



AUSTRALIAN  
INDUSTRY  
STANDARDS

# ELECTROTECHNOLOGY IRC WORKPLAN



**SECTOR  
OVERVIEW**

A black and white photograph of a technician wearing a hard hat and a light-colored shirt, working on a large air conditioning unit. The technician is focused on a bundle of wires.

**EMPLOYMENT**

A close-up photograph of hands working on a circuit board. The image is overlaid with a semi-transparent pink filter.

**SECTORAL  
INSIGHTS**

A photograph of hands holding a document with handwritten notes. The image is overlaid with a semi-transparent pink filter.

**SKILLS  
OUTLOOK**

A photograph of hands working on a circuit board with a screwdriver. The image is overlaid with a semi-transparent pink filter.

**TRAINING  
PRODUCT  
REVIEW PLAN  
2016-17 – 2019-20**

A photograph of hands holding a white electronic component. The image is overlaid with a semi-transparent pink filter.

**IRC  
SIGNOFF**

A photograph of hands holding a component. The image is overlaid with a semi-transparent pink filter.



## ELECTROTECHNOLOGY IRC WORKPLAN

This Four-Year Workplan has been submitted by the Electrotechnology Industry Reference Committee (IRC) to Australian Industry and Skills Committee (AISC) for approval.

The Workplan identifies the priority skill needs of the Electrotechnology industry following a research and stakeholder consultation process conducted by Australian Industry Standards on behalf of the IRC.

Once approved by the AISC the Workplan informs the development of a four year rolling National Schedule for development and review work of the Electrotechnology Training Package. More information on the National Schedule can be found at: [www.aisc.net.au/content/national-schedule](http://www.aisc.net.au/content/national-schedule)

This Workplan was agreed to by the Electrotechnology IRC Interim Chair on Monday, 26 September 2016:

Larry Moore  
**ELECTROTECHNOLOGY IRC INTERIM CHAIR**

### HOW TO USE THIS DOCUMENT



This document contains links to assist the reader to navigate efficiently through the content of the Workplan. The tiles on the cover page, and the divider pages will link to the relevant content when clicked with a mouse, or touched on a tablet device.

The tiles at the bottom of pages can be clicked to return to the beginning of each section, or the front page of the Workplan as required.



## **ELECTROTECHNOLOGY INDUSTRY REFERENCE COMMITTEE**

The Electrotechnology Industry Reference Committee (IRC) has been assigned responsibility for the Electrotechnology Training Package.

The UEE11 Electrotechnology Training Package provides the only nationally recognised Vocational Education and Training (VET) qualifications for occupations involved in: electronics, electrical, communications, control systems, instrumentation, lifts, refrigeration and air conditioning, renewable/sustainable energy, fire and security, appliances, gaming and rail.

More information about the Electrotechnology IRC and its work can be found here:

<http://www.australianindustrystandards.org.au/committee/electrotechnology-industry-reference-committee/>

# ELECTROTECHNOLOGY SECTOR OVERVIEW



**ELECTROTECHNOLOGY  
INDUSTRY OVERVIEW**



**TRAINING  
PACKAGE  
OVERVIEW**



**BUSINESS  
ANALYSIS**



**KEY  
STAKEHOLDERS**



**INDUSTRY  
CHALLENGES AND  
OPPORTUNITIES**

**FRONT PAGE**



## ELECTROTECHNOLOGY INDUSTRY OVERVIEW

The Electrotechnology industry includes the design, maintenance, installation and repair for all electrical and electronic equipment. The technology stretches across a number of other sectors including mining, manufacturing, ICT and communications, construction, renewables, domestic and commercial refrigeration and air-conditioning. The electrical services industry (a subsector within Electrotechnology) involves electrical wiring or fittings in buildings and other construction projects; and repair and maintenance of existing electrical equipment and fixtures. The Electrotechnology industry is a \$85.5 billion revenue industry employing nearly 340,000 people.

The UEE11 Electrotechnology Training Package provides the only nationally recognised Vocational Education and Training (VET) qualifications for occupations involved in: electronics, electrical, communications, control systems, instrumentation, lifts, refrigeration and air conditioning, renewable/sustainable energy, fire and security, appliances, gaming and rail.

The UEE11 Electrotechnology Training Package comprises 87 qualifications, 75 skill sets, 612 units of competency and associated assessment requirements and covers: electrotechnology, electrical, electronics, hazardous areas, instrumentation, rail signalling, refrigeration and air-conditioning, renewable and sustainable energy.

### The UEE11 Electrotechnology Training Package contains the following qualifications:

- Certificate I in ElectroComms Skills
- Certificate II in Split Air-conditioning and Heat Pump Systems
- Certificate II in Electronic Assembly
- Certificate II in Sustainable Energy (Career Start)
- Certificate II in Fire Alarms Servicing
- Certificate II in Computer Assembly and Repair
- Certificate II in Electronics
- Certificate II in Remote Area Essential Service
- Certificate II in Electrical Wholesaling
- Certificate II in Remote Area Power Supply Maintenance
- Certificate II in Winding and Assembly
- Certificate II in Antennae Equipment
- Certificate II in Security Assembly and Set-up
- Certificate II in Technical Support
- Certificate II in Electrotechnology (Career Start)
- Certificate II in Data and Voice Communications
- Certificate III in Air-conditioning and Refrigeration
- Certificate III in Electrotechnology Electrician
- Certificate III in Switchgear and Controlgear
- Certificate III in Electronics and Communications
- Certificate III in Gaming Electronics
- Certificate III in Business Equipment
- Certificate III in Custom Electronics Installations
- Certificate III in Renewable Energy - ELV
- Certificate III in Electrical Fitting
- Certificate III in Rail - Communications and Networks
- Certificate III in Data and Voice Communications
- Certificate III in Electrical Machine Repair
- Certificate III in Appliance Service
- Certificate III in Fire Protection Control
- Certificate III in Instrumentation and Control
- Certificate III in Security Equipment
- Certificate III in Computer Systems Equipment
- Certificate IV in Refrigeration and Air-conditioning Systems



