

REGISTERED NATIONAL STANDARD



UNIT OF COMPETENCY

Title:	Assist in the installation and operation of hybrid-wind systems <u>Notes:</u> 1) Due to safety issues inherent in working with electricity, all training and assessment activities must be in accordance with local industry and regulatory requirements; 2) This unit of competency has been adapted the Pacific regional unit standard <i>SE3306 Assist in the installation, operation and maintenance of systems for RE & EE</i> ;				
TQF Level:	3	Credits:	6	Version:	1
National standard code:	NS098-03				
Associated qualification (and code):	National Certificate in Sustainable Energy (Hybrid-wind) Level 3 (QR-03-NQ-018-04-0504-23-01)				
Approval date:	27 April 2023	Review date:	27 April 2028		
Purpose:	This unit standard involves installation and operation of Hybrid-wind systems. Persons credited with this unit standard are able to: <ol style="list-style-type: none"> 1. Prepare to install operate and maintain hybrid-wind system 2. Demonstrate installation of hybrid-wind systems equipment. 3. Demonstrate the safe handling and operation of hybrid-wind systems equipment. 4. Write completion report on installation and operation of hybrid-wind system. 				

Learning Outcome 1 (LO1)	Prepare to install and operate hybrid-wind systems
Performance standards	<ul style="list-style-type: none"> 1.1. Identify <i>occupation health and safety (OHS)</i> procedures for a given work area relevant to the installation and operation of a hybrid-wind system; 1.2. Determine the nature and location of the work from documentation or an appropriate person to establish the scope of work to be undertaken. 1.3. Identify and note safety <i>hazards</i> that have not previously been identified; 1.4. Identify and implement established <i>risk control measures</i> and procedures in preparation to install and operate hybrid-wind systems; 1.5. Identify others who are most likely to be affected by the installation and operation of a hybrid-wind system and consult with them to ensure relevant activities are sequenced properly to minimize disruptions; 1.6. Plan the location of hybrid-wind system within the constraints of the building structure, land use issues, wind resource availability and local regulations; 1.7. Identify and obtain the materials needed for the installation work in accordance with established procedures and checked against job requirements; 1.8. Identify and obtain tools, equipment and testing devices needed to for the installation work in accordance with established procedures and checked for correct operation and safety; 1.9. Check preparatory work to ensure no damage has occurred to any materials, equipment, testing devices or any part of the hybrid-wind system and ensure it complies with requirements
Learning Outcome 2 (LO2)	Demonstrate the safe handling and operations of hybrid-wind systems equipment.
Performance Standards	<ul style="list-style-type: none"> 2.1 Identify safe handling and operational procedures of a hybrid-wind system; 2.2 Describe the safety procedures required for operational system checks on hybrid-wind systems; 2.3 Describe safety procedures for handling and storage of hybrid-wind system components and materials; 2.4 Check the installation of apparatus and associated equipment to ensure compliance with technical standards and job specifications and requirements; 2.5 Describe procedures for finding faults and defects in hybrid-wind systems components and materials; 2.6 Explain safety monitoring techniques for hybrid-wind systems and equipment. 2.7 Operate hybrid-wind system components and equipment safely and in accordance to OHS requirements, technical standards, job specifications and requirements.

