland will affect the ability to address Demand Management issues. Ergon has run their Demand Management education program RECESS across regional Queensland, with over 650 attendees eager to update their knowledge on this issue. There is an ongoing need for such programs to continue to increase the knowledge of electrical contractors in this area.

Queensland

Queensland accounts for 19% to 20% of industry establishments, roughly corresponding with the state's share of the economy. Queensland's share of industry contractors will be boosted in the short term by the influx of workers to meet the demand for reconstruction activity in the aftermath of the devastating floods of January 2011. Queensland, just like Western Australia and the Northern Territory, has greater demand for specialised electrical services dispersed across wide regional markets servicing the mining and energy industries.

The Queensland Government has progressively introduced retail competition into the state's electricity market since 1998. Large commercial and industrial customers have been able to choose their energy retailer for some time, with many customers entering into negotiated contracts with their retailer of choice. In July 2007, Full Retail Contestability (FRC) commenced in Queensland's electricity and gas markets, giving all Queensland customers connected to the national electricity grid and major gas networks the right to choose their energy retailer - including some 1.8 million small business and residential customers. With the introduction of FRC, a new distinction between 'large' and 'small' electricity customers has been made (DEEDI, 2011). Large customers are those that consume more than 100 megawatt-hours (MWh) of electricity each year. Small customers are those that consume up to 100MWh of electricity each year, which includes many small businesses.

Queensland electrical contractors overview

Industry sector coverage

In December 2011, Energy Skills Queensland, in conjunction with the Electrical Contractors Association (ECA) conducted a survey to better understand employment and skills issues facing the electrical contracting industry in Queensland. Of the businesses who responded, 78% operate in more than one sector, with 39% of businesses operating in all three sectors i.e., domestic, commercial, and industrial (Table 15).

Table 15: Industry sectors in which the contractor is active

Industry sectors in which a business is active (QLD, 2011)	%
Domestic, Industrial and Commercial	39%
Domestic and Commercial	19%
Industrial and Commercial	17%
Domestic and Industrial	3%
Domestic	10%
Industrial	3%
Commercial	9%
Total	100%



Figure 13: Industry sectors covered by contractors (* Multiple answers were allowed, hence totals will not equal to 100%)

A combined 80% of all businesses cover the commercial sector, 68% cover the domestic sector, and 58% cover the industrial sector, as displayed in Figure 13.

Within the sectors of the electrical industry, there are also a large number of business areas in which a business can specialize. The three most common areas identified by businesses were services and maintenance, small/medium construction and data networks (Table 16).

Table 16: Industry area's covered by contractors

Business area in which the business is active	%*
Services and Maintenance	70%
Small/medium construction	48%
Data networks	46%
Industrial	46%
Air conditioning	22%
Instrumentation and control systems	16%
Major construction	14%
Manufacturing	14%
CCTV security	12%
Government department	12%
Home automation	12%
Power poles	12%
Domestic/commercial security	10%
Electricity supply sector	10%
Hazardous location	10%
Home theatre/AV	8%
Refrigeration	8%
Marine	6%
Pay TV	6%
Wholesale	4%
Fire detection	2%
High voltage	2%

* Multiple answers were allowed, hence totals will not equal to 100%

Skills shortages

The survey was also designed to uncover which skills are particularly difficult to attract and/or retain for the Queensland businesses. The average time reported that businesses experienced in attracting new employees for their vacancies, was seven weeks, regardless of the size of the business. The number one difficult skill to attract/retain was reported to be the electrical fitter/mechanic. The remainder of the top ten is displayed in Figure 14.

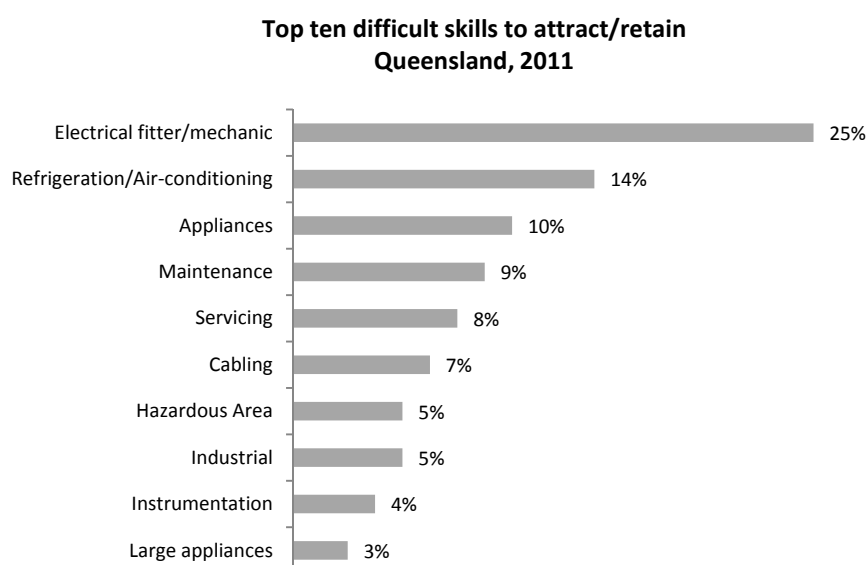


Figure 14: Top ten difficult skills to attract/retain

The top ten difficult skills to attract/retain comprised 90% of the responses. The subsequent 10% of responses covered the following areas; leadership, lift and escalator, marine, marketing, security, solar/photovoltaic, switchboard and working at heights.

GAS, INCLUDING CSG/LNG

Gas is a vital energy source for Queensland's industrial and manufacturing sectors. It is also increasingly used in electricity generation throughout Queensland, and is a major new export industry, based on the production of liquefied natural gas (LNG) from Queensland's gas resources.

The term 'gas' is used to describe natural gas, which is predominantly methane, a naturally occurring gas. Conventional natural gas is found and produced with other petroleum products such as oil. Coal seam gas (CSG) is found and produced from the cleats and fractures of coal seams. While the location and production method is different, natural gas produced from conventional gas fields and CSG gas fields is the same product. Commercial quantities of natural gas are produced from both conventional and CSG fields in Queensland.

Another form of gas used in households and industry is liquefied petroleum gas (LPG). LPG is a mix of the gases propane and butane and is stored and transported in metal canisters (gas bottles) as a liquid. LPG is produced by collection of butane and propane produced with conventional natural gas, and also as a by-product from the oil refining process. Its most common use in Queensland is as a fuel for barbeques and stoves.

Initiatives such as the Queensland Gas Scheme have boosted the Queensland gas market and development and expansion of gas reserves and infrastructure.

This guide provides an overview of gas in Queensland.

- Queensland's gas reserves
- Electricity generation from gas
- Gas transmission and distribution
- Gas retail and competition

Queensland Gas Scheme

The Queensland Gas Scheme began in 2005 and was established to boost the state's gas industry and reduce greenhouse gas emissions. The scheme is regulated under Chapter 5A of the Electricity Act 1994. Under the scheme, Queensland electricity retailers and other liable parties are required to source a prescribed percentage (currently 15%) of their electricity from gas-fired generation.

The scheme was first announced in the Queensland Energy Policy - a Cleaner Energy Strategy in May 2000 and has undergone significant consultation with industry and stakeholders over the past decade. The scheme offers gas-fired generators a direct subsidy to offset the higher cost of gas-fired generation compared with coal.

The scheme has been operating successfully to diversify the state's energy mix towards the greater use of gas, assist in encouraging the development of new gas sources and infrastructure in Queensland and reduce greenhouse gas emissions from the Queensland electricity sector. This guide provides an overview of the Queensland Gas Scheme. The Queensland Gas Scheme includes:

- Queensland Gas Scheme participants
- Exemptions from the Queensland Gas Scheme
- Regulation of the Queensland Gas Scheme
- Queensland Gas Scheme compliance, reporting and auditing
- Forms, policies and guidelines for the Queensland Gas Scheme
- Fees and payment for the Queensland Gas Scheme
- Gas electricity certificates
- Gas electricity certificate (GEC) registry

Gas market issues

Australia's gas industry is a significant contributor to the Australian economy. As an energy source gas has a wide range of uses including: electricity generation; as a fuel and feedstock for industry; and by households for heating, cooling and cooking. It is also used as a fuel in a range of transport applications. Australia's liquefied natural gas (LNG) industry generates substantial export income; it is forecast to exceed \$10 billion in 2011. The gas industry also provides significant employment opportunities for Australians.