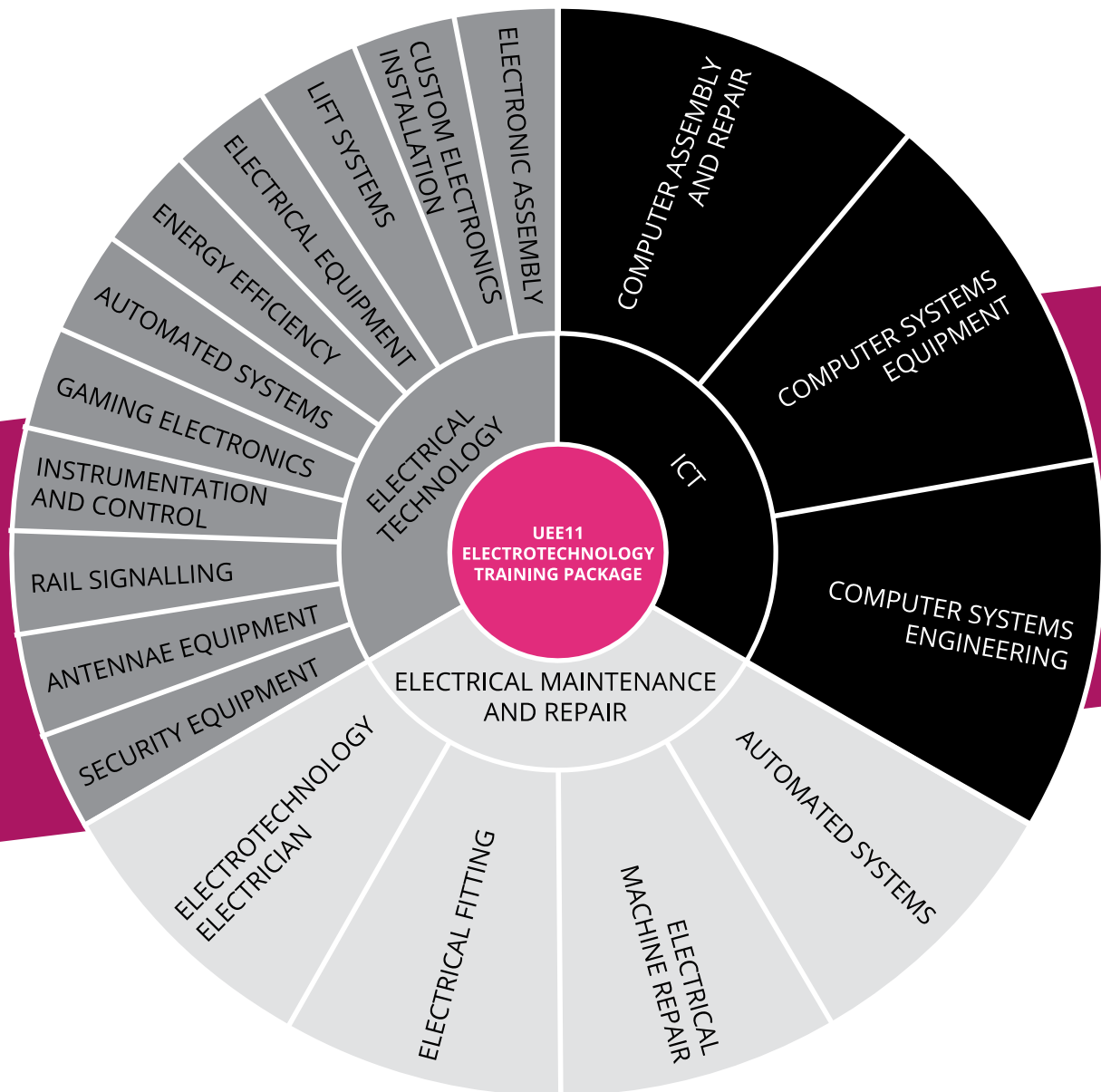
- Certificate IV in Air-conditioning and Refrigeration Servicing
- Certificate IV in Air-conditioning Systems Energy Management and Control
- Certificate IV in Electrical - Fire Protection Control Systems
- Certificate IV in Electrical - Instrumentation
- Certificate IV in Electrical Equipment and Systems
- Certificate IV in Electrotechnology - Systems Electrician
- Certificate IV in Computer Systems
- Certificate IV in Energy Management and Control
- Certificate IV in Electrotechnology - Electrical Contracting
- Certificate IV in Energy Efficiency and Assessment
- Certificate IV in Installation Inspection and Audits
- Certificate IV in Hazardous areas - Electrical
- Certificate IV in Electrical - Data and Voice Communications
- Certificate IV in Electrical - Lift Systems
- Certificate IV in Renewable Energy
- Certificate IV in Industrial Electronics and Control
- Certificate IV in Electronics and Communications
- Certificate IV in Video and Audio Systems
- Certificate IV in Electrical - Photovoltaic Systems
- Certificate IV in Electrical - Air-conditioning Split Systems
- Certificate IV in Industrial Automation and Control
- Certificate IV in Rail - Communications and Network Systems
- Certificate IV in Instrumentation and Control
- Certificate IV in Electrical - Rail Signalling
- Certificate IV in Electrical - Renewable Energy
- Diploma of Air-conditioning and Refrigeration Engineering
- Diploma of Engineering Technology - Refrigeration and Air-conditioning
- Diploma of Electrical and Instrumentation
- Diploma of Electrical Systems Engineering
- Diploma of Electrical Engineering
- Diploma of Industrial Electronics and Control Engineering
- Diploma of Renewable Energy Engineering
- Diploma of Research and Development
- Diploma of Instrumentation and Control Engineering
- Diploma of Computer Systems Engineering
- Diploma of Electrical and Refrigeration and Air-conditioning
- Diploma of Electronics and Communications Engineering
- Advanced Diploma of Engineering Technology - Air-conditioning and Refrigeration
- Advanced Diploma of Electrical - Engineering
- Advanced Diploma of Air-conditioning and Refrigeration Engineering
- Advanced Diploma of Electrical Engineering - Coal Mining
- Advanced Diploma of Engineering Technology - Renewable Energy
- Advanced Diploma of Engineering Technology - Electrical
- Advanced Diploma of Automated Systems Maintenance Engineering
- Advanced Diploma of Electrical Systems Engineering
- Advanced Diploma of Engineering - Explosion Protection
- Advanced Diploma of Instrumentation and Control Engineering
- Advanced Diploma of Renewable Energy Engineering
- Advanced Diploma of Computer Systems Engineering
- Advanced Diploma of Engineering Technology - Computer Systems
- Advanced Diploma of Industrial Electronics and Control Engineering
- Advanced Diploma of Engineering Technology - Electronics
- Advanced Diploma of Electronics and Communications Engineering