Learning Outcome 3 (LO3)	Demonstrate installation of hybrid-wind systems equipment
Performance Standards	<p>3.1 Identify the various kinds of hybrid-wind system configurations.</p> <p>3.2 Identify the functions and limitations of each part and components of a hybrid-wind system and equipment;</p> <p>3.3 Select and obtain the right tools required for installing hybrid-wind system equipment according to established procedures;</p> <p>3.4 Demonstrate the assembly and disassembly of a hybrid-wind system components;</p> <p>3.5 Carry out apparatus installation efficiently without unnecessary waste of materials or damage to apparatus and the surrounding environment or services in compliance with sustainable energy principles;</p> <p>3.6 Carry out ongoing checks on the quality of the installed apparatus in accordance with established procedures;</p> <p>3.7 Identify and check apparatus and components as being isolated where necessary in strict accordance OHS requirements and procedures;</p> <p>3.8 Demonstrate the testing and commissioning procedures involved in the installation of hybrid-wind systems and equipment.</p>
Learning Outcome 4 (LO4)	Write completion report on hybrid-wind system installation and operation activities.
Performance standards	<p>4.1 Identify requirements for completion reporting in hybrid-wind systems;</p> <p>4.2 Perform final checks to the installed and functioning hybrid-wind systems so that they conform to requirements.</p> <p>4.3 Document 'As-installed' emergency systems apparatus and associated equipment;</p> <p>4.4 Notify appropriate person or persons in regards to hybrid-wind installation and in accordance with established procedures;</p> <p>4.5 Compile relevant data and information in accordance with completion report requirements;</p> <p>4.6 Complete installation completion report as required;</p> <p>4.7 Explain procedures of identify and document faults in hybrid-wind systems.</p>
Pre-requisites	N/A
Co-requisites	N/A
Underpinning skills and knowledge	<p>The following knowledge and skills underpin this unit standard:</p> <p>1. Knowledge of basic tools and equipment;</p>

	<ol style="list-style-type: none"> 2 Knowledge of basic functions and components of hybrid-wind systems; 3 Basic knowledge of installing and operating hybrid-wind systems 4 Knowledge of basic civil works involved in hybrid-wind set ups. 5 Safety of hybrid-wind systems 6 Knowledge of the environmental and social impacts of hybrid-wind system development.
<p>Assessment requirements</p>	<p><u>Methods of assessment:</u></p> <p>A range of assessment methods should be used to assess students’ knowledge and application of skills. These shall include but not restricted to the following:</p> <ol style="list-style-type: none"> a) Direct observation of students performing certain tasks stated under context of assessment; b) Oral questions to test relevant skills and knowledge during observation (e.g., Interviews) c) Written assessment such as: <ol style="list-style-type: none"> 1) Reports – installation and operation activities. 2) Student Portfolios – containing other activities that demonstrate what a student can do – e.g., annotated photographs, video records, completed Activity logs, marked quizzes and assignments, etc., etc. 3) Reviews of workplace attachment reports (e.g., Supervisor/third party reports; testimonials from Project manager or supervisor) <p><u>Context of assessment:</u></p> <p>To support student assessment and to ensure they are valid, reliable, flexible, and fair, a training provider is encouraged to make the necessary arrangements to involve the relevant key industry organisations such as <i>Tonga Electricity Commission (TEC)</i>, <i>Tonga Power Limited (TPL)</i> and other trusted licensed private energy and electricity entrepreneurs in the assessment of the required skills and knowledge. Such collaboration between provider institutions and the industry may include but not restricted to the following:</p> <ul style="list-style-type: none"> • Experts from the industry contribute to the design and implementation of the curriculum and assessment activities; • Experts from the industry are engaged as trainers, assessors, or assessment moderators; • Students are placed in relevant industry organizations for workplace attachment; • Industry experts act as supervisors of students on workplace attachment • Etc.

