

Title	Demonstrate and apply knowledge of renewable energy design requirement assessment		
Level	4	Credits	7

Purpose	<p>This unit standard is for people who work with renewable energy systems and covers the knowledge and skills required to assess a building for efficient renewable energy use.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> – demonstrate knowledge of building thermal performance for a given climate and site; – demonstrate knowledge of a domestic dwelling energy services demand assessment in terms of ensuring efficient use of renewable energy; and – assess design requirements for a renewable energy system.
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Classification	Renewable Energy Systems > Renewable Energy Systems - Installation and Maintenance
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Available grade	Achieved
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Guidance information

- 1 This unit standard has been developed for learning and assessment off-job.
- 2 References

All Australian Standards (AS) may be found at www.standards.org.au;

All Australian/New Zealand Standards (AS/NZS) may be found at <http://www.standards.org.nz/>;

AS 4086.2:1997, *Secondary batteries for use with stand-alone power systems - Installation and maintenance*;

AS/NZS 3000:2007, *Electrical Installations (known as the Australian/New Zealand Wiring Rules)*;

AS/NZS 3010:2005, *Electrical installations – Generating sets*;

AS/NZS 4509.1:2009, *Stand-alone power systems - Part 1: Safety and installation*;

AS/NZS 4509.2:2010, *Stand-alone power systems - Part 2: System design*;

AS/NZS 5033:2012, *Installation and safety requirements for photovoltaic (PV) arrays*;

and all subsequent amendments and replacements.
- 3 Definitions

a.c. – alternating current.

Current regulations and standards – in this unit standard this term is used to refer to the requirements of the above references.

d.c. – direct current.

Enterprise policies and procedures – those practices and procedures that have been promulgated by the company or enterprise for use by their employees.

Industry practice – those practices that competent practitioners within the industry recognise as current industry best practice.

4 Range

- a All measurements are to be expressed in Système Internationale (SI) units, and where required, converted from Imperial units into SI units.
- b Candidates shall be supplied by the assessor with formulae involving more than three quantities.
- c Use of a calculator during assessment is permitted.
- d All activities must comply with any policies, procedures, and requirements of the organisations involved.
- e All activities and evidence presented for all outcomes and performance criteria in this unit standard must be in accordance with legislation, enterprise policies and procedures, ethical code, current regulations and standards, industry practice, and where appropriate, manufacturer's instructions, specifications, and data sheets.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of building thermal performance for a given climate and site.

Performance criteria

1.1 Explain terms used in relation to a building thermal performance.

Range may include but is not limited to – thermal comfort, passive system, active system, aspect of the site, orientation of the building, thermal mass.

1.2 Describe climatic factors that affect building design.

1.3 Explain the relationship between thermal comfort and climate.

1.4 Explain the relationship between the seasonal variation of the sun's path and the heat gain of the building elements.

Range roof, walls, windows, floor.

1.5 Explain the effect of the thermal conductivity of building materials on heat flows to and from the building.

1.6 Describe a method of monitoring thermal performance of a dwelling using both indoor and outdoor hourly temperature measurements.

1.7 Describe the effects of insulation, glazing, orientation, shading devices, thermal mass, and ventilation on the thermal performance of a building.

1.8 Describe an active solar system that could be used in a dwelling to complement passive design features in extreme climates.

Outcome 2

Demonstrate knowledge of a domestic dwelling energy services demand assessment in terms of ensuring efficient use of renewable energy.

Performance criteria

- 2.1 Define terms associated with energy services demand.
- Range energy, power, energy efficiency, end use energy, primary energy, embodied energy.
- 2.2 Write units of measurement and schematic symbols using standard SI units and perform prefixes and calculations.
- Range energy, power, time, temperature.
- 2.3 Use tables to convert energy and power values from one form to another.
- 2.4 Describe the relationship between end use energy, primary energy, and energy efficiency.
- 2.5 Describe the energy services required by a domestic dwelling.
- 2.6 Describe the use of meters and other methods to determine the power and energy consumption of individual appliances and systems.
- 2.7 Compare factors that determine the appropriate energy sources for services.
- Range environmental, economic, social, and legislative constraints.
- 2.8 Explain considerations when selecting energy efficient appliances and technologies.

Outcome 3

Assess design requirements for a renewable energy system.

Performance criteria

- 3.1 Determine system design criteria for a given dwelling specification.
- Range energy output, energy storage capacity, budget, usage patterns, monitoring and control interfaces, stand-alone, grid connected.
- 3.2 Assess energy demand for each end-user service.

Planned review date	31 December 2024
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	21 July 2011	31 December 2020
Review	2	24 October 2019	N/A

Consent and Moderation Requirements (CMR) reference	0003
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Comments on this unit standard

Please contact The Skills Organisation at reviewcomments@skills.org.nz if you wish to suggest changes to the content of this unit standard.