**SECTOR OVERVIEW**

**FRONT PAGE**

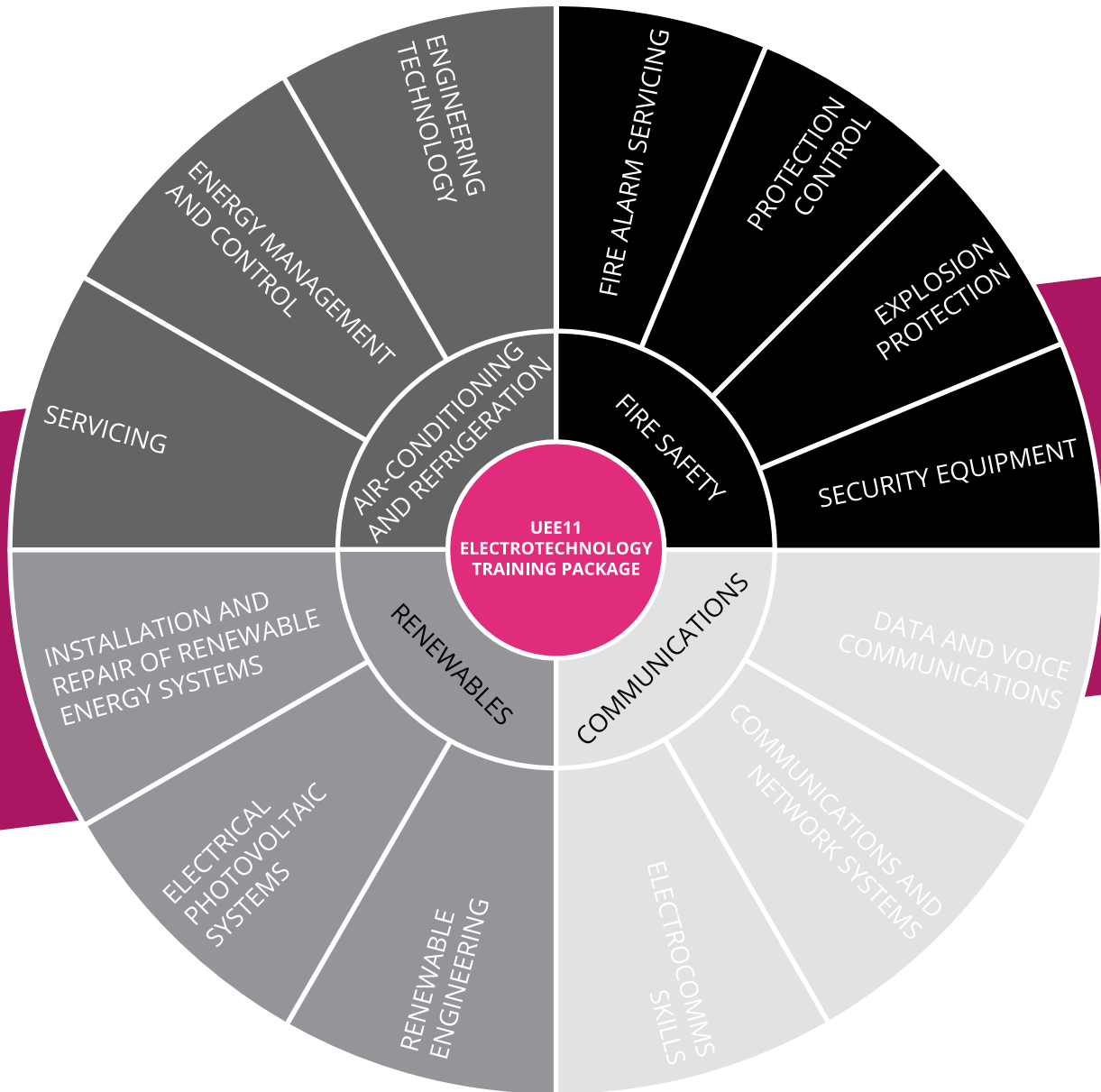


## ELECTROTECHNOLOGY TRAINING PACKAGE ARCHITECTURE



**SECTOR OVERVIEW**

**FRONT PAGE**



**SECTOR OVERVIEW**  
**FRONT PAGE**

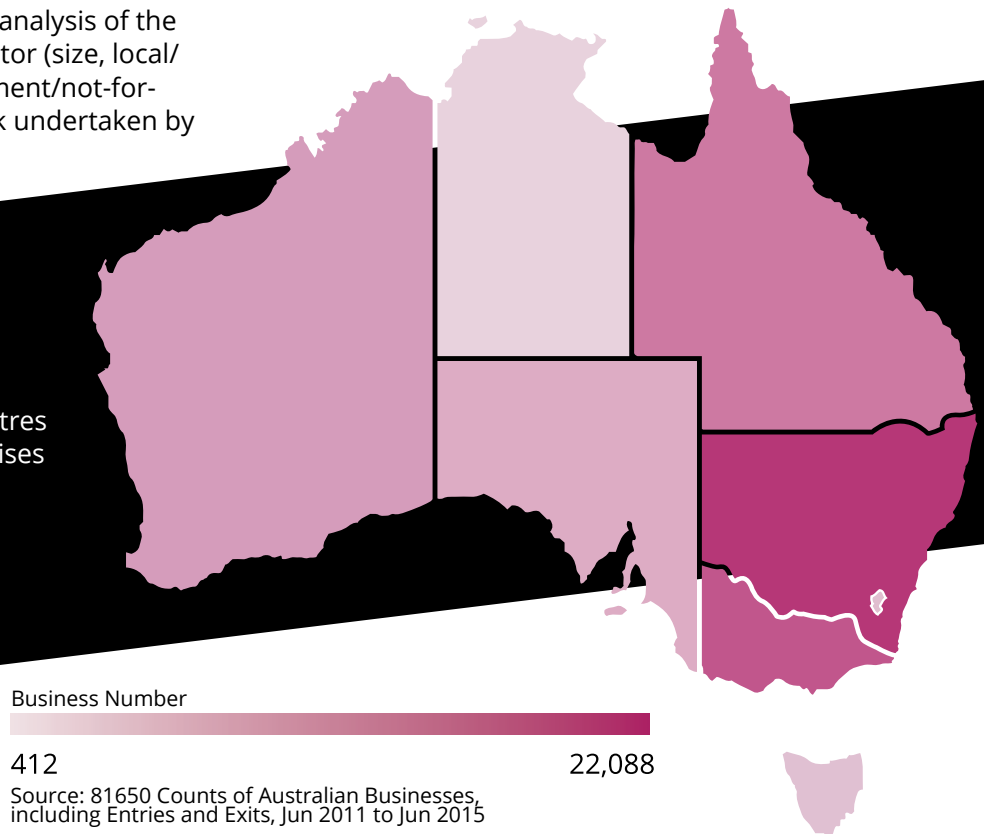




## ELECTROTECHNOLOGY BUSINESS ANALYSIS

The following image provides analysis of the businesses involved in the sector (size, local/state/national/global, government/not-for-profit/for-profit, scope of work undertaken by those businesses).

Enterprises are most concentrated in populous centres with ACT having most enterprises per capita.

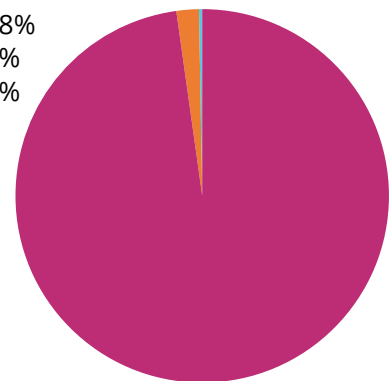


### Business Analysis Metrics

Revenue (\$m)	85,537.50
Profit (\$ m)	11834.5
Average Wage (\$)	78,185.65
No. of Businesses	50215
Employment Growth (% to 2021)	7%

### Business Size (Composition)

Small	97.8%
Medium	2.1%
Large	0.1%





## KEY ELECTROTECHNOLOGY STAKEHOLDERS

Stakeholder Category	Organisation	
<b>Employers</b>	ActewAGL Ausgrid AusNet Services ElectraNet Energy Australia Essential Energy	Powerlink QLD TasNetworks Transend Networks Transgrid Western Power Power and Water Corporation - NT
<b>Employer Representatives</b>	Air-conditioning and Mechanical Contractors Association Australian Energy Storage Council Australian Institute of Refrigeration, Air-conditioning and Heating Clean Energy Council Institute of Instrumentation Control & Automation	Master Electricians Australia National Electrical & Communications Association National Electrical Switchboard Manufacturers Association Refrigeration and Air Conditioning Contractors Association
<b>Employee Representatives</b>	Communications Electrical Plumbing Union Electrical Trades Union	
<b>Licensing/Regulatory</b>	Electrical Regulatory Authorities Council Energy Safe Victoria Energy Safety - WA	Safe Work Australia Worksafe Tasmania
<b>Government</b>	Federal, State/Territory Departments	
<b>Industry Advisory</b>	Electrotechnology Energy Advisory Board - ACT Electrotechnology, Power and Communications Industries Industry Training Board - Victoria Energy Skills - SA Industry Skills Advisory Council - NT	Energy Skills - QLD Utilities and Electrotechnology Industry Training Advisory Board - NSW Utilities, Engineering, Electrical and Automotive Training Council
<b>Training Organisations</b>	TAFEs, Private RTOs, Enterprise RTOs	

The UEE11 Electrotechnology Training Package is in the Scope of Registration of 160 Registered Training Organisations.



## INDUSTRY CHALLENGES AND OPPORTUNITIES

### TECHNOLOGY AND AUTOMATION

Technological advances will see the sector change with the merging of traditional industry sectors as well as the emergence of new industry subsectors.

Power over Ethernet is becoming widely used to support scalability of networks through the transmission of power through network cables. These networks include video, point-of-sale devices, security access control, building automation and lighting and industrial automation.

Self-generation and battery storage are also having an effect on the market<sup>1</sup> with customers generating, storing and trading their own electricity.

