

ESI – TRANSMISSION DISTRIBUTION AND RAIL

Annual Update to Industry Skills Forecast and Proposed Schedule of Work 2020

IRC Skills Forecast and Proposed Schedule of Work (ISF) are required once every three years. In the intervening years SSOs will report on the research questions listed below.

SSOs can also include additional cases for change to training packages as necessary. This will require evidence on why additional proposal(s) should be considered during an intervening year between the full ISFs (see item 4).

It is important that SSOs work with IRCs and other relevant stakeholders to provide evidence demonstrating to the AISC the veracity of claims. Where possible, statistical data should be used as an evidential basis.

SECTION A

1. Inform the AISC of any new industry workforce, skills developments or trends to emerge since the submission of a full ISF.

The traditional centralised and uni-directional electricity distribution is now omnidirectional where electricity is locally generated, stored, consumed, or sent back to the grid.¹

The Internet of Things (IoT), the trend of connecting devices, sensors and data collecting tools to networks, relaying information without a human intermediary, is also radically changing the nature of electricity supply. Sensors and wireless communication gateways collect and process data, enabling higher resolution (real-time) data collection of electricity use.

Distributed Energy Resources (DERs), such as battery energy storage and solar photovoltaics (PVs), are transforming the way electricity is produced and distributed. DERs are instrumental in addressing electricity supply reliability gaps. New software technologies continue to alter the operations of DERs by forecasting moments of peak demand on the grid and optimising electricity distribution using Big Data and Machine Learning.²

Energy storage reduces load on grids at peak times and enables energy providers to manage their supply and demand more effectively.³ Traditional consumers have now become prosumers i.e. consumers who are able to produce electricity as well. This can be done via Virtual Power Plants (VPPs) which are cloud-based power plants that can integrate electricity

¹ Johnson, G. (2019). "A Smart City Needs a Smart Grid." Electrical Comms Data. Vol. 17, No: 5.

² Polizzi, G. (2018). "IoT in Power Distribution." Electrical Comms Data. Vol. 17, No: 2.

³ Australian Trade and Investment Commission. (2017). Microgrids, Smart Grids and Energy Storage Solutions.

from solar panels and wind farms and release it into the grid. VPPs offer consumers the opportunity to tap into their stored solar power during peak times.⁴

Digitalisation is giving rise to smart energy networks which communicate between users and producers via technologies such as sensors and smart meters.⁵ The Western Australian Government is currently investing in the deployment of advanced metering infrastructure to install 238,000 smart meters in the next three years. This project will encompass smart communication infrastructure which will enable bi-directional power flow, leading to improved visibility of electricity flow, efficiency, safety, reliability of operations and customer services. Therefore, energy management, control and communication technology will have a central role in the digitalisation of the energy sector.⁶

With increasing interconnectedness and decentralised distribution models it is critical to have technical expertise at all levels to maintain the operations of these systems. To this end, workforce planning and skills development needs to occur now if the industry is to fulfil future labour force needs.

Industry-specific cyber security skills

According to a recent research study, the energy sector is among the top five sectors targeted by cyber security attacks.⁷ Australia's electricity grid is currently undergoing major transformations which are driving a more decentralised model. DERs, smart metering devices, changing consumer needs and increasing digitalisation are modernising the grid. These new digital technologies are accompanied by new security risks which can expose the electricity networks to cyber-attacks. Cyber-attack risks are rated among the top four threats to organisational growth.⁸

Cyber security specialists have been identified as one of the most critical roles for the future.⁹ The electricity grid has become more dependent on digitally connected information systems. In the light of serious safety risks, it is imperative to have a tailored cyber security training program not only to inform the workforce of the nature and examples of the ESI TDR industry cyberattacks, but also give them the knowledge and skills to be able to resolve them. Investing in skills through educational programs is key to understanding cyber security and being protected from cyber threats.

Energy literacy

Recent research by the University of Queensland and National Energy Resources Australia highlights the need for the level of energy literacy to be lifted. The report indicates that despite recent energy technologies and the high level of public exposure and commentary about low-emissions energy, there has been little improvement in the levels of energy understanding in the community, also known as 'energy literacy'.¹⁰ The report recommends identifying gaps in energy information and developing a plan to address them. The report calls for a coordinated national

⁴ McKinsey. (2017). Digital Australia: Seizing the Opportunity from the Fourth Industrial Revolution.

