



Australian Government

UEERE0081 Install photovoltaic systems to power conversion equipment

Release: 1

UEERE0081 Install photovoltaic systems to power conversion equipment

Modification History

Release 1. This is the first release of this unit of competency in the UEE Electrotechnology Training Package.

This unit replaces and is not equivalent to UEERE0016 Install, configure and commission LV grid-connected photovoltaic power systems. Modifications include:

- Unit title changed
- Unit application updated
- Prerequisites changed
- Significant amendments made to Elements and Performance Criteria
- Range of conditions updated
- Significant amendments to Performance and Knowledge Evidence.

Application

This unit involves the skills and knowledge required to install and commission a photovoltaic (PV) power system to power conversion equipment (PCE).

It includes working safely to industry installation standards, matching PV components specified for a given location, placing and securing system components accurately, making required circuit connections and completing the necessary installation documentation.

The skills and knowledge described in this unit require a licence or permit to practice in the workplace where work is carried out on electrical installations, which are designed to operate at voltages greater than 50 volt (V) alternating current (a.c.) or 120 V direct current (d.c.).

Competency development activities in this unit are subject to regulations directly related to licensing. Where a licence or permit to practice is not held, a relevant contract of training, such as an Australian Apprenticeship, is required.

Additional and/or other conditions may apply in some jurisdictions subject to regulations related to electrical work. Practice in the workplace and during training is also subject to work health and safety (WHS)/occupational health and safety (OHS) regulations.

Note: Those holding an Unrestricted Electrician's Licence or equivalent issued in an Australian state or territory meet the prerequisite requirements of UEEEL0012 Install low voltage wiring, appliances, switchgear and associated accessories. All other prerequisite requirements must be met.

Pre-requisite Unit

UEEEL0012 Install low voltage wiring, appliances, switchgear and associated accessories

And

UEERE0054 Conduct site survey for grid-connected photovoltaic and battery storage systems

Or

UEERE0055 Conduct site survey for off-grid photovoltaic/genset systems

Competency Field

Renewable Energy

Unit Sector

Electrotechnology

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1 Plan to install PV power system

PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

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|------------|--|
| 1.1 | Nature of the installation is verified from design documentation and any design concerns identified are referred to designer |
| 1.2 | WHS/OHS processes and procedures for work are identified and applied in accordance with workplace procedures |
| 1.3 | WHS/OHS hazards are identified, risks assessed, reported to relevant person/s and workplace procedures for risk control measures applied in preparation for work |
| 1.4 | Work is planned in consultation with the customer and others impacted by the work and sequenced appropriately |
| 1.5 | PV array mounting methods are verified in accordance with relevant industry standards |
| 1.6 | Location of PV array components is verified within the constraints of the building structure, design and industry standards and regulations |
| 1.7 | Material, tools, equipment and measuring devices |

		required for the PV installation are obtained in accordance with workplace procedures and checked against relevant diagrams and job requirements prior to installation
	1.8	Live testing, measurement and isolation requirements determined and applied in accordance with WHS/OHS requirements and workplace procedures
2	Install LV PV power array	
	2.1	Circuits/machines/plant are isolated in accordance with WHS/OHS requirements and workplace procedures
	2.2	PV array is installed in compliance with industry standards, regulations and job/manufacture specifications, and with sufficient access to enable terminations, adjustment and maintenance
	2.3	Wiring is terminated at components and associated equipment in accordance with manufacturer specifications, and functional and regulatory requirements
	2.4	Quality checks of installed apparatus are conducted in accordance with workplace procedures
	2.5	Testing and commissioning of the system is conducted in accordance with design documentation, regulations, relevant industry standards and manufacturer specifications
	2.6	Worksite is cleaned and made safe in accordance with workplace procedures
	2.7	‘As-installed’ system and associated equipment are documented, manuals produced, and system is handed over to required person/s as per legislation, regulations, industry standards and job requirements

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions may be found in the UEE Electrotechnology Training Package Companion Volume Implementation Guide.

Installation of PV array must include:

- two different types of mounting systems.

Unit Mapping Information

This unit replaces and is not equivalent to UEERE0016 Install, configure and commission LV grid-connected photovoltaic power systems.

Links

Companion Volume Implementation Guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b8a8f136-5421-4ce1-92e0-2b50341431b6>

Assessment Requirements for UEERE0081 Install photovoltaic systems to power conversion equipment

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- Significant amendments to Performance and Knowledge Evidence.

Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least two occasions and include:

- installing photovoltaic (PV) array, including:
 - applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements, including using risk control measures
 - verifying design and resolving any issues with designer
 - coordinating work with relevant person/s
 - determining and applying live testing, measurement and isolation requirements
 - reading and interpreting drawings/diagrams related to apparatus locations and circuit connections
 - applying appropriate array mounting methods for roof sections
 - placing and securing components
 - terminating wiring correctly and safety
 - testing and verification PV systems safely
 - connecting and commissioning in accordance with industry standards and regulations
 - completing documentation according to regulatory and industry standards.

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include

knowledge of:

- PV array installation requirements, including:
 - WHS/OHS requirements and methods for working on roofs
 - methods to ensure integrity of building and waterproofing
 - common types of PV array mounting frame construction and fixing methods
 - methods of tilt angle adjustment
- electrical PV array installation requirements, including:
 - methods used in wiring and connecting PV arrays in accordance with relevant industry standards
 - considerations involved in:
 - wiring of PV arrays
 - the location of associated system equipment
 - cable route from PV array/s to power conversion equipment (PCE)
- system installation including:
 - installation of a PV array in accordance with relevant industry standards and WHS/OHS guidelines
 - correct isolation and shutdown procedures
 - required vegetation control to remove or reduce shading or soiling on a PV array
- PCE including:
 - types of PCEs used in renewable energy systems
 - the basic function of a PCE
 - PCE operation
 - PCE characteristics
- PV modules, including:
 - cell, module, array
 - efficiency
 - typical applications
 - mechanical and electrical features necessary for the long life of a PV module
- module characteristics including:
 - I-V curve, operating point, MPP, power and voltage temperature co-efficient, Standard Test Conditions (STC), nominal operating cell temperature (NOCT)
 - major ratings of a PV module from manufacturer's information or nameplate data
 - configuration of a typical PV array
 - the effect of partial shading of a PV module or array
- Industry Standard requirements for the verification of system components selection including:
 - balance of the system components, including cabling and wiring systems, circuit protection and isolation equipment for a grid-connected PV system
 - schematic diagrams of common grid-connected PCE circuit configurations, including metering arrangements, isolation and connection with respect to residual circuit devices

(RCDs)”

- system documentation required by industry standards
- relevant manufacturer specifications
- relevant industry standards
- relevant WHS/OHS legislated requirements
- relevant workplace documentation, policies, procedures and standards
- risk mitigation processes.

Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that replicate workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- a range of relevant exercises, case studies and/or other simulations
- relevant and appropriate materials, tools, equipment and personal protective equipment (PPE) currently used in industry
- applicable documentation, including workplace procedures, equipment specifications, regulations, codes of practice and operation manuals.

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