Australia's gas markets are projected to undergo major changes in the period to 2030. These changes will introduce new market dynamics and new ways of doing business for suppliers, distributors and a range of end users. Some of the key drivers include:

- expected strong growth in domestic demand for gas, and the expected tripling of domestic gas production to 2030 (largely serving an export market)
- the development of new conventional and unconventional sources of gas
- difficulty in securing long-term contracts in the east coast market, as buyers and sellers wait to see how LNG exports affect market dynamics from 2014–15
- the impact of growing competition between domestic and international markets (through LNG)
- changes in price and technology due to carbon pricing
- changes in contracting behaviour with increasing use of shorter contracts
- greater linkage between key regional gas and electricity markets.

Coal seam gas (CSG) to liquefied natural gas (LNG)

Liquefied natural gas (LNG) production in Australia is set to rival that of major international producers. Combined with export volumes from the west coast, Australia will emerge as one of the largest worldwide exporters of LNG second only to Qatar.

Construction on Curtis Island in Gladstone ramps up to build a minimum of three LNG trains, combined with the development of the coal and gas reserves of the Surat Basin region, will result in substantial growth in the Darling Downs Southwest region, providing significant economic benefits to Queensland over the next decade. An AEC group report (2008), commissioned by the Department of Employment, Economic Development and Innovation (DEEDI), examined the high, medium and low scenarios for potential resource development in the Surat Basin. Growth projections based on a medium-level scenario include (DEEDI, 2010):

- Production of coal and CSG is expected to increase ten-fold by 2031.
- As a result of this activity, Gross Regional Product will double by 2031 to approximately \$9.3 billion, with the most rapid increase occurring between 2014 and 2018.
- Employment in the resource sector (coal, CSG and LNG) in the Surat Basin is projected to increase by 12,500 in the same time frame, with additional job growth in other sectors.

CSG/LNG construction phase

The following figures give an indication of the imminent construction growth of the CSG/LNG sector (CSQ/ESQ, 2011):

- Projected drilling of 30,000 wells over 30 years
- Up to 60,000 km of high density PE gathering pipeline
- Almost 10,000 km of trunk pipeline
- Up to 500 field compressor stations
- Up to 50 centralized compressor stations
- Up to 1,200 km 42" transmission pipeline
- A minimum of six, and a potential of 16 LNG plants
- Almost 3,500 operations staff from 2015, combined with 9,300 construction workers
- Almost 13,000 workers required in Gladstone by 2015

Skill needs analysis

Downstream priority skill areas (CSQ/ESQ, 2011): the following list represents those occupations that present critical skill needs during the peak labour demand period of downstream construction. The * indicates potentially high skill needs throughout the entire construction period.

- Boilermaker
- Carpenter
- Concrete Finisher
- Electrical Trade Assistant
- Electrician
- Instrumentation and Control Tradesperson *
- Insulator*
- Mobile Crane Operator
- Painter
- Pipefitter*
- Rigger*
- Scaffolder
- Sheet Metal Worker*
- Special Class Welder
- Steel Fixer*

Upstream priority skill areas (CSQ/ESQ, 2011): Upstream subcomponent constructors indicated that skills shortages were likely to occur in the following occupations:

- Welders (including electrofusion)
- Mechanical and electrical trades workers
- Diesel mechanics
- Mechanical fitters
- Pipe fitters
- Specialist machinery operators (side boom and trenching machine)
- Specialist project personnel (supervisor, safety and environment specialists)

CSG/LNG operations phase

Energy Skills Queensland's 2009 Workforce Planning Report for the CSG/LNG Operations Phase identified the following priority job roles:

- Driller and driller's assistant
- Process plant operators
- Production technicians
- Electrical and instrumentation technicians
- Diesel fitter mechanics
- Maintenance technicians
- Logistics/transport and warehouse technicians

Drilling and well servicing – current skills issues

Drilling and well servicing are growth sectors in Queensland and there are a large number of entry level workers (Leasehands) moving into roles that can be given basic training off a rig. However, there is a shortage of higher level skills because these jobs require extensive experience on a rig and training using actual equipment, both of which are difficult to achieve outside of the workplace. Social inclusion is also a key theme of focus for this sector, with the Coordinator General encouraging the employment of underrepresented groups e.g. Indigenous and women.

There are a number of CSG experienced drillers in Queensland, but a number of organisations traditionally involved in exploration drilling are moving into drilling for coal seam gas. They need development of new skills and modification of equipment to operate within the industry. In the last 12 months, there has been an increase in the monitoring of this industry to make sure that drillers are competent to perform their roles safely. This is a major concern as drilling operations can be shut down if workers are not appropriately trained and has highlighted the inadequacies in the training sector to provide up-skilling.

The increase in volume of workers needed over the next three years is also causing problems for the industry with a 45 % attrition rate, this is likely to be an ongoing concern. To compound this movement, each proponent and drilling contractor have their own inductions into the industry causing misalignment.

Well servicing is also a growth sector, and will continue to thrive over the life of the wells throughout the Surat Basin. This burgeoning sector will also require new qualifications to meet the capability and safety needs of Industry, and it is recommended that this area be reviewed more closely to determine skills needs.

Drilling operations are supported by camp operations, which require a range of camp management skills and camp utility workers who move with the drillers as they travel from site to site. Camp operations require hospitality skills and asset maintenance (cleaning, grounds, general maintenance) which are becoming increasingly more difficult to find in regional areas.

SUSTAINABLE AND RENEWABLE ENERGY

The Queensland Government is investing in programs to help reduce greenhouse gas emissions from the energy industry. These include clean and renewable energy technology, energy efficiency measures, and low-emission coal technology.

Renewable energy is electricity generated from sources that cannot be depleted. Queensland is rich in renewable energy resources, which include:

- Solar
- Wind
- Geothermal
- Biomass and biofuels (such as bagasse)
- Tidal, wave and hydroelectricity

Renewable energy sources are becoming increasingly important, as they generate less greenhouse gases than conventional power stations and therefore reduce carbon emissions. It is anticipated that these industries will require approximately 1,200 additional workers over the next three years.

In Queensland, the government agency responsible for promoting energy conservation and renewable energy uptake is the Office of Clean Energy. It works with investors, energy companies, and other interested parties to establish clean energy business. Established in October 2008, the Office of Clean Energy is a 'one stop shop' providing policy and program support. The Office assists companies by helping to fast track eligible clean energy projects. It oversees integration of renewable energy, energy efficiency and demand management related projects across Queensland.

The Office of Clean Energy contributes to the Queensland Government's Q2 vision to reduce Queenslanders' carbon footprint by one-third by 2020. Through the Q2 vision and the Queensland Renewable Energy Plan, the Queensland Government is actively pursuing development of clean energy sources. This will help ensure Queensland plays its part to achieve the national target of a 60% reduction in greenhouse gas emissions by 2050.

Renewable Energy Industry Guide

The Renewable Energy Industry Development Guide provides a single reference point for renewable energy developers in Queensland.

Queensland Energy Management Plan

The Queensland Energy Management Plan (QEMP) is a roadmap to help manage electricity growth in a more cost-effective manner. It includes a range of initiatives that will engage electricity customers, electricity distributors and the broader community. A key focus of the QEMP is to ease upward pressure on electricity prices by slowing the current growth in electricity use and peak demand (OCE, 2012).

Low-emission coal technology

Low-emission coal technology (also known as clean coal technology) covers a range of techniques that aim to reduce the carbon dioxide emissions released into the Earth's atmosphere from fossil-fuelled power stations. About 81% of the state's electricity is generated by coal-fired power stations. The challenge for Queensland in the 21st century is to use energy resources more wisely, and to reduce the state's greenhouse gas emissions, especially from electricity production.

In Queensland, research and development is being carried out in 3 major techniques for low emission coal technology (OCE, 2012):

- Pre-combustion capture
- Post-combustion capture
- Oxyfuel combustion.

For more information about low-emission coal technology techniques, research initiatives and demonstration projects currently underway in Queensland, visit Queensland's Energy Futures website.

Emerging Renewable Program

The Australian Government's \$126 million Emerging Renewables Program will support promising new renewable energy and enabling technologies and reflects the Australian Centre for Renewable Energy (ACRE) Board's Strategic Directions.

A minimum of \$40 million will assist the development of renewable energy and enabling technologies with potential to contribute to the generation of large-scale base load power, such as wave, geothermal and enabling technologies. A further \$26.6 million will be targeted at supporting the geothermal energy sector. The Emerging Renewables Program will be administered by ACRE until the establishment of the new Australian Renewable Energy Agency (ARENA). ARENA will administer \$3.2 billion in Australian Government renewable energy investment to promote the research and development, demonstration, commercialisation and deployment of renewable energy projects to improve the sector's competitiveness.