New specialist skills will likely be sought for these new technologies as well as renewable energy, smart homes, electric cars, commercial fitouts, communications and remediation services<sup>2</sup>.

### SUSTAINABLE ENVIRONMENTS

With a shift in focus to renewable energy technologies, energy efficiency and low emissions<sup>3</sup>, the industry is moving to more innovative and emerging technologies. The announcement of the Clean Energy Innovation Fund<sup>4</sup> aims to drive this change, and many new jobs are expected to emerge.

The design and installation of these products will shape much of the electrotechnology sectors over the coming years. The integration of renewable energy into established distribution networks will be a priority.

### CONSTRUCTION MARKET FLUCTUATIONS

Market fluctuations mirror the demands for much of the industry, with growth expected in the commercial, industrial and institutional building sectors. Apartments, townhouses and unit construction are set to decrease. Heavy industry construction is also set to decline<sup>5</sup>.

Large-scale firms will likely take the biggest share of the contract electrical maintenance market, with smaller contractors moving towards household and small building installation<sup>6</sup>.

With increasing demand for data and communications services, fire protection and security systems, it is likely that electrotechnology service demands will increase to meet these needs.



The training currently available for the design of renewable energy systems is inadequate for commercial/utility scale installations (100kW+ systems). Some of the areas that are not adequately covered include:

- Assessing the impact to the network connection point of the system
- Network protection requirements
- Building structural requirement
- Interpreting commercial electricity bills
- Power factor impacts

## CONSUMER BEHAVIOUR

Consumer behaviour is changing the sector as customers now demand more control over systems such as metering, billing, payments, as well as pricing.

Homes and businesses are now using new integrated technologies to control all aspects of the physical world. The Internet of Things for example is seeing consumers use their smart phones to control and integrate their IT systems, security and intercoms, climate control, and electrical services from one central system.

Australia also has one of the highest global rates of roof-top solar photovoltaic (PV) systems<sup>7</sup> and integration of PV systems with home battery storage has already begun.<sup>8</sup> Energy businesses will need to provide new services to domestic and commercial customers. However, renewable energy training is not yet a key focus area for industry.

Consumer behaviour driven by new technology changes further increases competition within the market as companies compete for more efficient and user-friendly devices and management systems.

# EMPLOYMENT

A grayscale photograph of a person in a dark shirt working on a circuit board. They are using a pair of tweezers to place a component on the board. The background is slightly blurred, showing what appears to be a workshop or laboratory setting.

**EMPLOYMENT  
STATISTICS**

A photograph of a person wearing a hard hat and safety gear, kneeling on a roof. They are working on a large solar panel that is being tilted upwards. The scene is overlaid with a semi-transparent magenta color.

**WORKFORCE  
CHALLENGES AND  
OPPORTUNITIES**

**FRONT PAGE**



## EMPLOYMENT

### EXPLANATORY NOTES

#### Workforce

The size of an industry's workforce is established by the Australian Bureau of Statistics (ABS) using two different approaches. The Labour Force survey, which provides a 30-year view of the industry, assigns each industry category based on the main job of the respondent. The Australian Industry dataset (which the Workforce Projections charts are based on), uses a top-down approach where industries are primarily classified by the single predominant industry class associated with a business' ABN. An industry's workforce therefore is bounded in the first instance by the occupations of workers and in the second by the primary business of an enterprise. The different approaches can therefore result in quite different workforce figures.

AIS has chosen to distinguish these approaches using the terms **Workforce – Occupation based** and **Workforce – Employer based**.

#### Enterprise size

Industry definition by ABN also applies to the Counts of Australian Businesses data (size and distribution). Furthermore, low level values in these tables are subject to perturbation to anonymise the data. This may result in some areas with a low level value being perturbed to zero.

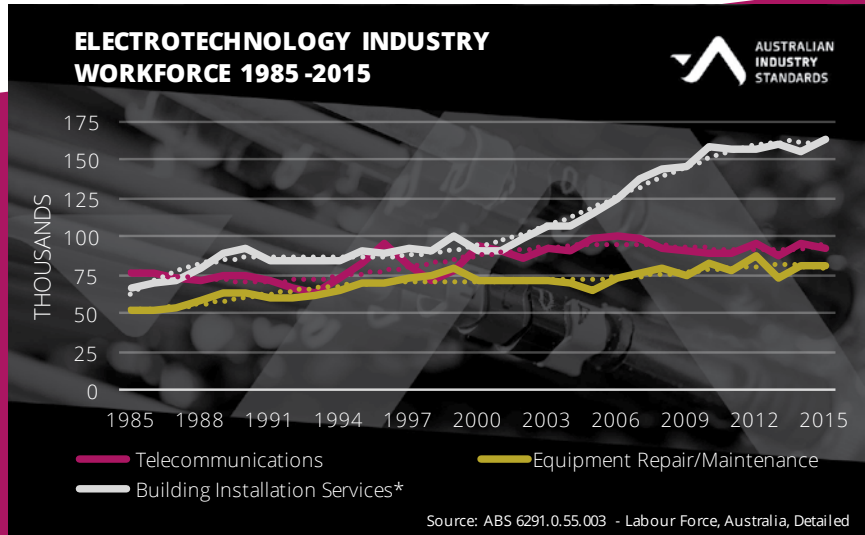
#### Exemptions

The scope of the Labour Force Survey is limited to the civilian population of Australia and therefore members of permanent defence forces are excluded from the survey.

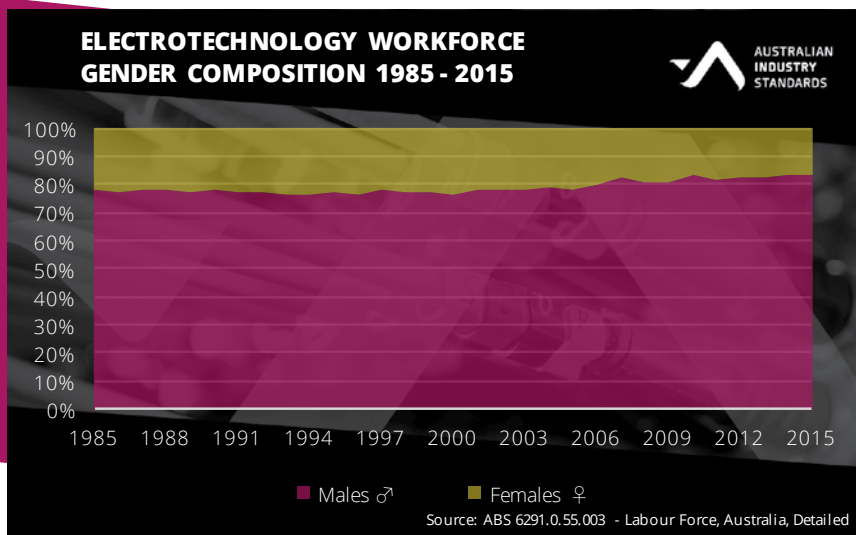


## EMPLOYMENT HISTORY - OCCUPATION BASED

Building Installation Services\* has experienced the strongest growth of the selected industries at 144%. Telecommunications has grown by 54% in the same period with Equipment Repair and Maintenance measuring 21%.



\*Building Installation Services comprises Electrical Services, Air Conditioning and Heating and Fire and Security Alarm Installation services. The contribution of Plumbing to this figure has been subtracted.