	<p>To show that learners have the required competence they will need to demonstrate and apply their knowledge in the workplace (or in an environment that closely resembles the workplace) in relation to:</p> <ol style="list-style-type: none"> a) LO1: Prepare to install and operate hybrid-wind systems. b) LO2: Demonstrate the safe handling and operations of hybrid-wind systems equipment c) LO3: Demonstrate installation of hybrid-wind systems equipment. d) LO4: Write completion report on hybrid-wind installation and operation activities. <p>Each LO and associated performance standards must be demonstrated on at least TWO occasions. Sources of evidence need to be rich in nature to minimise error judgment.</p> <p><u>Re-assessment</u></p> <p>Candidates of assessment are eligible to three (3) attempts to achieve the required competency within 14 days of their first attempt:</p> <ol style="list-style-type: none"> 1. Feedback must be provided to the candidate and sufficient time provided to prepare for re-assessment. 2. The trainer/assessor has the discretion to vary the assessment tasks used in each assessment attempt as long as the: <ol style="list-style-type: none"> a) same competencies are being assessed; b) principles of assessment are adhered to. <p>Failure to achieve the required competency after three (3) attempts on the exam or specific part of the assessment will require the person studying this Unit to re-enrol for the same Unit.</p>
<p>Moderation arrangements</p>	<ol style="list-style-type: none"> 1. Training providers must have their own moderation system approved by TNQAB before accreditation is granted: <ol style="list-style-type: none"> a. Relevant internal moderation processes are documented; b. Assessment is planned for each unit, and moderation processes are integrated into such plan 2. External moderation is conducted by the National qualifications unit of TNQAB for all unit components of national qualifications; <ol style="list-style-type: none"> a. Samples of assessed activities are submitted for moderation; b. Moderation (external) forms are available on request from the National qualifications unit of TNQAB.
<p>Resource requirements</p>	<ol style="list-style-type: none"> 1. A textbook (or compilation of printed resources) on HWECS control system fault analysis, installation and operation, at the discretion of the course/unit

	<p>coordinator or trainer;</p> <p>2. Safety Tools and equipment, at least the following:</p> <ul style="list-style-type: none"> a) Hand gloves for electrical and mechanical lab work b) Safety helmet; c) Safety glasses/goggles; d) Ear-mask/muff for use in noisy workshop environment; e) Dust mask; f) Electrician safety harness; g) Safety tags (e.g. <i>out of service, do not operate, live wire, etc.</i>). <p>3. Tools and Equipment, at least the following:</p> <ul style="list-style-type: none"> a) Electrician’s Tool Kit includes at least the following: <ul style="list-style-type: none"> (i) Insulated screwdrivers, (ii) Insulated pliers, (iii) Electrical tester, (iv) Ratchet set (containing handle, universal joint, extension bar, and coupler etc.); (v) Measuring tape. b) Drill set for electricians (with bits); c) Heat gun - for cable sleeving; d) Soldering iron and solder wire; e) Termination tools, include at least the following: <ul style="list-style-type: none"> (i) Crimping tool; (ii) Air blower; (iii) Solder wire; (iv) Crimp lugs; (v) Cables and accessories. f) Testing Equipment for electrical, include at least the following: <ul style="list-style-type: none"> (i) AC Variable Power Supply; (ii) DC variable Power Supply ; (iii) Oscilloscope; (iv) Frequency counter; (v) Power factor tester; (vi) Three-phase power analyser; (vii) Fused Low-voltage test lamp.
<p>Requirements to complete this unit</p>	<p>There are three (4) Learning outcomes and Thirty-one (31) Performance standards to measure competence.</p> <p>To demonstrate competence, the person studying this unit is:</p> <ul style="list-style-type: none"> 1. Required to demonstrate all Los to the expected standards of performance; 2. Required to attain an <i>Achieved</i> Grade (Competent) to fulfil the

	<p>requirements of the Unit Standard.</p> <p>3. Eligible to three (3) attempts to achieve the required competency within 14 days of the first attempt.</p> <p>Failure to achieve the required competency level after three (3) attempts of the exam or specific part of the assessment will require the person studying this Unit to re-enrol for the same Unit.</p>
<p>Important notes and definitions</p>	<p><u>Notes:</u></p> <ol style="list-style-type: none"> 1. All activities associated with this unit standard must comply with the requirements of national codes of practice, regulations and legislation for workplace health, safety, and environmental protection and any subsequent amendments. 2. Assessors must comply with Tonga national assessment and moderation requirements. <p><u>Definitions:</u></p> <ol style="list-style-type: none"> 1. Occupational Health and Safety (OHS) refers to a multi-disciplinary field concerned with protecting safety, health and welfare of people working at an organization 2. The term “tool” refers to tools such as written toolkits for HW assessment, surveys, hand tools or machines
<p>Public comments on unit</p>	<p>Please contact TNQAB National Qualifications Unit (email EnquireNQ@tnqab.to or Telephone 28136) if you like to discuss or suggest changes to the details of this unit.</p>