⁵ Australian Academy of Science. (2016). Energy for Australia in the 21st Century: The Central Role of Electricity. Australian Government: Canberra.

⁶ Australian Academy of Science. (2016). Energy for Australia in the 21st Century: The Central Role of Electricity. Australian Government: Canberra.

⁷ Proofpoint. (2019). Human Factor Report 2019.

⁸ KPMG. (2019). Agile or Irrelevant: Redefining Resilience – 2019 Global CEO Outlook. KPMG International.

⁹ Deloitte & ACS. (2019). ACS Australia's Digital Pulse 2019. Deloitte Access Economics.

¹⁰ University of Queensland & National Energy Resources Australia. (2019). Building Australia's Energy Literacy

approach to enhance energy literacy and greater industry impetus to build the required skills.¹¹ More informed communities and consumers play a significant role in transitioning to a carbon-free future.

Energy pricing

The price of electricity continues to be one of the most challenging issues in the energy industry. Some Australian households spend 4.8 to 7.6 per cent of their disposable income on electricity.¹² The issue of cost containment remains an immediate priority for the industry.¹³ Strong policy design and technologies such as smart meters can help consumers be more aware of their consumption and keep prices down. Data provided through smart meters can empower consumers to make more informed energy decisions.¹⁴ Removing barriers to innovation in the retail energy market is a key step in ensuring affordable and accessible products and services.¹⁵

Renewable technologies

The increasing focus on Hydropower, Solar and Wind generation represents significant shifts for the energy sector, and this will demand a pool of labour with a different skill profile than in the past. Hydropower involves pumping water from a storage reservoir at a lower elevation to a storage reservoir at a higher elevation, and later releasing it through turbines to generate electricity.¹⁶ There are currently over 22,000 potential sites across Australia for pumped hydro.¹⁷ Hydro is the largest contributor to renewable generation, producing 36 per cent of renewable generation in 2017–18 (7 per cent of total electricity generation). Wind and solar generation also contributed 34 per cent and 23 per cent of renewable energy generation respectively in 2018.¹⁸ Solar installation has been steadily growing with currently over two million installations in Australia¹⁹ and 90 per cent of solar power generation coming from rooftop solar PVs.²⁰ At the present time, and in the next few years, the industry is focused on building the skills required for workers in renewables, especially developing skills for first responders for installation, maintenance, and operation of equipment.

¹¹ Ibid.

¹² Australian Energy Regulator. (2019). Affordability in Retail Energy Markets.

¹³ Ibid.

¹⁴ Australian Competition and Consumer Commission. (2018). Restoring Electricity Affordability and Australia's Competitive Advantage.

¹⁵ Australian Energy Market Commission. (2019). "Consumer Protections Needed As Energy Technology Changes." Media Release. September 12. 2019.

¹⁶ Finkel, A. (2017). Independent Review into the Future Security of the National Electricity Market: Blueprint for the Future

¹⁷ Clean Energy Council. (2019). Hydro. Retrieved from

<https://www.cleanenergycouncil.org.au/resources/technologies/hydroelectricity>

¹⁸ Department of Environment and Energy. (2019). Australian Energy Update 2019.

¹⁹ Smart Energy. (2019). "The Rise of Renewable Energy." Smart Energy Magazine, Vol 39, Issue 153

²⁰ Department of Environment and Energy. (2019). Australian Energy Update 2019.