TELECOMMUNICATIONS SERVICES

Within the industry there are different terms and a different understanding can exist about the terms ICT and telecommunications. Generally ICT is understood as the industry comprised of; organisations engaged primarily in providing computer and telecommunications services, as well as hardware sales and services. The ICT industry under this term is integral to banking, healthcare, telecommunications, education, transport, resource exploration, manufacturing, tourism, primary and mineral production, security and the sustainable environment. The term ICT industry is often used to describe a range of different businesses and industry sectors, including those that provided ICT products, goods and services, retail ICT, helpdesks and other professional services. As such, more than 554,000 people work in ICT occupations with the ICT industry directly employing 285,000 of those and contributing 4.6% of Australia's GDP and 4.9% of economic gross

value add (IBSA, 2012). The OECD, Productivity Commission and ABS studies estimate that 50% of all Australian business productivity can be attributed to the application of ICT (IBSA, 2012).

Within the discussion of this report, the term telecommunications industry is used to describe the range of skills that are primarily trained under the ICT training packages (ICT10), and persons trained under the ICT10 training package could be classified as any of the ANZSCO defined occupations as listed in Table 17. Telecommunications therefore, in contrast with the ICT industry is described earlier, leaves out a large range of persons that are working in the ICT industry but are not relevant to Energy Skills Queensland and this report.

Table 17: ICT occupation descriptions

ANZSCO	Occupation Description (nec = not else classified)
223211	ICT Trainer
263111	Computer Network and Systems Engineer
263113	Network Analyst
263212	ICT Support Engineer
263213	ICT Systems Test Engineer
263299	ICT Support and Test Engineers nec
263311	Telecommunications Engineer
263312	Telecommunications Network Engineer
312411	Electronic Engineering Draftsperson
312412	Electronic Engineering Technician
313199	ICT Support Technicians nec
313211	Radiocommunications Technician
313212	Telecommunications Field Engineer
313214	Telecommunications Technical Officer or Technologist
342312	Communications Operator
342411	Cabler (Data and Telecommunications)
342412	Telecommunications Cable Jointer
342413	Telecommunications Linesworker
342414	Telecommunications Technician
899914	Electrical or Telecommunications Trades Assistant

The explosion in connectivity has entrenched telecommunications as a vital part of the day-to-day functioning of Australian businesses and has changed the way Australians interact, with social networking transitioning online. Telecommunications services are currently provided using wired, wireless and satellite infrastructure. Despite the increased demand to communicate, forecasts for 2011-12, revenue for the telecommunications services sector will have actually declined by 2.0% to \$40.1 billion (IBISWorld, 2011c).

Industries within the telecommunications services sector have experienced contrasting results. Once all industries are consolidated, overall sector revenue has remained stable, expected to record an annualised decline of just 0.9% in the five years through 2011-12 (IBISWorld, 2011c). However, over the course of the period there has been an increased demand and use of telecommunications services. Despite the increased demand, intense intra-industry and, more importantly, intra-sector competition has created a fiercely competitive environment where growth in demand has been achieved at the expense of other, more profitable, telecommunications services. The over-riding factor driving the shift in demand has been price-based competition and as such the demand has shifted to lower priced service to benefit the consumer but at the expense of the overall sector revenue.

The gap between demand for and the supply of telecommunications skills threatens Australia's export and productivity gains, innovation capacity and employment growth across the ICT industry. Telecommunications skills are in demand from virtually all sectors with ICT professionals and ICT support technicians providing core skills used for innovation by all industries. Demand trends for telecommunications services from finance, banking and insurance are important because they are significant clients. For financial services, fundamental changes in regulatory systems, business models and management philosophies over the last five years are placing increasing pressure on the sector to not only perform traditional finance functions but also to provide management accounting expertise to inform decision making and identify business opportunities. Also important are trends in the telecommunications services sector, particularly with new broadband and digital services, and the demand for associated software services (IBSA, 2012).

National Broadband Network (NBN)

The roll out of the National Broadband Network (NBN) is seen as a potential catalyst for promoting leadership, innovation and risk management with business at the cross roads of this movement and seeking certainty about widespread community access to high speed broadband. Related products and services are expected to continue to grow with developments in information technology providing increasing economies of scale. These economies of scale may not be equally available to small, medium and large businesses with small businesses at risk of being left behind if they lack the resources and skills to take advantage of the opportunities possible through high speed broadband (IBSA, 2012).

The NBN will impact on the telecommunications workforce with demand for lines workers and cable jointers to deploy the network in the streets. The telecommunications lines workers may require between four and 24 months training depending on their existing skills (IBSA, 2012). Cable jointers also need training depending on their current skills (IBSA, 2012).

The industry is aware the rollout of the NBN will require a mix of both skilled and semi-skilled labour, but as at the time of publication of this report NBN Co, has yet to release any of their workforce planning demand projections. The NBN Co. are still to announce how they intend to deliver and resource this project, making it difficult to determine the correct ratio of skilled and semi-skilled labour required. It has been suggested by a number of analysts in the media, that late 2012 will see a ramp up in delivery of the NBN across Queensland and Australia, and therefore it can be assumed that more accurate workforce information for Queensland will be available in the coming months.

One of the most critical roles to deliver the NBN is Fibre Optic Network Designers. It has been cited that the critical shortage in these roles is causing bottlenecks in project delivery, further delaying the roll-out of the network.

National Broadband Network (NBN) – Environment

The National Broadband Network (NBN) is the largest infrastructure project in the nation's history. Once completed, it will service 93% of the population, with broadband speeds of 100 megabits per second (with capability as high as 1 gigabit per second). For the remaining 7%, broadband services will be provided through a combination of next generation high-speed wireless and satellite technologies, providing broadband speed of 12 megabits per second or more.

The construction phase of the project is still in its very early stages, with eight communities currently able to access NBN fibre services. The rollout of wireless services to rural areas has been accelerated with the first 5 sites set to come online in mid 2012, with completion in 2015. NBN Co. has advised that while skills demand has been low through the trial period (to September 2011) it will now begin ramping up to 2013, when an estimated workforce of 20,000 will be required and maintained for 8 years (EE-OZ, 2012). The current work plan is for 758,000 premises by the end of 2012.

The potential of super-fast broadband to support integrated technologies is considerable, yet imperfectly understood. The evolving use of 'distributed-intelligence microprocessors' to continually monitor and adjust electrical systems has broad ranging applications across business and social settings (EE-OZ, 2012). Continual consultation will be required to ensure that training standards support evolving innovative uses for transferring information.

Deloitte Access Economics reports that adopting smart technologies in electricity, irrigation, health, transport and broadband could add more than 70,000 jobs to the economy in 2014 alone, with further benefits being realized as the network approaches maturity.

National Broadband Network (NBN) – Skills impact

The NBN will contribute to demand for electrotechnology skills through the construction phase and subsequently, where electricians will be involved in installing, maintaining and controlling a number of technologies facilitated by the network (EE-OZ, 2012). Current technologies which will benefit from the network will include energy management, security and safety, intelligent power and lighting, communications and entertainment. The skill implications of the network will vary according to the production stage. The geographical scale of the network is such that at any point in time during the rollout, different communities and regions will be at different stages.

Stage 1 - Infrastructure development

Industry has identified the lead-up period 2012-2013 as a crucial time to develop the skills required to build the network and to ensure that the social and economic benefits flow as broadly as possible.

It is expected that NBN Co.'s stated preference for employing local workers in the construction phase will provide a feedstock of workers around the country with the basic skills required to work in the energy sector industries. Ensuring that training programs are available to up-skill these workers into vocations will remain an industry focus, leveraging the investment in entry level skills.

Stage 2 - Access and enhancement

Connecting premises to the network will be carried out by workers with an open cabler registration, aligning with Certificate II and III qualifications in Data and Voice Communications or Certificate III in Electrotechnology Electrician (with elective units in Data and Voice Communications).

Demand for these workers is already high and training statistics indicate there has yet to be any substantial increase in training numbers nationally. Industry expects short term peaks in local demand for Data and Voice specialists within narrow geographical regions, following the establishment of local network infrastructure. Enterprises are concerned that these local peaks will be insufficient to warrant the development of local specialists; with this work falling to local electricians (approximately 50% of electricians hold an open cabler registration). This will aggravate local shortages of electricians, placing strain on other industry sectors seeking to employ these skills and the broader community.

Stage 3 - Exploitation and maintenance

The network will have specific applications in relation to instrumentation and industrial control, allowing remote monitoring and control of electrical systems to provide optimized efficiency, productivity or comfort. The ability of existing Training Package components to accommodate the development of these skills has been an industry focus in setting priorities for future development (EE-OZ, 2012).