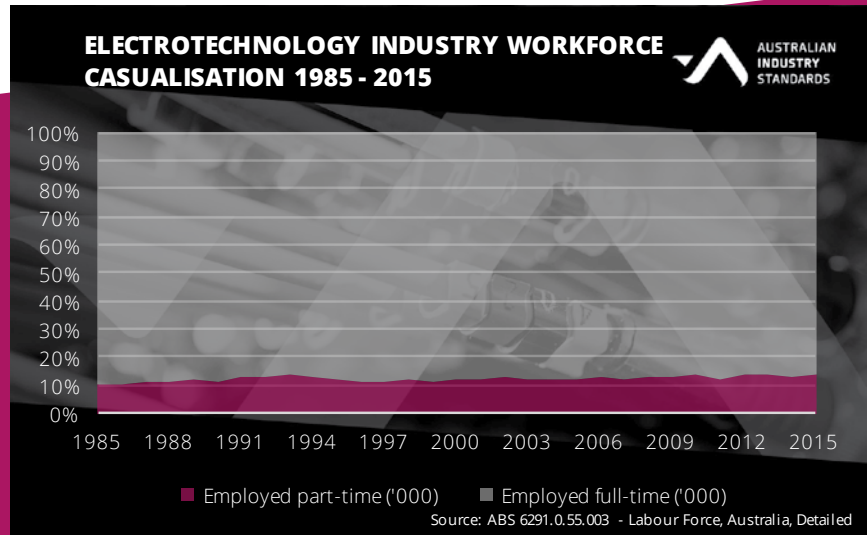


While the number of females in the industry has grown by almost a third, the proportion of females has actually fallen from 22% to 17%.

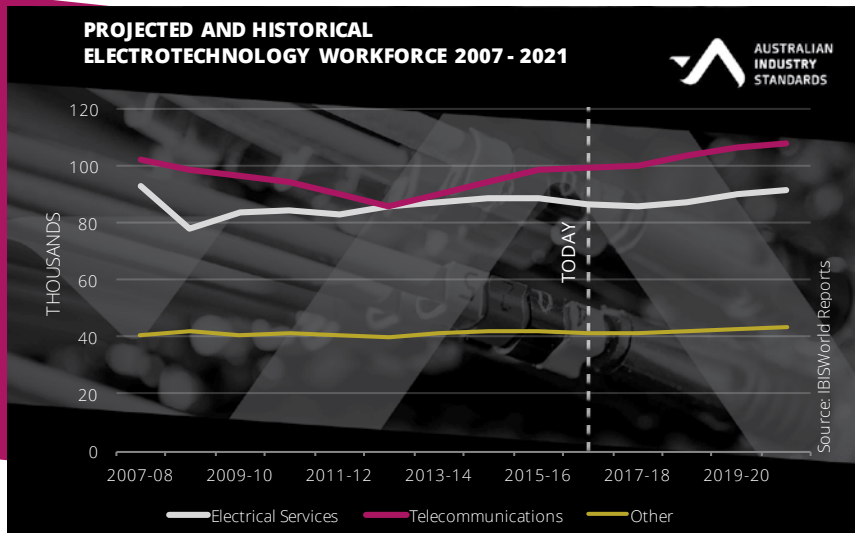
**EMPLOYMENT  
FRONT PAGE**



Full-time employment has remained almost static, decreasing from around 90% to 86.6%



## EMPLOYMENT PROJECTION - EMPLOYER BASED



The industry is expected to grow quite strongly to 7% in the coming five years with Telecommunications the strongest growth area.

**EMPLOYMENT  
FRONT PAGE**





## WORKFORCE SUPPLY-SIDE CHALLENGES AND OPPORTUNITIES

### AGEING WORKFORCE

The percentage of Electrotechnology workers over the age of 45 has risen to approximately 30 per cent over the past 30 years<sup>8</sup>. The ageing workforce presents a considerable challenge to the industry with the loss of key skills and the skills gaps created by retiring workers.

With the steady increase in construction projects and major shifts in the use of technology, ensuring that workers have the right skills is also important. Upskilling existing workers will be necessary for workers to interact and work with new products.

The ageing workforce also increases the risk of knowledge gaps when industry experience and corporate knowledge is not passed on. Mentoring and other knowledge sharing initiatives could assist in maintaining corporate and industry knowledge.

Companies will be faced with greater demand to upskill or recruit appropriately qualified people to undertake these emerging roles.

### ATTRACTION AND RETENTION

Attracting new people to the sectors is challenging, with increasing costs for apprenticeships and licences, competitive salaries from other sectors, and difficulty attracting women to the industry.

Licensing requirements for this sector are tightly regulated, requiring those working in the industry to have correct accreditation further narrowing the workforce pool.

Employers have also reported difficulty attracting applicants with suitable experience using specific technologies, machinery or equipment<sup>9</sup>.

Strong competition exists for highly-skilled individuals, therefore companies will need well-designed human resource initiatives and effective recruitment and retention programs. This may include rewards through recognition and incentives as well as ongoing professional development and mentoring.



## LANGUAGE, LITERACY AND NUMERACY

Industry has concerns about the language, literacy and numeracy capability of new apprentices who present with school certification, but who are significantly below the recommended literacy and numeracy standards required to satisfactorily complete the trade course. This has a direct result on apprenticeship drop-out and failure rates which appear to be increasing.

## HIGHER-LEVEL SKILLS

Reduced uptake of 'post trade' training has the potential to create a widening 'skills gap' between the highly technical systems being manufactured today and the ability of trade technicians to keep those systems operating.



**EMPLOYMENT  
FRONT PAGE**

# SKILLS OUTLOOK

A man in a white shirt is shown in profile, looking at a server rack. He is holding a cable and appears to be working on it. The background is a server room with multiple racks.

**INTERNATIONAL  
/ NATIONAL  
WORKPLACE  
TRENDS**

A man in a plaid shirt is shown in profile, pointing at a large screen. The screen displays a complex data visualization, possibly a 3D model of a building or a large data set. The entire scene is overlaid with a semi-transparent pink filter.

**PRIORITY SKILLS**

**FRONT PAGE**



## SKILLS OUTLOOK

### INTERNATIONAL / NATIONAL WORKPLACE TRENDS

Electrotechnology industry operators are now working in highly automated and technological environments. Emerging specialist skills will be sought for the new technologies in renewable energy, smart homes, electric cars, commercial fitouts, communications and remediation services.

Sustainable environments and climate change will also likely see a change in workplace and job design, with more focus on renewable energy technologies, energy efficiency and low emissions.

Consumer behaviour, from individuals to large corporations, will also likely affect the shape of the sector, with demand for more control of customer metering, billing and payments. Homes and businesses are now using new integrated technologies to control all aspects of the physical world, changing the way in which consumers interact and engage with providers.

Consumer behaviour driven by these new technologies further increases competition within the market as companies compete for more efficient and user-friendly devices and management systems.

### FUNDING

Variations in jurisdictional funding and traineeship arrangements are reported as impacting the viability of delivering training, in particular for narrow markets and in specialist technical areas. Longer-term this situation may lead to capacity constraints for employers and training organisations alike. These conditions also present challenges for RTOs and when considering future investment in training infrastructure and equipment, particularly those involved in new technology.

The capacity for RTOs to deliver training on central plant and other sophisticated technologies is further impacted by challenges identifying trainers who are qualified to deliver training on the new and emerging technologies.

## PRIORITY SKILLS

### ELECTROTECHNOLOGY TECHNICAL SKILLS

Australian Industry Standards has developed this list of technical skills from analysis of the qualifications in the UEE11 Electrotechnology Training Package.

These skills can be grouped into eight categories:

1. Electronic Assembly
2. Radio Broadcast
3. Computer Systems
4. Data and Voice Communications
5. Electrical operations
6. Electronics
7. Instrumentation and Industrial Control
8. Rail Signalling

The interim IRC Chair strongly indicated that Electrotechnology Technical Skills were the highest priority for the industry.