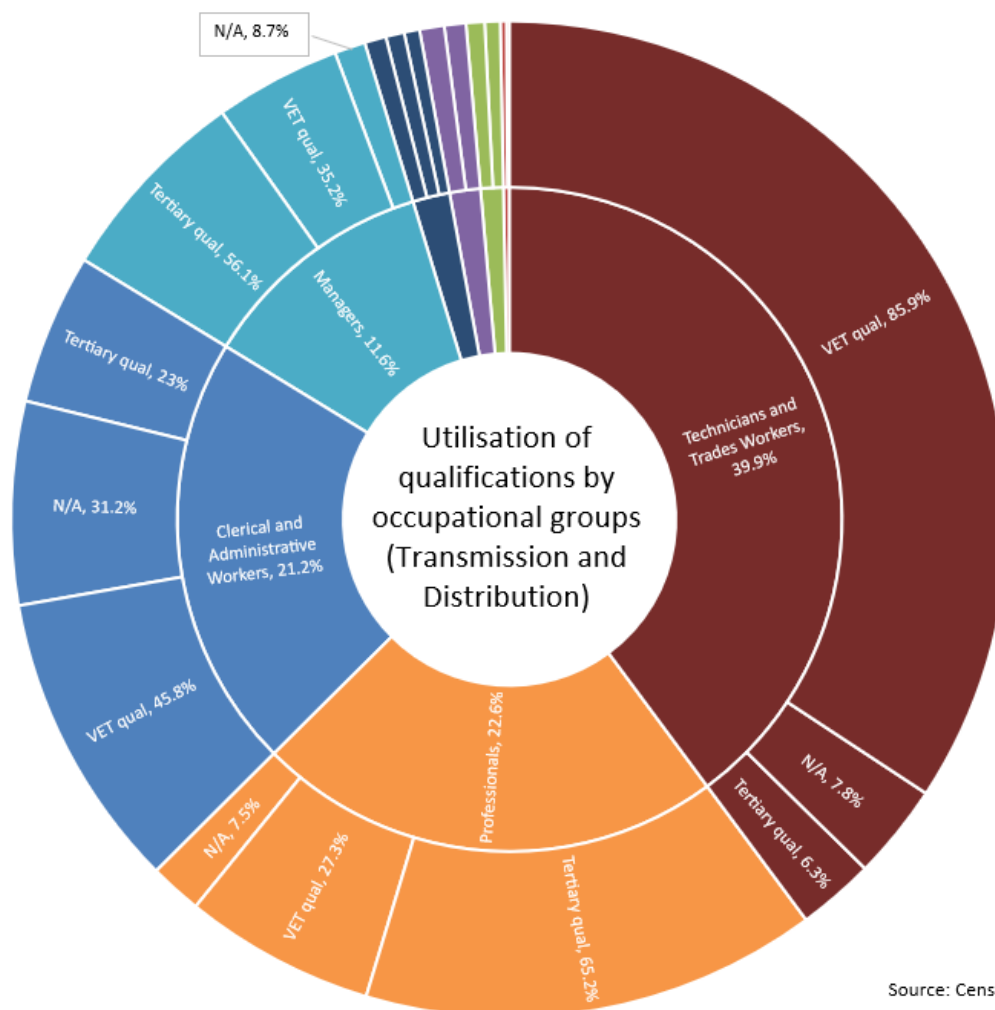
2. Qualification utilisation:

Identify circumstances in which employers:

- employ people with VET qualifications
- do not employ people with VET qualifications

Qualification utilisation by occupational group

The largest occupational group, Technicians and Trades Workers, is primarily made up of Distribution Trades Workers, Electricians and Technicians. This group, which accounts for nearly 40% of the workforce, has a VET qualification rate of 85.9% and a tertiary qualification rate of only 6.3%. The next largest group, Professionals, (primarily Electrical Engineers) accounts for 22.6% of the workforce and are more than twice as likely to hold a tertiary qualification as a VET qualification (65.2% | 27.3%). Comprising about the same portion of the workforce (21.2%) are Clerical and Administrative Workers who are, conversely, about twice as likely to hold a VET qualification as a tertiary qualification (45.8% | 23.0%). Just over half of Managers, who make up 11.6% of the workforce, have a tertiary qualification (56.1%) and 35.2% have a VET qualification. Each of the four remaining occupational groups make up less than 2% of the workforce and generally hold qualifications outside of the UET Training Package.



Source: Census 2016

3. Are employers using training outside the national system and if so, why?

A review of 1,176 accredited courses and qualifications with enrolments listed in VOCSTATS yielded no known current accredited courses or qualifications in the Transmission, Distribution and Rail field.

4. Identify qualifications with low and no enrolments. Provide reasons and evidence for the need to retain/delete these qualifications.

The following UET qualifications have had no enrolments in the last four-year cycle.

- UET20519 Certificate II in National Broadband Network Cabling (Electricity Supply Industry Assets)
- UET60319 Advanced Diploma of ESI - Power Systems Operations

Of the 71 UET units with zero enrolments, the following units are currently under review to improve industry relevance.