QUEENSLAND AND NATIONAL OVERVIEW

THE ECONOMIC OUTLOOK

The current global economic environment has a direct impact on Australia's economy, business confidence and workforce. During 2011, the positive signs of recovery from the global financial downturn were impacted by growing concerns over sovereign debt problems and the effects on economic growth in Europe and the United States. The slowing of the world economy looks set to continue with forecasts of growth being reliant on the immense emerging economies of China and India, which are largely driven by domestic demand. This macroeconomic environment continues to fuel business and consumer uncertainty, further driving the two speed economy with mining and related services and health and aged care experiencing unparalleled growth, while other industries merely survive (IBSA, 2012).

Global financial market volatility, falling asset prices and the high value Australian Dollar have impacted on consumers and non-mining businesses. The Australian economy appears to be stabilizing with improved business conditions following the sharp decline in the Australian Dollar and the recent interest rate reductions. The GDP growth for the 2010-2011 financial year was 1.8%, and analysts expect it to rise to 2.3% for the 2011-2012 financial year. The unemployment rate in Australia was reported at 5.1% (May 2012, ABS). The number of people employed increased by 20,400 to 11.45 million, driven by an increase in full time and part time employment. Low unemployment is placing pressure on the labour market with many industries reporting labour demand that is not being met by current supply.

Queensland's economy has been experiencing a rapid recovery in recent times. The ingredients of this turnaround have been clear for some time: the hit to coal exports and farm production from 2011's floods and cyclones was temporary, and the ongoing spending on resource sector projects in the State is pushing Queensland's economy up.

Nevertheless, important parts of the Queensland economy are doing poorly. Tourism has been hit by the natural disasters and the financial disaster of the high Australian Dollar. There's similarly news in much of construction – particularly housing – while the retail sector is also seeing mixed results, although it is hoping that recent interest rate cuts will turn the tide on consumer caution.

It's the resource sector that is the driver of growth in this State. Not only is coal production rebounding in the wake of the floods, but the increasing amounts now being spent on new mining production potential is set to bear fruit over the next few years. However, there is the potential for this growth to slow in response the recent UNESCO report on the development around the Great Barrier Reef. If transport routes around the Great Barrier Reef are reduced due to environmental impacts, alternative transport of CSG/LNG and Coal exports will have to be determined.

Although Queensland's population gains have slowed considerably, dropping to the lowest in more than a decade, that still leaves them higher than Australia's population growth (OESR, 2012), and hence a rising share over time. The latest figures from the 2011 census data, show Queensland population is currently 4,3 million, which is an 11% increase from the 2006 census report (ABS, 2012).

Much depends on events in Europe but the resource investment spend in Queensland is well and truly underway and committed, and it would take a very negative outcome in Europe to slow the surge in engineering construction work already underway (McLeish, 2012). That said, although the surge in resource development could increase funds for apartment development this is likely to be in regional not urban centres.

Over the last decade, roughly 25 percent of Australia's growth has been from emerging Asia's growth differential over that period. Looking ahead, analysts suggests that should Asia continue to grow in a similar fashion, Australia's growth dividend could almost double (Hunt, 2010).

Emerging economies are expected to remain the drivers of global economic growth over the short term. In China and India, industrial production growth is assumed to weaken modestly from the very high levels experienced in recent years. In China, the effect of government policies designed to ease inflationary pressures, combined with weaker demand for manufactured goods from key OECD export markets, is expected to lead to economic growth moderating to 9.5% in 2011 and 8.5% in 2012, compared with growth of 10.3% in 2010. Downside risks to China's economic growth over the short term are expected to be limited by the capacity for fiscal stimulus to be implemented in the event of lower than expected demand for Chinese manufactured exports (BREE, 2012b).

In India, tighter monetary policy aimed at reducing inflation is assumed to lead to a moderation of economic growth in 2011 to 8% over the forecast period, compared to growth of 9% in 2010. Robust growth in this economy is expected to be sustained by ongoing investment in infrastructure. In 2011, for other non-OECD Asian economies including Thailand and Vietnam, the impacts of supply chain disruptions as a result of the March earthquake and tsunami in Japan are assumed to dampen growth. As Japan's capital and infrastructure are rebuilt throughout the rest of 2011 and 2012, economic activity within these non-OECD economies is assumed to strengthen (BREE, 2012b).

The energy sector update

Key facts on Australia's energy sector

The information below is produced by the Bureau of Resources and Energy Economics (BREE), and is the most recent information available at the time of publication.

Source: BREE (2012a)

- Australia is endowed with abundant, high quality and diverse renewable and non-renewable energy resources, including coal, gas, uranium, wind and solar.
- The energy industry is a significant contributor to the Australian economy, accounting for around 5% of total industry value added in 2009–10.
- Australia is the world's ninth largest energy producer, accounting for around 2.5% of world energy production and 5% of world energy exports.
- In 2009–10, net energy exports accounted for 68% of domestic energy production, while domestic consumption accounted for the remaining 32%.
- In 2009–10, coal accounted for 37% of total primary energy supply, followed by oil (35%), gas (23%) and renewable energy sources (5%).
- Earnings from energy exports were around \$70 billion in 2010–11, accounting for 33% of the total value of Australia's commodity exports. Coal is Australia's largest energy export earner, followed by crude oil and liquefied natural gas (LNG).
- Most of Australia's electricity is produced using coal, which accounted for about 75% of total electricity generation in 2009–10. Gas accounted for about 15% of electricity generation and renewable energy sources accounted for around 8%.
- Households in Australia face relatively low retail electricity prices compared with many OECD economies.

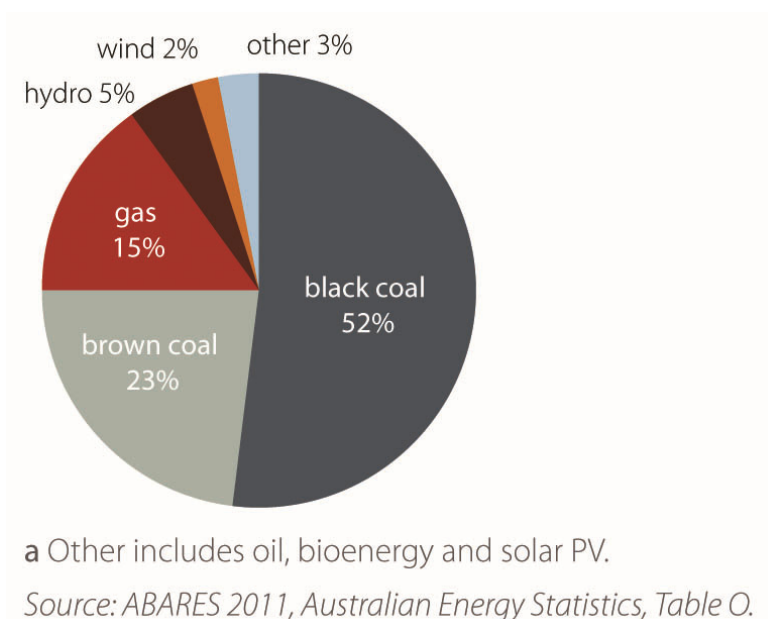


Figure 15: Australia's electricity generation, 2009–10

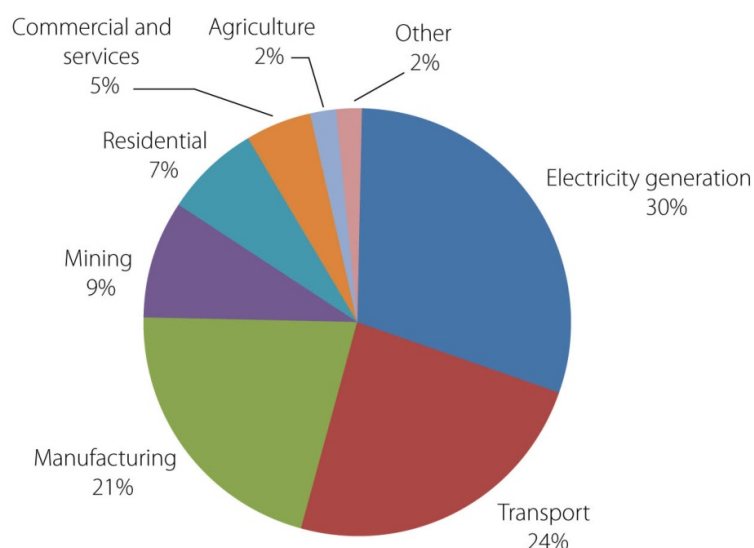


Figure 16: Australia's energy consumption, by industry, 2009–10

Source: ABARES 2011, Table B

For a further overview of Australia's energy resources, please visit the BREE website.

Note: In the electricity generation industry energy consumption is based on energy used for conversion and distribution of electricity.

Future outlook of energy in Australia

Over the medium to longer term there is expected to be a major change in the Australian energy landscape. The most significant change is expected in the energy mix, driven by policies that promote a less emission intensive economy (BREE, 2012a).