### GENERIC SKILLS

Ranking of the 12 generic workforce skills in order of importance to the Electrotechnology industry.

Skill	Priority
Technology	1
Environmental and Sustainability	2
Design mindset / Thinking critically / System thinking / Solving problems	3
Learning agility / Information literacy / Intellectual autonomy and self-management	4
Customer service / Marketing	5
Communication / Virtual collaboration / Social intelligence	6
Science, Technology, Engineering, Mathematics (STEM)	7
Data analysis	8
Managerial / Leadership	9
Entrepreneurial	10
Financial	11
Language, Literacy and Numeracy (LLN)	12



## IDENTIFIED PRIORITY SKILLS

The list of identified priority skills below is based on advice from the interim Electrotechnology Industry Reference Committee Chair.

The priority skills are listed below in order of importance to the Electrotechnology industry

Skill	Priority
Data and Voice Communications	1
Planning	2
Drawing	3
Safety	4
Refrigeration and Air Conditioning	5



## ELECTROTECHNOLOGY SKILLS - RELATED INSIGHTS

The Electrotechnology industry face a number of challenges as it moves to integrate the traditional forms of electricity products and transmission with fast-emerging technologies to an increasingly demanding consumer environment.

The Electrotechnology industry employs nearly 340,000 people and has an estimated annual revenue of \$85.5 billion, adding \$37 billion to the Australian economy in 2015-16. The industry includes the design, maintenance, installation, and repair for all electrical and electronic equipment.

Automation in the industry is moving quickly, with a focus on renewable energy technologies, changes in consumer behaviour and environmental issues providing challenges in the design and installation of new systems and products.

The design and installation of these products will shape much of the Electrotechnology industry activity over coming years. The integration of renewable energy into established distribution networks will be a priority.

Consumer behaviour is changing the sector as customers now demand more control over systems such as metering, billing, payments, as well as pricing. Homes and businesses are now using new integrated technologies to control all aspects of the physical world.

Industry stakeholders highlight the need for greater leadership and collaboration, particularly between the industry and government, in identifying proper standards, setting proactive policy settings, ensuring relevant skills training and utilising new technologies.

The interim Electrotechnology Industry Reference Committee (IRC) Chair has strongly indicated that Electrotechnology Technical Skills are the highest priority for the industry to prepare the workforce to meet current and future challenges. Technical skills focus on areas related to Electronic Assembly, Radio Broadcast, Computer Systems, Data and Voice Communications, Electrical operations, Electronics, Instrumentation and Industrial Control, and Rail Signalling.

Stakeholders have also noted the need to integrate new technologies into the existing supply chains and other sectors. Self-generation and battery storage are also having an effect on the market with customers generating, storing and trading their own electricity.

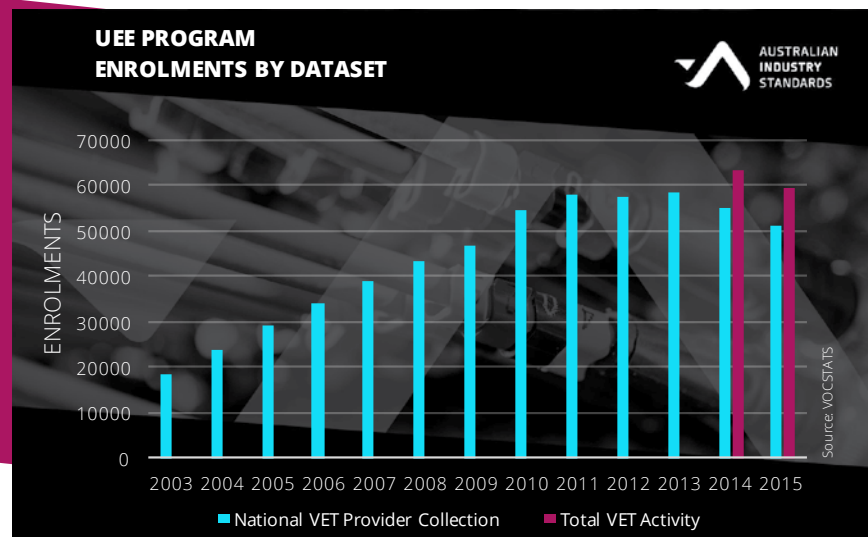
Energy storage is a major growth area for consumers, both with and without renewable energy systems. These systems will in many cases interact with the electrical grid and as such a level of grid-protection knowledge will be required to ensure a smooth integration with minimal disruptions to the network.



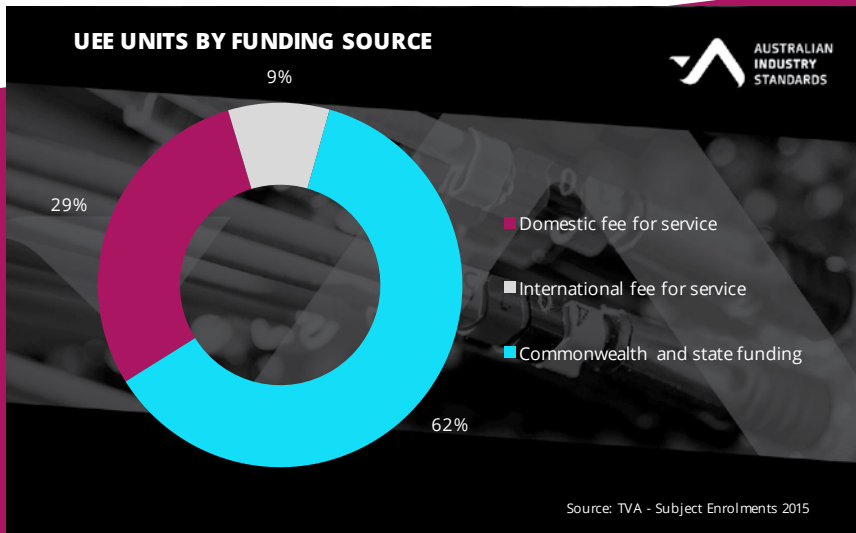
Technological advances will see the sector change with the merging of traditional industry sectors with new industry subsectors. Power over Ethernet is increasingly being used to support scalability of networks incorporating video, point-of-sale devices, security access control, building automation and lighting and industrial automation. New specialist skills will likely be sought for these new technologies as well as renewable energy, smart homes, electric cars, commercial fitouts, communications and remediation services.

The industry is supported by the UEE11 Electrotechnology Training Package, consisting of a range of qualifications around electrotechnology, electrical, electronics, hazardous areas, rail signalling, refrigeration and renewable energies, among others. Total VET activity enrolments have decreased from a peak in 2013.

Enrolments have dropped somewhat from a peak at 2013, with Certificate III in Electrotechnology Electrician comprising more than 50% of the total.







International fee for service amounts to about a third of the size of Domestic fee for service. Government funding comprises 62% of funding for training.

The Electrotechnology workforce is forecast to increase by 7 per cent through to 2021. The percentage of Electrotechnology workers over the age of 45 has risen to approximately 30 per cent over the past 30 years.

Attracting new people to the sectors is challenging, with increasing costs for apprenticeships and licences, competitive salaries from other sectors, and difficulty attracting women to the industry. While the number of females in the industry has grown by almost a third, the proportion of females has actually fallen from 22 per cent to 17 per cent in the last 30 years.

Licensing requirements for this sector are tightly regulated, requiring those working in the industry to have correct accreditation, further narrowing the workforce pool.

Due to the large number of technologies coming on line, and the large number of companies operating in the Electrotechnology space, the identification of necessary qualifications and standards and subsequent development of Training Packages is a challenge.