- UETTDRIS32 Solve electrical problems in remote community network apparatus
- UETTDRIS33 Solve electrical problems in remote community network systems
- UETTDRIS35 Perform remote community network field switching to a given schedule
- UETTDRIS36 Install and maintain low voltage services in remote communities (overhead)
- UETTDRIS37 Install and maintain low voltage services in remote communities (underground)
- UETTDRTP33 Maintain energised transmission lines using bare hand technique on a helicopter platform

The below 65 units have had zero enrolments in the last four-year cycle

- UETTDRCJ29 Install gas and oil filled specialised underground cables
- UETTDRCJ30 Maintain gas and oil filled specialised underground cables
- UETTDRCJ31 Install and maintain polymeric specialised underground cables
- UETTDRCJ32 Install and maintain gas and oil pressure systems for specialised underground cables
- UETTDRCJ33 Install and maintain network infrastructure LV underground cables
- UETTDRCJ34 Install and maintain network infrastructure HV underground cables
- UETTD RDP15 Inspect, maintain and restore energised low voltage overhead distribution network infrastructure
- UETTD RDS31 Draft and layout a power system overhead distribution extension
- UETTD RDS38 Design power system public lighting systems
- UETTD RDS40 Prepare and appraise power systems financial impact statements

- UETTD RDS41 Manage electrical power systems infrastructure projects
- UETTD RDS44 Design power system substations modifications
- UETTD RDS47 Review power system asset management strategies
- UETTD RDS48 Analyse and appraise power system fault and outage data
- UETTD RDS49 Establish and manage power system geographical information systems data
- UETTD RDS50 Design customer power system substations
- UETTD RDS51 Manage power system transmission and sub-transmission design process
- UETTD RDS52 Design power system transmission, sub-transmission and zone substation buildings
- UETTD RDS53 Design power system transmission and sub-transmission substation primary plant
- UETTD RDS55 Design power system transmission and sub-transmission substation earthing
- UETTD RDS56 Design power system transmission, sub-transmission & zone substation civil & structural components
- UETTD RDS57 Design power system overhead transmission systems
- UETTD RDS58 Design underground transmission systems
- UETTD RIS46 Install and maintain ESI network infrastructure electrical equipment
- UETTD RIS64 Install mobile generation set for synchronised HV Genset
- UETTD RIS66 Manage an electricity power system WHS/OHS management system
- UETTD RIS81 Install telecommunications infrastructure on electricity supply industry assets
- UETTD RRT31 Maintain energised d.c. traction overhead wiring system
- UETTD RRT32 Maintain energised traction overhead electrical apparatus using stick techniques
- UETTD RRT33 Maintain energised traction overhead electrical apparatus using glove techniques
- UETTD RRT34 Install and maintain traction network wiring systems
- UETTD RRT35 Install and maintain traction network equipment and components
- UETTD RRT36 Maintain traction network wiring systems
- UETTD RRT37 Maintain traction network equipment and components
- UETTD RSB30 Maintain high voltage power system static VAR compensators (SVC)
- UETTD RSB31 Maintain high voltage power system synchronous condensers
- UETTD RSB32 Maintain power transformer on load tap changers (OLTC)
- UETTD RSB36 Commission discrete control and protection systems
- UETTD RSB37 Maintain power system distribution field devices
- UETTD RSB38 Commission power system distribution field devices
- UETTD RSO33 Manage power systems critical events
- UETTD RSO34 Control power systems generating plant
- UETTD RSO39 Coordinate low voltage distribution networks
- UETTD RSO42 Manage power systems transmission network demand