The strongest growth prospects are in renewable energy, largely supported by the Renewable Energy Target and the Clean Energy Future plan. Within the renewables sector, the largest expansion is expected to occur in wind energy as it is a relatively mature technology compared with other renewable energy options. Solar and geothermal energy will play a growing role in the energy mix in the future.

Within the non-renewable energy sources, there is expected to be a large increase in the use of gas, particularly in electricity generation where the technology is more cost competitive relative to other low emission options. The growth in gas consumption is likely to be at the expense of coal. Despite this trend, coal is expected to continue to be an important component in the energy mix for some time to come. The development of cost effective lower emissions coal technologies, that include carbon capture and storage, will be critical to maintaining coal's position in electricity generation.

The transition to a lower carbon economy will involve some long-term structural adjustment of the Australian energy sector. Considerable investment is required in energy supply chains to meet the growing demand for energy and to allow for the greater integration of low emission technologies. The changes will also present opportunities, including trade and investment in new industries and technologies, both domestically and in overseas markets.

Clean energy

Renewable energy accounts for around 5% of Australia's energy consumption (BREE, 2012a). Renewable energy sources comprise a small, although growing share of Australia's electricity generation. Energy sources used in electricity generation include wind, hydro, solar energy and bio-energy, and make up around 8% of the electricity generation mix (BREE, 2012a). Wind-powered electricity and solar electricity have exhibited strong growth since 2004–05, albeit from a low base, increasing at an average annual rate of 23% and 21%, respectively (BREE, 2012a).

Renewable energy production increased at an average rate of 1% a year in the five years to 2009–10 (BREE, 2012a). In 2009–10, renewable energy production declined by 0.3% compared with the previous year reflecting a fall in the use of bagasse³ for electricity generation by sugar manufacturers in Queensland and New South Wales. In 2009–10, the strongest growth in renewable energy production occurred in solar-powered electricity generation, which increased by 76%, albeit from a small base. Wind-powered electricity generation and solar hot water also increased considerably, by 26% and 23%, respectively (BREE, 2012a).

In 2009–10, solar accounted for 0.2% of Australia's energy mix (BREE, 2012a). Solar thermal water heating has been the predominant form of solar energy use to date, but electricity generation is increasing through the deployment of PV and concentrating solar thermal technologies. Solar accounted for only 0.1% of total electricity generation in Australia in 2009–10, but has grown by 21% a year on average over the past five years (BREE, 2012a).

The uptake of small scale solar PV has increased significantly in the past few years supported by various Australian and state/territory government programs, such as rebates and feed-in tariffs. From 2001 to 2009, 86,000 solar panel systems were installed with a combined capacity of 123 megawatts. In 2010 there were over 158,000 solar panel installations with a combined capacity of 305 megawatts (BREE, 2012a).

REGULATION AND POLICY

The energy and telecommunication industries have a high degree of regulation relative to most special construction trade industries. It is subject to stringent registration and licensing controls enforced at the state and territory level, which restricts entrance into this industry to suitably qualified practitioners. Further, quality standards set out by Standards Australia in the National Wiring Rules govern the methods of installation, testing techniques and product attributes, and there are regulatory controls and monitoring of compliance by local electricity authorities. Generally, compliance with the strict regulatory environment increases the cost of doing business in this industry, but also directly benefits industry participants by restricting access to the industry and ensuring product standards.

³ Bagasse is the fibrous matter that remains after sugarcane or sorghum stalks are crushed to extract their juice. It is currently used as a bio-fuel and in the manufacture of pulp and paper products and building materials.

Electrical contractors are required to be licensed by the appropriate state based authority. To obtain licenses, contractors must have a technical nominee qualified as a licensed tradesperson. The licensing requirement protects this industry from unlicensed competitors, including home handymen, as all electrical installation and repair work must be done through a licensed contractor. Licensing authorities and electricity-generating authorities regularly undertake random inspections of electrical wiring and installations on new building and industrial sites to ensure the work meets standard specifications. Failure to meet required specifications can lead to the contractor incurring penalties (e.g., demerit points) and the potential loss of licence.

The relevant state and territory licensing authority for Queensland is the Department of Justice and Attorney (Electrical Safety Office). The February 2006 Council of Australian Governments (COAG) meeting laid the foundations for the national recognition of licensing for electrical contractors and a range of other construction trades. COAG's Licence Recognition website, which was launched in February 2007, sets out the arrangements for mutual recognition of licences issued to electricians, electrical fitters, line workers, cable jointers, tradespeople with restricted electrical licences, plumbers and gas-fitters, carpenters and joiners, bricklayers and builders, refrigeration and air conditioning mechanics, and auto-gas installers. These trades were identified as the initial priority areas (skills-shortage trades), with national recognition across all trades the ultimate target. This mutual recognition requires increased engagement on a national basis of the industry and the licensing and regulatory bodies to ensure quality-assurance arrangements for the vocational education and training sector.

Energy policy in Australia

Government policies play an important role in shaping the energy market, and can affect both the pace of energy demand growth and the type of energy used. Policies designed to enhance energy efficiency, for instance, could slow the pace of energy demand growth. Policies designed to enhance energy security may encourage diversity in the types of fuel used in an economy, or where the energy is sourced from. Policies to address environmental issues such as climate change may target a greater uptake of renewable energy technologies.

The Australian Government released the Draft Energy White Paper, *Strengthening the Foundations for Australia's Energy Future* in December 2011. Four main policy priorities are identified within: *i)* enhancing energy policy through regular evaluations, *ii)* furthering competitiveness and efficiency in the energy market through reforms, *iii)* furthering the development of energy resources (with an emphasis on gas), and *iv)* promoting the transition towards clean energy technologies (BREE, 2012a). It is expected that the final Energy White Paper will be released mid 2012.

A key input into the Energy White Paper was the National Energy Security Assessment (NESA), which was also released in December 2011. The NESA found that Australia's overall energy security situation is expected to remain adequate and reliable but increasingly will be shaped by the strength of new investment going forward and the price of energy, which are both being materially influenced by global trends (BREE, 2012a).

The Carbon Tax

Australia has a Renewable Energy Target (RET), which mandates that 45,000 gigawatt hours of Australia's electricity supply will come from renewable energy sources by 2020 (BREE, 2012a). A carbon price will also be introduced from 1 July 2012, which will make large emitters of carbon financially liable for their emissions.

Once the Carbon Tax is introduced in July, 2012, initially the top 500 polluting organisations will pay \$23 per tonne of carbon emissions, with households being compensated for extra costs through tax cuts and increased benefits.

Research into, and consideration of, green and renewable energy is not new to the energy sectors, and there is a growing acknowledgement that a new type of worker, the 'green' collar worker, is required to assist the implementation of green and renewable technologies in the energy sector. Because of the introduction of the carbon tax it is expected that the green collar worker may be in high demand faster than previously expected.

Key Policy Changes

There have been a number of key policy changes over the last 18 months affecting the energy and telecommunications industries including:

- User Choice Reform 2010-2015
- National Licensing
- National Resources Sector Employment Taskforce (NRSET)
- QLD Work Health and Safety Act 2011
- National Energy Customer Framework
- Petroleum Rent Resources Tax (PRRT)

User Choice Reform 2010-2015

The User Choice Reform 2010-2015 Program allows apprentices/trainees and their employers to choose their preferred Registered Trade Organisation (RTO) to deliver accredited training, which is subsequently publicly-funded. The funding comes through programs such as User Choice.

User Choice Reform was implemented in July 2010. At this time, all RTOs in Queensland were required to apply for a Purchasing Online Account (POL) to access publicly-funded training in Queensland. Doing so engendered these RTOs with pre-qualified status to become a supplier of publicly-funded training, including training under User Choice Reform.

As the system has only recently been implemented, there has been limited opportunity for the effects of the Reform to set in. A report by NCVER (2005) "Trading Places: The impact and outcomes of market reform in vocational education and training" assessed the outcomes for the implementation of market reform in general, including User Choice Policy, on the market for training. The following outcomes were identified with reference to User Choice Policy reform:

- Increased competitions as TAFEs are no longer the sole recipients of public VET funds. Overall, the research indicated that TAFE and non-TAFE RTOs traded places with respect to income sources, organisational identity, values and priorities.
- Increased reliance on government VET funds by non-TAFE providers as these organisations successfully compete for public funds.
- Decreased reliance on government VET funds by TAFE providers.
- Positive outcomes with regards to choice, diversity, responsiveness to medium/large enterprises and fee-paying clients, flexibility and innovation.

Challenges were identified with regard to:

- Efficiency (pertaining to high transaction costs and complexity).
- Responsiveness to small enterprises, local communities and government-subsidised students.
- Quality, access and equity.