## EXPLANATORY NOTES

The Training Enrolments charts compare two datasets; the **National VET Provider Collection** and the **Total VET Activity (TVA)** dataset. The primary distinction between the two is that Total VET Activity data is collected from all types of providers and not only those in receipt of Commonwealth or state funding. TVA data collection commenced in 2014.

### Exemptions

Where the submission of training data to TVA conflicts with defence or national security legislation, or jeopardise the security or safety of personnel working in defence, border protection, customs or Australian police departments, an exemption from reporting training data is available.

Organisations that deliver training for vital services to the community (such as emergency, fire, first-aid and rescue organisations) may have received an exemption to submit data to TVA. From 1 January 2016 however, the exemption from reporting will apply only in respect of training activity not delivered on a fee-for-service/commercial basis.

## REFERENCES

### INDUSTRY CHALLENGES AND OPPORTUNITIES

<sup>1</sup> Price Waterhouse Coopers. 2016. Customer engagement in an era of energy transformation. <https://pwc.docalytics.com/v/webcuststrans-v12-160216>

<sup>2</sup> Electrical Solutions 2015. Electrical services industry powers on. <http://www.electricalsolutions.net.au/content/business-andmanagement/article/electrical-services-industry-powers-on-843943375>

<sup>3</sup> Australian Renewable Energy Agency. <http://arena.gov.au/>. Accessed August 2016.

<sup>4</sup> IBIS world. Industry Reports: E3232, E3233, J5801, J5800, E3234, OD5424

<sup>5</sup> IBIS world. Industry Reports: E3232, E3233, J5801, J5800, E3234, OD5424

<sup>6</sup> Energy Supply Association of Australia. Renewable Energy in Australia. <https://c311ba9548948e593297-96809452408ef41d0e4fdd00d5a5d157.ssl.cf2.rackcdn.com/2016-03-23-factcheck-renewables/ESA002-factsheet-renewables.pdf> Accessed August 2016.

<sup>7</sup> CSIRO. Future Energy Storage Trends: An Assessment of the Economic Viability, Potential Uptake and Impacts of Electrical Energy Storage on the NEM 2015-2035

### WORKFORCE SUPPLY-SIDE CHALLENGES AND OPPORTUNITIES

<sup>8</sup> ABS. Electrotechnology and Telecommunications Trades Workers. Employed persons by Age, Occupation sub-major group of main job (ANZCO) and Sex. August 1986 onwards.

<sup>9</sup> Department of Employment. Labour Market Research – Electrotechnology Trades June to December 2015. [https://docs.employment.gov.au/system/files/doc/other/auselectrotechtrades\\_0.pdf](https://docs.employment.gov.au/system/files/doc/other/auselectrotechtrades_0.pdf)

## UEE11 ELECTROTECHNOLOGY TRAINING PACKAGE REVIEW PLAN 2016/17 - 2019/20

### REVIEW PLAN – TIMING AND PRIORITISATION

The Training Package Workplan priorities will be constantly monitored and formally reviewed annually by the IRC. This will allow the Workplan to remain at the forefront of the IRC goals and objectives and have the flexibility to respond to the industry needs as they arise.

The Electrotechnology IRC does not anticipate that any of the UEE11 Electrotechnology Training Package qualifications, skill sets or units of competency contained within the Training Package, will be required to be reviewed more than once in the four-year period. The exception to this would be where there is regulatory or legislative change, or industry driven change due to safety requirements or specific technology advancement.

The Electrotechnology IRC has not identified any training product that is expected to be contentious or lengthy in terms of development timelines.

### *TRANSITION*

#### 2016 – 2018

Once established, the Electrotechnology IRC will set the direction and prioritisation of activities for the UEE11 Electrotechnology Training Package transition to the 2012 Standards for Training Packages.

The work covers the transition of all 87 qualifications in the UEE11 Electrotechnology Training Package and the relevant units of competency and skill sets.

The main priority work item for the Electrotechnology IRC is the transition of the UEE11 Electrotechnology Training Package to the 2012 Standards for Training Packages.

The Electrotechnology IRC is currently under review by the AISC.

#### 2017 -2020

The Electrotechnology IRC will identify Training Package review and development priorities, for Workplan inclusion, once it has been formed.

## LEGISLATIVE /REGULATORY REQUIREMENTS

Any legislative or regulatory change requirements identified, would take precedence over other reviews planned as these are often associated with higher workplace risk and a deadline.

As legislation or regulations are updated the UEE11 Electrotechnology Training Package and Companion Volume affected need to be updated, to reflect the change in legislative or regulatory requirements by a due date, generally the effective date of the legislative or regulatory change.

## INTERDEPENDENCIES

The UEE11 Electrotechnology Training Package qualifications include imported units of competency, within core and elective qualification packaging rules. Industry sector interdependencies that will potentially initiate future UEE11 qualification reviews include imported units from 16 interdependent Training Packages (inclusive of predecessor releases).

- BSB07 - Business Services Training Package
- CPC08 - Construction, Plumbing and Services Training Package
- CPP07 - Property Services Training Package
- HLT - Health
- ICT10 - Integrated Telecommunications Training Package
- MEM05 - Metal and Engineering Training Package
- MSS11 - Sustainability Training Package
- NWP07 - Water Training Package
- PMA08 - Chemical, Hydrocarbons and Refining Training Package
- RII - Resources and Infrastructure Industry Training Package
- TLI10 - Transport and Logistics Training Package
- UEP12 - Electricity Supply Industry - Generation Sector Training Package
- UET12 - Transmission, Distribution and Rail Sector Training Package
- UEG11 - Gas Industry Training Package
- CUA - Creative Arts and Culture Training Package
- MSF - Furnishing Training Package

**IRC Training Product Review Plan – 2016/17 – 2019/20**  
**Electrotechnology Industry Reference Committee**  
**Contact details: GM IRC Operations, Australian Industry Standards**  
**Date submitted: 30 September 2016**

Planned review start (Year)	Training Package code	Training Package name	Qualification code	Qualification name	Unit of competency code	Unit of competency name
2016-2017	UEE – Electrotechnology		UEE10111	Certificate I in ElectroComms Skills	All Training Package Components to be transitioned to the 2012 Standards for Training Packages.  This work has commenced as per the executed Additional Activity Order	
			UEE22011	Certificate II in Electrotechnology (Career Start)		
			UEE22111	Certificate II in Sustainable Energy (Career Start)		
			UEE20411	Certificate II in Winding and Assembly		
			UEE21911	Certificate II in Electronics		
			UEE20911	Certificate II in Electronic Assembly		
			UEE20111	Certificate II in Split Air-conditioning and Heat Pump Systems		
			UEE21611	Certificate II in Security Assembly and Set-up		

Planned review start (Year)	Training Package code	Training Package name	Qualification code	Qualification name	Unit of competency code	Unit of competency name
<b>2016-2017</b>	UEE – Electrotechnology		UEE21411	Certificate II in Remote Area Power Supply Maintenance		
			UEE21711	Certificate II in Technical Support		
			UEE21311	Certificate II in Remote Area Essential Service		
			UEE21011	Certificate II in Fire Alarms Servicing		
			UEE21211	Certificate II in Antennae Equipment		
			UEE20711	Certificate II in Data and Voice Communications		
			UEE20511	Certificate II in Computer Assembly and Repair		
			UEE20811	Certificate II in Electrical Wholesaling		