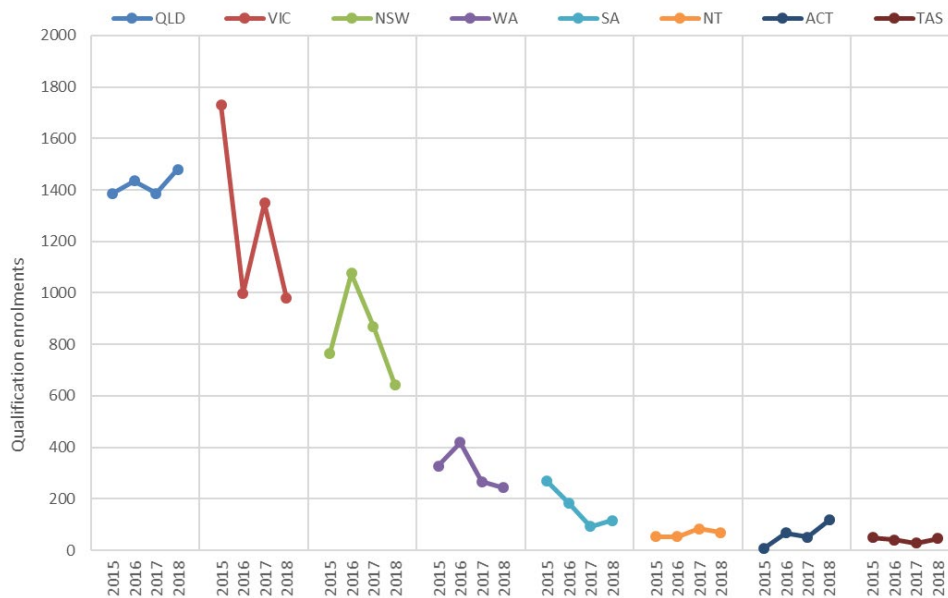
- UETDRSO43 Coordinate low voltage distribution network demand
- UETDRSO44 Develop crisis power systems management plans
- UETDRSO51 Manage network systems power flows
- UETDRTTP22 Establish and reinstate a power systems transmission structure work site
- UETDRTTP23 Erect power systems transmission structures
- UETDRTTP24 Erect power systems transmission structure hardware
- UETDRTS24 Design testing and commissioning procedures for field devices and substations
- UETDRTS30 Design power systems secondary isolation instructional documents
- UETDRTS37 Perform current injection testing using phantom load
- UETDRTS38 Install and replace high voltage metering and associated equipment
- UETDRTS39 Maintain compliance with national electricity market metrology practices and procedures
- UETDRTS40 Test and maintain energy/revenue metering schemes
- UETDRTS41 Install and replace complex energy/revenue metering schemes and associated equipment
- UETDRTS42 Management of energy registration data errors for revenue billing purposes
- UETDRTS43 Commission energy/revenue metering schemes
- UETDRTS44 Test and maintain energy/revenue metering schemes (complex)
- UETDRTS45 Manage compliance with national electricity market metrology practices and procedures
- UETDRTS46 Verification and certification of revenue metering/energy measurement instruments
- UETDRTS47 Commission energy/revenue metering schemes (complex)
- UETDRTTP34 Install/maintain overhead transmission network infrastructure
- UETDRTTP35 Install/maintain transmission network infrastructure electrical equipment

Qualification enrolments by state/territory

Qualification enrolments in Queensland, the Northern Territory and the Australian Capital Territory were largely positive over the last four years with large declines elsewhere, most notably in Victoria where enrolments fell by 43.4% since 2015. Similarly, enrolments in New South Wales fell from a peak of 1076 in 2016 to 644 in 2018, a decline of 40.1%.

While qualification enrolments have generally declined in the last four years, Unit enrolments have increased substantially nationwide, driven primarily by increases in only seven units. In 2018, 87.5% of these enrolments occurred outside of a nationally recognised program, 9.5% were delivered within Skill Sets and only 3% delivered within qualifications. These seven units, covering the areas of safety, rescue and first aid, accounted for nearly 80% of all UET unit enrolments in 2018.

Qualification enrolments by State/Territory



Source: NCVET VOCSTATS

5. Reasons for non-completion of qualifications and skill sets (including micro-credentials). Where students complete qualifications or skill sets, what was the purpose of undertaking them (e.g. finding employment, upskilling)?

Data on reasons for non-completion are unfortunately not available at the qualification and Skill Set level in Total VET Activity (TVA) data. Our analysis relates to the study reason of students that passed, failed or withdrew from units of competency.

Consideration must be given to the fact that a single unit, Perform rescue from a live LV panel, made up 42% of all UET unit enrolments in 2018. Achieving competency in this unit is a mandatory requirement for electrical workers across the States and Territories, with some local variations. This explains why, of the known study reasons given by students, being a job requirement was the dominant reason given, accounting for nearly 86% of responses. Since this unit is also often assessed on a yearly basis, the very high pass rate (99.3%) that is observed is also not unexpected.