The report also noted that while User Choice Reform would appear to 'level' the playing field between public and private training providers, the most significant restriction on RTOs is the capital cost associated with entering new markets. For TAFEs, this was the second most significant restriction, with the main issues affecting TAFE competitiveness being the industrial awards and conditions for teachers/trainers as well as the cost of meeting community service obligations. These issues increase overhead costs for providers and, in some ways, put the TAFEs at a competitive disadvantage. However, there is no evidence to suggest this will impact on the expected commencements and completion outcomes for apprentices.

National Occupational Licensing

The National Occupational Licensing System (NOLS) is being developed to remove licensing differences across state and territory borders and provide for a more mobile workforce. Organisations utilising licensed personnel will be able to improve business efficiency and the competitiveness and productivity of the national economy. Initially, four occupational areas will be covered by the NOLS: electrical, plumbing and gas fitting, refrigeration and air conditioning mechanics, and property occupations.

Interim Advisory Committees (IACs) have been established to provide policy advice to the Council of Australian Governments (COAG) National Licensing Steering Committee in the development of national licensing for each occupational area. The Electrical Occupations IAC (EOIAC) and Refrigeration and Air Conditioning Mechanics IAC (RACMIAC) met on a number of occasions since 2010 to develop a series of proposals in relation to:

- License categories, scopes of work and licence types;
- Eligibility requirements, both skills based and non-skill based.

The NOLS program has been put on hold until post July 2012, to ensure that all parties have time to respond to any potential risks or concerns as a result of the proposed licensing changes.

National Resources Sector Employment Taskforce (NRSET)

The National Resources Sector Employment Taskforce (NRSET) was established in 2009 to secure an additional 70,000 plus skilled workers for the resources sector over the next five years. To this end, the Taskforce released a discussion paper in March 2010, receiving 97 submissions in response to the questions posed to industry stakeholders on skills development in the resources sector. Key outcomes from the discussion paper included the following recommendations by the Taskforce in their July 2010 final report.

Table 18: Recommendations and Outcomes (NRSET 2011)

Recommendations - 2009	Outcomes - 2011
A new partnership approach. This included Energy Skills Queensland's discussion paper response recommendation that workforce impact statements be required for large resources projects	All Environmental Impact Statements for major projects must now include a workforce impact statement for consideration of approval.
Increase the number of trade professionals. Achieving this objective could include up-skilling workers, implementing accelerated/competency-based apprentice training, improving induction programs, apprentice sponsorship, recognition of prior learning, and group training arrangements.	Implementation of the National Accelerated Apprenticeship Program which has seen the introduction of the Mentoring Package. This is part of the Australian Government's Building Australia's Future Workforce package which was announced by the Australian Government on 10 May 2011 in the 2011-2012 Budget, and comprises two grants programs, the Mentoring Program (approximately \$80 million, 2011-12 until 2014-15) and the Australian Apprenticeships Advisers Program (around \$21 million, 2011-12 until 2012-13).
Graduate more engineers and geoscientists.	Outcomes still to be determined.
Meet temporary skills shortages with temporary migration.	There were 6,840 applications for the 457 visa granted in QLD for the FY 2010-11, with only 1.7% granted for the Electricity, Gas, Water and Waste Services Industry. While this number is very low, the introduction of the Regional and Enterprise Migration Schemes to fast track 457 visa for skilled and semi-skilled labour aims to improve these numbers. (New figures are expected to be released from DIAC in July to report on progress made June 30, 2012.)
Strengthen workforce participation.	Outcomes still to be determined.
Forge stronger ties between industry and education.	Development of Industry Skills Body's and Industry Skills Committees
Address the need for affordable housing and community infrastructure.	Increase in State Government and private investment of housing for various non-energy sector roles such Police, School Teachers, Hospital workers. An example of this is the investment made to reduce living cost pressures in Gladstone made by the CSG project commencements.

Currently, there are some critical job roles e.g., High Voltage Technicians, who being trained primarily by the ESI industry but are also employed in related industries such as Mining. There is anecdotal evidence these job roles are often “poached” by the mining sector that have a greater capacity to pay higher wages. Given the competition for labour, there are potential partnership opportunities the industry could seek with NRSET to ensure training needs are being matched to external demands.

Queensland Work Health and Safety Act 2011

The Act, associated Regulations and revised Code of Practice, commenced on 1 January 2012, with the aim to provide a balanced and nationally consistent OH&S framework. To date, each Australian state has worked under state regulations for Workplace Health and Safety. The greatest benefits will be found by organisations that operate Australia wide and have a mobile workforce as the regulations will apply across all states, reducing OH&S training costs.

There are a number of changes in the Act that will impact Queensland businesses and the way they currently operate with regards to Health and Safety. One of the key changes most likely to impact SME sized Electrical Contractors in Queensland is the removal of the requirement of organisations with 30 or more staff, to have a trained member of staff with a Health and Safety certificate. Whilst on paper it seems this will eliminate this job role because it is no longer required by law, the reality is that organisations still need to make sure Health and Safety obligations are being met. Therefore it is safe to assume these job roles will continue to exist. As the Act includes elected Health & Safety Representatives who require specific OH&S training and engagement and this provides an alternative group to provide safety support to the business.

Under the old legislation, many larger organisations held exemptions in the form of Enforcement Notes for minor construction projects. The new legislative framework significantly broadens the definition of construction work, effectively capturing the majority of the field work. This will change under the new legislation and will require organisations to broaden their Work Health and Safety Management Plans with the introduction of Safe Work Method Statements for high risk construction activities. These statements are similar to the Standard Work Practice audits which are reviewed at the commencement of a new job or task. However, this is most likely to impact the way work site hazards are managed, and is not likely to impact delivery timeframes.

The safety audit requirement to ‘test and tag’ all equipment used to perform every day business, from extension leads to drills, have increased from occurring every six months to every three months under the new legislation due primarily to the broader construction definition. This could impact organisations that may need to increase the number of FTE’s required to perform this work.

Another key change in the legislation is the increase of Penalties for Health and Safety offences. There are three categories of offences (see Table 19), and it is important to note the increase of the maximum penalty from \$1 million to \$3 million and the introduction of a jail term for reckless behaviour.

The requirement for more intensive worker consultation has also been introduced and this could impact organisations that have workers who fall out of the standard type of worker e.g., volunteers.

Table 19: Categories of penalties according to changes in OHSR

Category	Fine	Sentence	Definition
Category 1: recklessly exposes a person to risk of death or serious injury or illness	\$3m Corporations \$600k Individuals	5 Years Imprisonment	Reckless = intentional, wilful, or grossly negligent
Category 2: serious risk of harm without recklessness	\$1.5m Corporations \$300k Individuals	Nil	
Category 3: fails to comply with WHS duty	\$0.5m Corporations \$100k Individuals	Nil	

National Energy Customer Framework

The National Energy Customer Framework (NECF) will implement reform under Clause 14 of the Australian Energy Market Agreement in relation to the non-economic regulation of energy distributors and for regulation (excluding price regulation) of energy retailers. This reform encompasses the transfer of current state and territory responsibilities to the National Electricity Law, National Gas Law and the National Energy Retail Law. The main objectives of the NECF are to:

- Streamline the regulation of energy distribution and retail regulation functions in a national framework
- Develop an efficient national retail energy market including appropriate consumer protection.

The NECF covers a range of subject matters, including:

- The governance model, including a contractual model that forms the basis of the framework
- Supply of energy to retail customers including a regulatory obligation to offer supply to small customers
- Provision of customer distribution services to customers
- Arrangements between distributors and retailers in provision of energy services to customers
- Authorisations
- Enhancements to the enforcement and compliance regime.

The legislation to give effect to the NECF was passed by the South Australian Parliament and received the Royal Assent in March 2011. The Ministerial Council on Energy has agreed on a target implementation date of 1 July 2012 for the National Energy Customer Framework. While the NECF is likely to impact the customer facing and support staff of some organisations, there has been little impact identified on the job roles being reviewed in this report.

SKILLS REFORM

The Australian Government is investing in skills reform to provide a platform to maintain and grow Australia's productivity and increase participation. Around \$3 billion will be spent on initiatives over 6 years including reform of the national VET system. The program comprises the following key initiatives:

- A \$558 million National Workforce Development Fund (NWDF), which will place industry at the heart of the training effort
- Apprenticeships that work for more Australians – \$100 million to support new approaches to training and \$101 million for mentoring to support apprentices and trainees through to completion of their training
- VET to meet the longer term needs of the economy – review of the Australian Government's \$1.4 billion per annum investment in the National Agreement on Skills and Workforce Development and an additional investment of \$1.75 billion over five years from 2012-2013 under a new national partnership with the states and territories to make the VET system more transparent and productive, and
- Building better skills for workforce participation through policies and programs to improve the workforce participation of single and teenage mothers, and increasing commencements for job seekers in the Australian Government's language, literacy and numeracy program (LLNP).