Planned review start (Year)	Training Package code	Training Package name	Qualification code	Qualification name	Unit of competency code	Unit of competency name
<b>2016-2017</b>	UEE - Electrotechnology		UEE30911	Certificate III in Electronics and Communications		
			UEE30111	Certificate III in Business Equipment		
			UEE32111	Certificate III in Appliance Service		
			UEE30211	Certificate III in Computer Systems Equipment		
			UEE31211	Certificate III in Instrumentation and Control		
			UEE32011	Certificate III in Renewable Energy - ELV		
			UEE30311	Certificate III in Custom Electronics Installations		
			UEE31011	Certificate III in Fire Protection Control		

Planned review start (Year)	Training Package code	Training Package name	Qualification code	Qualification name	Unit of competency code	Unit of competency name
<b>2016-2017</b>	UEE – Electrotechnology		UEE31411	Certificate III in Security Equipment		
			UEE30811	Certificate III in Electrotechnology Electrician		
			UEE32211	Certificate III in Air-conditioning and Refrigeration		
			UEE30411	Certificate III in Data and Voice Communications		
			UEE31111	Certificate III in Gaming Electronics		
			UEE33011	Certificate III in Electrical Fitting		
			UEE30711	Certificate III in Switchgear and Controlgear		
			UEE30611	Certificate III in Electrical Machine Repair		



Planned review start (Year)	Training Package code	Training Package name	Qualification code	Qualification name	Unit of competency code	Unit of competency name
<b>2016-2017</b>	UEE – Electrotechnology		UEE31511	Certificate III in Rail - Communications and Networks		
			UEE41611	Certificate IV in Renewable Energy		
			UEE42611	Certificate IV in Hazardous areas - Electrical		
			UEE41511	Certificate IV in Video and Audio Systems		
			UEE42911	Certificate IV in Refrigeration and Air-conditioning Systems		
			UEE43011	Certificate IV in Electrical Equipment and Systems		
			UEE40511	Certificate IV in Electrical - Air-conditioning Split Systems		

Planned review start (Year)	Training Package code	Training Package name	Qualification code	Qualification name	Unit of competency code	Unit of competency name
2016-2017	UEE – Electrotechnology		UEE40611	Certificate IV in Electrotechnology - Systems Electrician		
			UEE40811	Certificate IV in Electrical - Fire Protection Control Systems		
			UEE41711	Certificate IV in Rail - Communications and Network Systems		
			UEE40411	Certificate IV in Electrical - Instrumentation		
			UEE42711	Certificate IV in Air-conditioning and Refrigeration Servicing		
			UEE42111	Certificate IV in Electrotechnology - Electrical Contracting		
			UEE42011	Certificate IV in Electrical - Photovoltaic systems		

Planned review start (Year)	Training Package code	Training Package name	Qualification code	Qualification name	Unit of competency code	Unit of competency name
2016-2017	UEE – Electrotechnology		UEE43111	Certificate IV in Energy Efficiency and Assessment		
			UEE42811	Certificate IV in Air-conditioning Systems Energy Management and Control		
			UEE41211	Certificate IV in Electrical - Rail Signalling		
			UEE41911	Certificate IV in Electrical - Renewable Energy		
			UEE41011	Certificate IV in Energy Management and Control		
			UEE40111	Certificate IV in Computer Systems		
			UEE40711	Certificate IV in Electronics and Communications		
			UEE40911	Certificate IV in Industrial Electronics and Control		

Planned review start (Year)	Training Package code	Training Package name	Qualification code	Qualification name	Unit of competency code	Unit of competency name
<b>2016-2017</b>	UEE – Electrotechnology		UEE40211	Certificate IV in Electrical - Data and Voice Communications		
			UEE43211	Certificate IV in Industrial Automation and Control		
			UEE40311	Certificate IV in Installation Inspection and Audits		
			UEE41111	Certificate IV in Electrical - Lift Systems		
			UEE42211	Certificate IV in Instrumentation and Control		
			UEE50511	Diploma of Electronics and Communications Engineering		
			UEE50111	Diploma of Computer Systems Engineering		

Planned review start (Year)	Training Package code	Training Package name	Qualification code	Qualification name	Unit of competency code	Unit of competency name
<b>2016-2017</b>	UEE – Electrotechnology		UEE51111	Diploma of Engineering Technology - Refrigeration and Air-conditioning		
			UEE50711	Diploma of Renewable Energy Engineering		
			UEE53011	Diploma of Electrical Systems Engineering		
			UEE51011	Diploma of Instrumentation and Control Engineering		
			UEE50411	Diploma of Electrical Engineering		
			UEE50211	Diploma of Electrical and Instrumentation		
			UEE50811	Diploma of Research and Development		
			UEE50311	Diploma of Electrical and Refrigeration and Air-conditioning		

Planned review start (Year)	Training Package code	Training Package name	Qualification code	Qualification name	Unit of competency code	Unit of competency name
2016-2017	UEE – Electrotechnology		UEE51211	Diploma of Air-conditioning and Refrigeration Engineering		
			UEE50911	Diploma of Industrial Electronics and Control Engineering		
			UEE61711	Advanced Diploma of Engineering Technology - Electronics		
			UEE62311	Advanced Diploma of Electrical Engineering - Coal Mining		
			UEE61511	Advanced Diploma of Instrumentation and Control Engineering		
			UEE61211	Advanced Diploma of Engineering - Explosion protection		

Planned review start (Year)	Training Package code	Training Package name	Qualification code	Qualification name	Unit of competency code	Unit of competency name
<b>2016-2017</b>	UEE – Electrotechnology		UEE60411	Advanced Diploma of Computer Systems Engineering		
			UEE63011	Advanced Diploma of Electrical Systems Engineering		
			UEE60611	Advanced Diploma of Industrial Electronics and Control Engineering		
			UEE62011	Advanced Diploma of Engineering Technology - Renewable Energy		
			UEE62111	Advanced Diploma of Engineering Technology - Electrical		
			UEE62211	Advanced Diploma of Electrical - Engineering		
			UEE60211	Advanced Diploma of Electronics and		

Planned review start (Year)	Training Package code	Training Package name	Qualification code	Qualification name	Unit of competency code	Unit of competency name
<b>2016-2017</b>	UEE – Electrotechnology			Communications Engineering		
			UEE62511	Advanced Diploma of Air-conditioning and Refrigeration Engineering		
			UEE61811	Advanced Diploma of Engineering Technology - Computer Systems		
			UEE62411	Advanced Diploma of Engineering Technology - Air-conditioning and Refrigeration		
			UEE61111	Advanced Diploma of Automated Systems Maintenance Engineering		
			UEE60911	Advanced Diploma of Renewable Energy Engineering		
<b>2018 -2020</b>	UEE – Electrotechnology		To be prioritised with formation of IRC			

Appendix A

**FRONT PAGE**





## AUSTRALIAN INDUSTRY STANDARDS

Australian Industry Standards (AIS) provides high-quality, professional secretariat services to the Electrotechnology Industry Reference Committee, in our role as a Skills Service Organisation.

AIS provide services to 11 allocated IRCs which cover the Gas, Electricity, Electrotechnology, Corrections, Public Safety (including Police, Fire Services, Defence), Water, Aviation, Transport and Logistics, Rail and Maritime industries. AIS supports these important industry sectors using our world-class in-house capability and capacity in technical writing, quality assurance, project management and industry engagement in the production of Training Packages.

AIS was established in early 2016, 20 years after its predecessor the Transport and Logistics Industry Skills Council (TLISC) was established in 1996. More information about AIS can be found at [www.australianindustrystandards.org.au](http://www.australianindustrystandards.org.au)

- We support industry growth and productivity through our modern innovative approach to establishing skills standards
- We provide high-quality, professional secretariat services to help our allocated industry reference committees develop the skills that industry needs
- We partner with industry to shape the workforce of the future



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**AUSTRALIAN INDUSTRY STANDARDS**

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**FRONT PAGE**

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