Study reason	Passed	Failed	Withdrawn
It was a requirement of my job	110940	418	321
Other reasons	5121	29	28
I wanted extra skills for my job	4672	48	21
To get a job	2249	10	1
For personal interest or self-development	1778	0	0
To develop my existing business	1704	0	0
To get a better job or promotion	1394	19	2
To try a different career	677	6	0
To get into another course of study	511	0	3
To start my own business	344	0	0

6. Identify, where possible, opportunities for use of cross-sector units developed by the AISC.

The following endorsed Cross Sector units may be suitable for future use in ESI-TDR qualifications and Skill Sets, the Units of Competency below will be considered by the ESI-TDR IRC for inclusion where applicable. This will allow for the removal of superfluous Units of Competency from the UET Training Package.

All currently endorsed Cross Sector units

- BSBXCM301 - Engage in workplace communication
- BSBXCM401 - Apply communication strategies in the workplace
- BSBXCM501 - Lead communication in the workplace
- BSBXDB301 - Respond to the service needs of customers and clients with disability
- BSBXDB401 - Develop and implement recruitment processes that are inclusive of people with disability
- BSBXDB501 - Support staff members with disability in the workplace
- BSBXDB502 - Adapt organisations to enhance accessibility for people with disability
- BSBXTW301 - Work in a team
- BSBXTW401 - Lead and facilitate a team
- TAEXDB401 - Plan and implement individual support plans for learners with disability
- TAEXDB501 - Develop and implement accessible training and assessment plans for learners with disability

7. If there are jobs that have experienced changes in skill requirements, provide evidence for these changes and their impact.

The ESI TDR industry has not seen dramatic changes in skill requirements. Whilst different enterprises may have slight variations in how they respond to skills needs, new requirements may be needed as renewable technologies make a greater impact on jobs.

8. Identify barriers to employers hiring apprentices and trainees. Are employers using alternative pathways/labour strategies to address these barriers?

The industry reports that these are the potential barriers to hiring apprentices and trainees:

VET versus In-house Training

Learners are undertaking in-house training versus the VET system due to some nationally recognised qualification not being suitable for industry requirements. This has been addressed with current and future reviews of the Training Package.

Regulatory Compliance

The different state regulatory requirements are becoming a barrier to learners, training and industry; workers cannot freely move across the country or other roles in the energy sector. This is impacting workers flexibility and industry's ability to alleviate skill shortages.

STEM/Foundation Skills and Gender Diversity

There is a lack of candidates with the appropriate STEM/Foundation skills to complete a vocational trade. The need to attract candidates with these skills, as well as attracting more females to this sector has become a priority.

Overseas Workers

The current shortfall of qualified workers for transmission lines work in Australia is expected to exacerbate during 2021 when projects in transmission lines and distribution run concurrently. The possibility of job openings to overseas workers has been flagged as a barrier for apprentices and trainees to get a job.

9. Other relevant activities.

N/A

SECTION B

STAKEHOLDER CONSULTATION

Stakeholders involved in the consultation process

7 IRC Members

548 AIS UET Electricity Supply Industry- Transmission, Distribution and Rail Sector Training Package subscribers

8 State Training Authorities

Ongoing Consultation

The AISC seeks to ensure SSOs undertake broad and meaningful (e.g. face-to-face) industry consultation, including rural, regional and remote stakeholders.

The following table details the employers and businesses for each sector and state that Australian Industry Standards have met with as part of:

1. ongoing engagement and validation with industry and stakeholders
2. collection of industry intelligence
3. promotion of the VET system
4. cultivating and maintaining networks and partnerships with industry including engagement in rural and regional areas.

Entity Name	Sector	State	Rural/Regional/Remote (RRR)	Activity
<i>Stakeholder name</i>	<i>Stakeholder sector</i>	<i>State, multi-state or national?</i>	<i>Is stakeholder located in RRR areas or does it represent RRR interests?</i>	<i>SSO activity as per dot points above</i>
ARCUS Australia	Transmission Distribution and Rail	State	Rural/Regional	1,2
Ausgrid	Transmission Distribution and Rail	State	Rural/Regional	1,2,4
AusNet Services	Transmission Distribution and Rail	State	Rural/Regional	1,2,4
Cengage Australia	Transmission Distribution and Rail	National	Rural/Regional/Remote	3
Corpus Christi College	Transmission Distribution and Rail	State	Rural	1,2,3
Electrical Trades Union of Australia	Transmission Distribution and Rail	National	Rural/Regional/Remote	1,2,3,4
Endeavour Energy	Transmission Distribution and Rail	State	Rural/Regional	1,2,3,4
Energy Queensland	Transmission Distribution and Rail	State	Rural/Regional	1,2,3,4
Energy Safe Victoria	Transmission Distribution and Rail	State	Rural/Regional	1,2,3,4

