

<b>Title</b>	<b>Install, commission and maintain wind energy conversion systems</b>		
<b>Level</b>	<b>4</b>	<b>Credits</b>	<b>25</b>

<b>Purpose</b>	<p>People credited with this unit standard are able to demonstrate skills to install wind energy conversion systems for residential and small community applications.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> <li>– install and commission a WECS at a site in accordance with AS/NZS 4509; and</li> <li>– maintain a WECS in accordance with AS/NZS 4509.</li> </ul>
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<b>Classification</b>	Renewable Energy Systems > Renewable Energy Systems - Installation and Maintenance
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<b>Available grade</b>	Achieved
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### Guidance information

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

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

AS 3011.1:1992, *Electrical installations - Secondary batteries installed in buildings Vented cells*;  
 AS/NZS 1170.2:2011 Rec: 2016, *Structural design actions - Part 2: Wind actions*;  
 AS 4777.1:2005, *Grid connection of energy systems via inverters – Part 1: Installation requirements*;  
 AS 4777.2:2005, *Grid connection of energy systems via inverters – Part 2: Inverter requirements*;  
 AS 4777.3:2005, *Grid connection of energy systems via inverters – Part 3: Grid protections requirements*;  
 AS/NZS 3000:2007, *Electrical Installations (known as the Australian/New Zealand Wiring Rules)*;  
 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*;  
 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.

*WECS* – Wind Energy Conversion Systems.

- 4 Range
- All measurements are to be expressed in Système Internationale (SI) units, and where required, converted from Imperial units into SI units.
  - Candidates shall be supplied by the assessor with formulae involving more than three quantities.
  - Use of a calculator during assessment is permitted.
  - All activities must comply with any policies, procedures, and requirements of the organisations involved.
  - 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.
- 5 It is recommended that candidates have been assessed against Unit 27426, *Demonstrate knowledge of d.c. and a.c. machines used for small scale renewable energy systems*; and Unit 27430, *Design wind energy conversion systems* prior to assessment to this unit standard.

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## Outcomes and performance criteria

### Outcome 1

Install and commission a WECS at a site in accordance with AS/NZS 4509.

Range tower selection, tower erection, safety procedures, lightning protection, cable voltage drop, component installation, commissioning tests, diagrams, maintenance schedule.

### Performance criteria

1.1 Select an appropriate tower for the installation of a WECS taking local conditions into consideration.

Range tower selection, soil type and footings, local council approvals, appropriate codes such as AS/NZS 1170.2, tower transportation.

1.2 Describe safety procedures for the installation and commissioning of WECS system components.

Range safety procedures, lightning protection, cable voltage drop, component installation, commissioning tests, diagrams.

1.3 Manage the site during construction to minimise environmental impacts.

Range environmental, social, and legislative constraints.

- 1.4 Raise a WECS tower using appropriate safety procedures.  
Range safety procedures, lightning protection.
- 1.5 Install lightning protection.  
Range lightning protection, cable voltage drop, component installation.
- 1.6 Select an electrical transmission voltage and cable size from the WECS to the load or energy storage.  
Range cable voltage drop, component installation.
- 1.7 Install and connect system components.  
Range component installation, commissioning tests.
- 1.8 Perform commissioning tests to confirm specified industry requirements.  
Range WECS power output, voltage regulation, transmission cable voltage drop, manual and automatic furling, shut-down.
- 1.9 Prepare as-built schematic and wiring diagrams for the WECS showing the circuit layout and protection between the WECS, energy storage, inverter and loads according to AS/NZS 3000, AS/NZS 4509 and lightning protection requirements.  
Range safety procedures, lightning protection, cable voltage drop, component installation, commissioning tests, diagrams.
- 1.10 Prepare the as-built layout and location of energy storage diagram to meet AS/NZS 3000, AS 3011.1 and AS/NZS 4509.  
Range schematic diagrams.
- 1.11 Prepare a maintenance schedule for the system in accordance with current industry practice.  
Range maintenance schedule and procedure.

## Outcome 2

Maintain a WECS in accordance with AS/NZS 4509.

### Performance criteria

- 2.1 Perform safety procedures for fault diagnosis and maintenance of WECS system components.
- 2.2 Carry out tower maintenance.

2.3 Diagnose potential fault conditions and propose rectification.

Range at least three potential fault conditions are identified.

<b>Planned review date</b>	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

<b>Consent and Moderation Requirements (CMR) reference</b>	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](mailto:reviewcomments@skills.org.nz) if you wish to suggest changes to the content of this unit standard.