In terms of the Electrotechnology and Telecommunications Industries, this provides significant scope to access funding for new and existing workers to meet the future skill needs by opportunities such as:

- The NWDF will support subsidised training in higher qualifications and skill sets on the priority occupations list, and
- Securing support for additional traineeships and apprenticeships and developing strategies to close the gap between commencements and completions.

A recent Skills Australia's report, *Skills for Prosperity: a roadmap for vocational education and training* provides a blueprint for VET's key role in improving Australian workforce development. The key challenge is workforce participation, and in particular: increasing foundation skills; better use of existing skills and knowledge; and matching skills with enterprise needs. Three areas highlighted in the report as critical for the VET sector include:

- An increase in participation in vocational learning, acquisition of a deeper level of skills by individuals and improved qualification outcomes
- An increase in skills use and innovation by enterprises, and
- An increase in workforce participation and social inclusion in communities.

MAJOR PROJECT UPDATE

Electricity generation

Projects committed in the past 12 months

Figure 17 gives a nationwide overview of the Advanced Electricity Generation Projects as reported by BREE. The projects relevant to Queensland are as discussed below. Bow Energy is developing the 30 megawatt coal seam gas-fired Blackwater Power Project in Queensland at an estimated capital cost of \$35 million which is scheduled to be completed in 2012.

Several commercial scale hybrid plants are currently proposed in Australia. The Solar Dawn project in Queensland proposes a 250 megawatt solar thermal-gas hybrid plant, expected to be operational in 2015. This project is aimed at maintaining constant electricity generation and optimising energy use, with a low emissions profile. Solar Dawn is being pursued by the Solar Dawn consortium that includes AREVA Solar and Wind Prospect. The Queensland based Solar Dawn project is the largest solar project in terms of capital expenditure and planned capacity. The Solar Dawn project is being developed near the Kogan Creek Solar project in southwest Queensland by the Solar Dawn consortium. The project has a planned capacity of 250 megawatts at a capital cost of \$1.2 billion. Whilst State funding was withdrawn from this project under the Newman government, it is expected that the project will continue with alternative sources of investment.

TRUenergy's Blackstone and Aldoga Power Stations in Queensland are the largest gas-fired projects at a less advanced stage of development, with a potential capacity of 1500 megawatts each. Both projects will have an initial capacity of 500 megawatts. At full capacity these projects will represent 16% of the proposed capacity of gas-fired projects at a less advanced stage of development and 6% of total proposed capacity. The remaining five projects being developed in Queensland include: APA Group and AGL Energy's Diamantina power station (242 megawatts); ERM Power's Braemar 4 expansion (550 megawatts); and Westlink's Westlink Power project (200 to 300 megawatts). There are four wind projects being developed in Queensland with a total capacity of 1155 megawatts, including Windlab's Kennedy Wind Farm (750 megawatts).



Figure 17: Advanced Electricity Generation Projects: October 2011 (Stark, Martin, & Penney, 2011)

Table 20: Proposed electricity generation projects 2012-2015**Proposed electricity generation projects 2012 - 2015:**

	New Capacity (MW)	Employment	# projects
Queensland	11,000	13,000	26
Australia	51,000	25,000	185
Queensland as % of AUS	21%	51%	14%

Transmission

In 2009–10, Australia’s principal electricity generation capacity was around 54 gigawatts (BREE, 2012a). Average capacity utilisation remained between 49% and 56% over the past five years (BREE, 2012a). The majority of Australia’s electricity generation is supplied by steam plants, using coal or gas. Most of Australia’s black coal-fired generation capacity is located in New South Wales and Queensland, while Queensland also has the largest gas-fired generation capacity.

As at the end of October 2011, there were 19 major electricity generation projects at an advanced stage of development on BREE’s list (see the BREE website for full list). These projects have a combined capacity of 2.668 megawatts and a capital cost of around \$4.8 billion from a range of energy sources (BREE, 2012a). Seven of these projects are wind-powered, representing 41% of the announced capacity of advanced electricity projects. Gas-fired projects account for a further 37% of planned capacity, black coal-fired projects 17%, and hydroelectricity and solar-powered projects account for the remaining 5% (BREE, 2012a). A further 167 major electricity generation projects were at a less advanced stage with a combined potential generation capacity of 47.187 megawatts (BREE, 2012a).

The NEM is connected by six major transmission interconnectors. These interconnectors link the electricity networks in New South Wales, Queensland, South Australia, Tasmania and Victoria. The NEM electricity transmission and distribution networks consist of around 787.300 kilometres of overhead transmission and distribution lines and around 119.500 kilometres of underground cables (BREE, 2012a). There are a number of projects that are under development to expand the capabilities of the interconnector system. AEMO lists 25 transmission projects in the Electricity Statement of Opportunities 2011 report. Table 21 identifies the nine projects scheduled to be completed in 2011–12 (BREE, 2012a).

Table 21: Major committed transmission projects for Australia’s National Electricity Market ^a (AEMO, 2011)

Region	Project details
New South Wales	Upgrading the Tamworth-Armidale 330 kV line 86 conductor clearance to improve the thermal rating
New South Wales	Commissioning the Armidale 330 kV SVC power oscillation damper
Queensland	Installation of a 220 MVar capacitor bank at the Belmont 275 kV substation and a 50 MVar capacitor bank at each of Loganlea and Ashgrove West 110 kV substations
Queensland	Replacing the 132 kV line from Ingham to Yabulu substations
Queensland	Installing two 120 MVar capacitor banks on the Millmerran-Middle Ridge 330 kV circuits (at the Middle Ridge end) and a 200 MVar capacitor bank at the Millmerran 330 kV substation
South Australia	Construction of a 275/66 kV connection point at Mount Barker South

Region	Project details
South Australia	Construction of a 275/132 kV injection point to provide supply to Dorrien and feed Roseworthy
South Australia	Establishing the City West Substation with two 300 MVA, 275/66 kV transformers and independent 275 kV supply from Torrens Island
South Australia	Expanding the capacity of the Kadina East substation by installing two 60 MVA 132/33 kV transformers and associated works

^a Scheduled to be completed in 2011–12.

Resources

Regional expansion

The expansion of resource extraction industries is expected to benefit specific areas within the Darling Downs, North West and South West statistical divisions. In the 10 years to 2022, the population of Western Downs is projected to grown by 4,300, Mount Isa City by 2,500 and Maranoa by 2,000 people (OESR, 2011). Scenic Rim is projected to have the second fastest growth rate, with an average annual population change over the 10 years to 2022 of 3.5% (OESR, 2011). Gladstone and Isaac are also expected to experience relative fast population growth rates, as a result of expansion in resource activity (OESR, 2011).

Table 22: 10 fastest growing local government areas^(a), Queensland (OESR, 2012)

Local government area	Estimated resident population at 30 June				Average annual change 10 years to 30 June 2011		Annual change Year to 30 June 2011	
	2001	2006	2010 ^r	2011 ^p	June 2011	% ^(b)	June 2011	%
Cook (S)	3,710	3,700	3,970	4,220	50	1.3	250	6.4
Gladstone (R)	46,370	53,940	60,200	62,320	1,600	3	2,120	3.5
Somerset (R)	18,090	19,680	22,480	23,140	510	2.5	660	2.9
Ipswich (C)	125,450	142,480	167,820	172,740	4,730	3.3	4,920	2.9
Western Downs (R)	29,280	30,180	32,010	32,830	360	1.2	820	2.6
Central Highlands (R)	25,060	28,260	31,020	31,780	670	2.4	760	2.5
Townsville (C)	144,790	165,280	185,420	189,930	4,510	2.8	4,510	2.4
Northern Peninsula Area (R)	2,100	2,140	2,380	2,440	30	1.5	60	2.4
Lockyer Valley (R)	28,670	31,930	36,520	37,370	870	2.7	850	2.3
Moreton Bay (R)	286,530	332,860	381,570	389,680	10,320	3.1	8,120	2.1
Queensland	3,628,950	4,090,910	4,505,430	4,580,280	95,130	2.4	74,850	1.7

p = preliminary r = revised (C) City (R) Regional Council (S) Shire

(a) Excludes LGAs with a starting population of less than 2,000 at 30 June 2010

(b) Average annual growth rate

Note: Top 10, ranked by % change, year to 30 June 2011

Note: Population figures are rounded to the nearest 10 and as a result may not add to totals shown. Unrounded figures are available on the OESR website

The fastest growing local government areas displayed in Table 22. Notable are the Gladstone, Ipswich and Moreton Bay regions, with over 3% average annual growth over the past 10 years. It is anticipated that the flow-on economic activity associated with developing mineral and energy resources will lead to higher population growth rates in other centres in the region. Mackay in particular is projected to increase its population growth, from 21,500 people in the decade to 2006 to 34,700 in the decade to 2021, equivalent to an average annual growth rate of 2.6% from 2011 to 2021 (OESR, 2012). Figure 18 shows the advanced minerals and energy projects that will contribute to this expected regional growth.