Energy Skills Queensland	Transmission Distribution and Rail	State	Rural/Regional/Remote	1,2,3,4
Energy Skills Solutions	Transmission Distribution and Rail	State	Rural/Regional/Remote	1,2,3,4
Enerven	Transmission Distribution and Rail	State	Regional/Remote	1,2,3
Ergon Energy	Transmission Distribution and Rail	State	Rural/Regional	1,2,3,4
Essential Energy	Transmission Distribution and Rail	State	Rural/Regional	1,2,3,4
Get Solutions Rail	Transmission Distribution and Rail	Multi-State	Rural/Regional/Remote	1,2,3,4
Horizon Power	Transmission Distribution and Rail	State	Rural/Regional/Remote	1,2,3,4
Metro Trains	Transmission Distribution and Rail	State		1,2,3,4
Powerline Training Pty Ltd	Transmission Distribution and Rail	National	Rural/Regional/Remote	1,2,3,4
Powerlink	Transmission Distribution and Rail	State	Regional/Remote	1,2,4
Public Transport Authority	Transmission Distribution and Rail	State	Rural/Regional/Remote	1,2,3,4
Queensland Rail	Transmission Distribution and Rail	State	Rural/Regional/Remote	1,2,3,4

SA Power Networks	Transmission Distribution and Rail	State	Rural/Regional/Remote	1,2,3,4
SmartEnergy NT	Transmission Distribution and Rail	State	Regional/Remote	1,2,4
Sydney Trains	Transmission Distribution and Rail	State	Rural/Regional	1,2,3,4
Transgrid	Transmission Distribution and Rail	Multi-State	Rural/Regional/Remote	1,2,3,4
TAS Networks	Transmission Distribution and Rail	State	Rural/Regional	1,2,3,4
UEEA Training Council	Transmission Distribution and Rail	State	Rural/Regional/Remote	1,2,3,4
United Energy	Transmission Distribution and Rail	State	Rural/Regional	1,2,3,4
Western Power	Transmission Distribution and Rail	State	Rural/Regional/Remote	1,2,3,4

SECTION C

PROPOSED NEW WORK

2020-21

Currently there are no UET Electricity Supply Industry – Transmission Distribution and Rail Sector Training Package products currently identified by the ESI-TDR IRC for review or development during this forecast period. Where imported Units of Competency are identified as either deleted or superseded, the IRC may elect to revise the affected qualification(s) through the IRC minor upgrade process

2021-22

Review of ESI-TDR Certificate IV Qualifications

The ESI TDR IRC have identified the Certificate IV qualifications within the UET Electricity Supply Industry – Transmission Distribution and Rail Sector Training Package as a priority to address issues which require further consultation with industry and a detailed review of these training products to ensure that they meet current and future industry practices and emerging technologies. The project will also look at opportunities to delete materials across the Certificate IV's that are obsolete or duplicates of other materials within the National Register.

2022-23

Review of ESI-TDR Advanced Diploma Qualifications

During the Industry Skills review of the UET Electricity Supply Industry – Transmission Distribution and Rail Sector Training Package, the IRC identified the low enrolments and low usage of the two Advanced Diploma Qualifications.

The ESI TDR IRC have proposed a project to review both the UET60319 Advanced Diploma of ESI - Power Systems Operations and UET60219 Advanced Diploma of ESI - Power Systems and amalgamate them into one, with the associated Units of Competency being reviewed as a matter of industry priority. The outcomes of the project will ensure that all materials are updated to align with current and future industry practices and emerging technologies. The project will also look at opportunities to delete materials across the Advanced Diplomas that are obsolete or duplicates of other materials within the National Register.

2023-24

ESI TDR Training Package

The ESI TDR IRC have not identified Training Package materials for review or development during this forecast period. Where imported elective Units of Competency are identified as either deleted or superseded, the ESI TDR IRC may elect to revise the affected qualification(s) through the IRC Minor Change process.