

UEENEEK046A Design energy management controls for electrical installations in buildings

Unit Descriptor

1) Scope:

This competency standard unit covers designing and developing methods to reduce the energy use without compromising occupancy standards in new buildings and structures. The unit encompasses working safely, setting up and conducting evaluation measurements, predicting energy use from plans and specifications and designing and documenting strategies to effectively reduce energy use in the completed installation. It draws on some multi-disciplinary skills.

Prerequisite Unit(s)

2) Prerequisites:

Competencies

2.1) CSU(s):

Competency in this unit shall be assessed only after the following competencies have been acquired.

UEENEEK032A	Develop strategies to address sustainability issues
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Literacy and numeracy skills

2.2) L&N:

Participants are best equipped to achieve this unit if they have reading, writing and maths skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 “Literacy and Numeracy”

Reading	5	Writing	5	Maths	5
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Application of the Unit

3) Application:

This competency standards unit is intended for competency development entry-level employment based programs incorporated in approved contracts of training. It is intended to apply to any formal recognition for this standard at the aligned AQF 5 level or higher.

License to practice

3.1) Licensing:

The skills and knowledge described in this unit do not require a licence to practice in the work place. However practice in this unit is subject to regulations directly related to occupational health and safe and contracts of training such as new apprenticeships and the like.

Competency Field

4) Discipline:

Renewable and Sustainable Energy

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

1 Prepare to design energy management techniques for electrical installations in buildings	1.1	OHS procedures for a given work area are obtained and understood.
	1.2	Established OHS risk control measures and procedures in preparation for the work are followed.
	1.3	The extent of the electrical design is determined from specifications of building and its services, plant and machinery and discussion with appropriate personnel.
	1.4	Advice is sought from allied trades areas (e.g. air conditioning) on required energy usage and system design.
	1.5	Advice is sought from the work supervisor to ensure the work is co-ordinated effectively with others.
	1.6	Tools, testing devices, and materials needed to carry out the work are obtained and checked for correct operation and safety.
2 Design energy management techniques for electrical installations in buildings	2.1	OHS risk control measures and procedures for carrying out the work are followed.
	2.2	Tests and measurements are carried out in strict accordance with OHS requirements safety procedures.
	2.3	In-depth knowledge of the energy use of building services, plant and machinery is applied to the design process
	2.4	Energy evaluation tests are set up in accordance with established test methods and procedures for each particular parameter under scrutiny.
	2.5	Strategies to reduce energy use without compromising occupancy standards are developed from knowledge of energy management and evaluation test results.

		2.6	Unexpected situations are dealt with safely and with the approval of an authorised person.
		2.7	Design and evaluation is carried out without unnecessary damage to systems, circuits, the surrounding environment or services and using sustainable energy practices.
3	Complete the design of energy management techniques for electrical installations in buildings	3.1	OHS work completion risk control measures and procedures are followed.
		3.2	Work site is cleaned and made safe in accordance with established procedures.
		3.3	Results of design and recommended strategies and their criterion for energy reduction are documented in accordance with established procedures.
		3.4	Plans, wiring diagrams and specifications are forwarded to appropriate persons.

REQUIRED SKILLS AND KNOWLEDGE

6) Essential Knowledge and Skills (EK&S): This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and developing strategies for effective energy reduction in buildings. The extent of the essential knowledge and skills required is given Volume 2 Part 2, Clauses:

- 2.16.13 Building management systems
- 2.18.1 Occupational Health and Safety principles
- 2.20.12 Energy efficient building design

RANGE STATEMENT

7) Range: This relates to the unit of competency as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This competency standard unit shall be demonstrated in relation to developing strategies for effective energy reduction in at least two buildings each used for a different purpose.

Generic terms are used throughout this Vocational Standard shall be regarded as part of the Range of Variables in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

EVIDENCE GUIDE

8) Evidence Guide: This provides essential advice for assessment of the unit of competency and must be read in conjunction with the performance criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1) Overview:

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2) Critical Aspects of Evidence:

Before the critical aspects of evidence are considered all prerequisites shall be met.

The evidence on which competency in this unit is based shall be considered holistically for each element on at least two occasions comprising:

- A representative body of performance criteria demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
 - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range; and
 - Apply sustainable energy principles and practices as specified in the performance criteria and range; and
 - Demonstrate an understanding of the essential knowledge and associated skills as described in Clause 6.1 'Essential knowledge and associated skills' of this unit to such an extent that the learner's performance outcome is reported on a percentile basis consistent with the preferred industry and/or regulatory benchmark requirements; and
 - Demonstrate an appropriate level of skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:
 - Develop strategies for effective energy reduction in buildings as listed in Clause '5. Range statement' and including:
 - A Determining the extent of the design
 - B Setting up and conducting appropriate examinations and tests.
 - C Reporting evaluation including recommendation for improving energy efficiency
 - D Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

8.3) Context:

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit.

Resources required to assess this unit are listed above in Context of assessment', which should also be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment it must ensure that the conditions for assessment are authentic and as far as possible reproduce and replicate the workplace and is consistent with the approved industry simulation policy.

In addition to the resources listed above in Context of and specific resources for assessment, evidence should show demonstrated competency in developing strategies for effective energy reduction in buildings.

Method of assessment

8.4) Assessment Method(s):

This competency standard unit shall be assessed by methods given in Volume 1, Part 3 "Assessment Guidelines".

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

8.5) Concurrency:

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6) Key Competencies:

Evidence that particular key competencies have been achieved within this competency standard unit is in the context of the following performance criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 3.4	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1; 1.3; 1.4; 1.6; 2.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.1 to 1.6	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.4	2
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.4; 2.5	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 2.4; 2.5	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 2.4; 2.5	2

Skills Enabling Employment**8.7) Skills Enabling Employment:**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: All
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: All
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 3.3; 3.4
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.3; 1.4; 2.5 to 2.7
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1 to 1.5
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.7