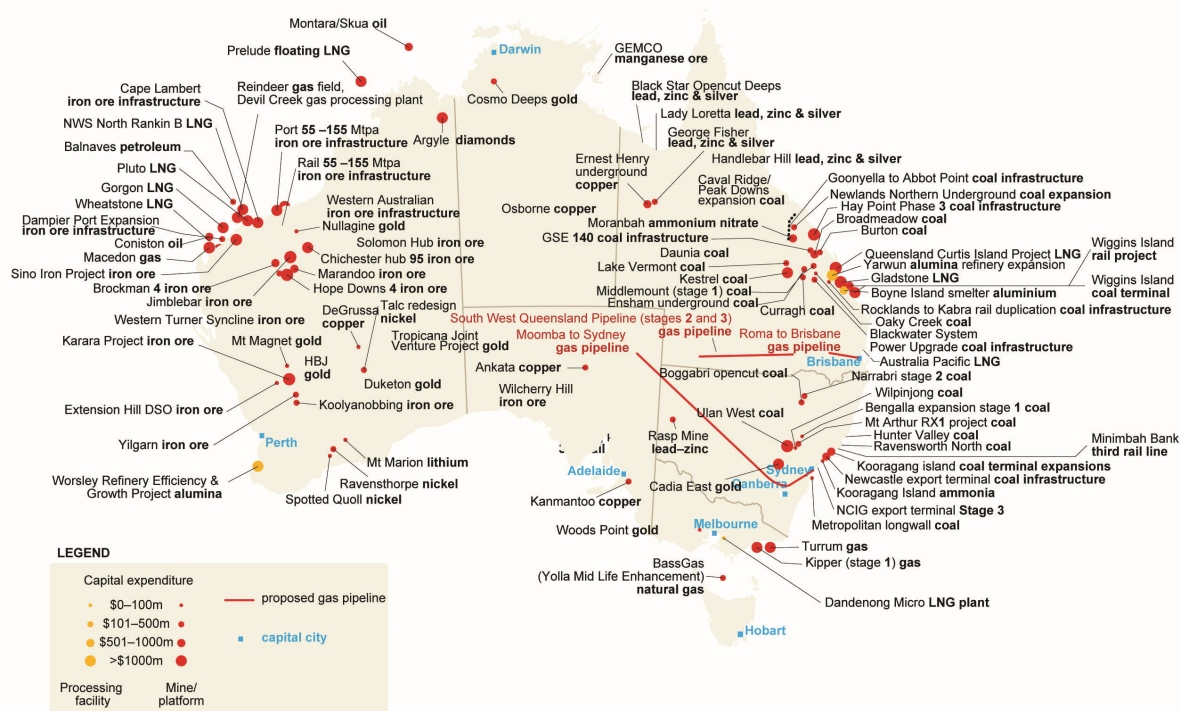


Figure 18: Advanced minerals and energy projects October 2011 (BREE, 2011)

With the currently proposed projects, a massive employment of nearly 80,000 workers is proposed over the next five years for Queensland. Though few consider it realistic that all projects will go ahead, projects already committed will account for an increase in the workforce of nearly 25,000 persons in the next five years.

Table 23: Current proposed projects, last update October 2011

	All Proposed mining projects		Committed mining projects	
	Employment	# projects	Employment	# projects
Queensland	78,000	228	25,000	22
Australia	177,000	404	60,000	72
Queensland as % of Australia	44%	56%	41%	31%

The National Broadband Network (NBN)

The \$43 billion National Broadband Network is Australia's largest infrastructure project and is expected to impact on the electrical (ESI and electrotechnology) and telecommunications labour markets. To be built over eight years, it will provide 93% of all Australian premises with fibre-based services and the remaining 7% with next generation wireless and satellite.

Construction of the NBN alone will see an unprecedented demand for skilled workers including fibre designers, ICT engineers, fibre jointers and testers, as well as the expected roles of electrical lineworkers, telecommunications lineworkers, cable jointers, labourers and earthmoving plant operators. Providing a suitably-qualified and skilled workforce to construct it is critical to ensuring quality of the network, timely achievement of milestones and the effective mitigation of risk. NBN Co. is consequently developing a Workforce Development Strategy to address this and to define the following:

- The national supply of appropriate skilled resources versus the demand for these resources, and what potential gaps will require intervention.
- The relevant training programs and qualifications, providers and funding sources to support the development of skills and capabilities.
- An approach to provide assurance that the workforce engaged on the NBN has the required skills and qualifications.

The rollout of the cabling is just one part of a much larger labour and skills requirement presented by the NBN. On the customer premises side (i.e., beyond the network boundary), there will be significant opportunities for workers to assist customers with installation of digital televisions, home security systems, IPTV and other forms of interactive entertainment.

The NBN has already commenced in Queensland. The first trial site was at Townsville, with the second 'release sites' already selected at Springfield and North Brisbane for commencement mid-2011. The programs rollout will create an extra 4,500 jobs in Queensland's Information and Communications Technology (ICT) sector and 30,000 new jobs across Australia (Communications and Information Technology Training Limited 2009) in a variety of trades and para-professional occupations.

The roll-out of the NBN in QLD has been slowed due to a number of reasons. Primarily due to the skill shortage of qualified Fibre Network Designers, as well as delay in NBN Co accredited training courses being created and delivered for various skills. Both issues are creating bottlenecks for both skilled and un-skilled workers to enter into this sector. The increased competition in regional areas for contracts to deliver the roll-out, is also likely to increase wage pressures for small businesses, but still presents opportunities for regional operators to benefit from the increased work available in this sector.

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Technical notes

This publication was prepared by Energy Skills Queensland, as a continuance in the series of annual reports produced by Energy Skills Queensland. Data used in this report is based on various sources, as referenced where appropriate.

Caution should be applied when comparing output data to that contained in previous editions of Energy Skills Queensland's annual reports and other sources. Historic data, such as for example apprentice and traineeship data always experience lag, and as such when new data is acquired from sources such as NCVER and DET, historical numbers are possible to change. For further information see the notes on ABS and NCVER data below.

Figures and tables included in text and commentary throughout this publication have been rounded, unless stated otherwise.

Assumptions and limitations around ABS and NCVER data

ABS Labour Force Survey

Every month, the ABS runs a Labour Force Survey across Australia covering almost 30,000 homes as well as a selection of hotels, hospitals, boarding schools, colleges, prisons and Indigenous communities. Apart from the Census, the Labour Force Survey is the largest household collection undertaken by the ABS. Data are collected for about 60,000 people and these people live in a broad range of areas and have diverse backgrounds - they are a very good representation of the Australian population. From this information, the ABS produces a wide variety of statistics that paint a picture of the labour market. Most statistics are produced using established international standards, to ensure they can be easily compared with the rest of the world. The ABS has also introduced new statistics in recent years that bring to light further aspects of the labour market. It can be informative to look at all of these indicators to get a grasp of what is happening, particularly when the economy is changing quickly.

One thing to remember about the ABS labour force figures is that when a publication states that, for example, 11.4 million Australians are employed, the ABS has not actually checked with each and every one of these people. In common with most statistics produced, the ABS surveys a sample of people across Australia and then scales up the results – based on the latest population figures - to give a total for the whole country. Because the figures are from a sample, they are subject to possible error. The Labour Force Survey is a large one, so the error is minimised. The ABS provides information about the possible size of the error to help users understand how reliable the estimates are.

It is important to note that using detailed occupational data (i.e., ANZSCO – 6 digit) must be approached with caution due to statistical reliability and sampling errors.

NCVER VOCSTATS Database

VOCSTATS is a SuperWEB product which allows users to construct their own tables via an interactive web interface, using databases containing data from various NCVER collections. The data selected are loaded as a SuperWEB table allowing the user to manipulate the table to customise it for their own use. Tables can then be printed or exported in a variety of formats.

Data presented in NCVER VOCSTATS database include the following:

- Apprentices and trainees
- Students and courses
- Student outcomes

These databases are based on the NCVER collections; Apprentice and Trainee Collection, VET Provider Collection, Student Outcome Survey. There are some limitations with VOCSTATS mainly due to timeliness. In some instances, there are delays in receiving apprentice and trainee data from each state and territory which occasionally have an impact on NCVER data processing timetable and hence updating VOCSTATS.

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