

REGISTERED NATIONAL STANDARD



UNIT OF COMPETENCY

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| Title: | Maintain and repair biogas system infrastructure and facilities associated with <i>remote area</i> essential service operations Note: 1. Due to safety issues inherent in working with combustible substances, all training and assessment activities must be in accordance with local industry and regulatory requirements; 2. This unit of competency has been adapted from the Pacific regional unit standard SE3305 (B) <i>Maintain and repair facilities associated with remote area essential service operations (Biomass)</i> . | | | | |
| TQF Level: | 3 | Credits: | 4 | Version: | 1 |
| National standard code: | NS103-03 | | | | |
| Associated qualification (and code): | National Certificate in Sustainable Energy (Biomass) Level 3 (QR-03-NQ-018-03-0504-23-01) | | | | |
| Approval date: | 27 April 2023 | | Review date: | 27 April 2028 | |
| Purpose: | <p>This unit covers basic maintenance of <i>remote area</i> biogas system infrastructure and facilities. It encompasses working safely, to maintenance standards and following maintenance routines, identifying deterioration and damage to facilities using routine procedures, and completing the necessary maintenance reporting.</p> <p><i>[Range of remote area infrastructure and facilities include but not restricted to: biogas system and components, fences and gates, gutter system and downpipes, windows and louvres, locks, paintwork; essential services facilities such as lighting, plumbing work. Only basic skills and knowledge for DIY jobs are expected]</i></p> <p>This unit is intended primarily for individuals living in rural and remote communities such as those in the villages and outer islands of Tonga and the rest of the Pacific Islands.</p> <p>Persons credited with this unit standard are able to:</p> <ol style="list-style-type: none"> 1. Prepare to maintain and repair remote area biogas facilities and infrastructure; 2. Maintain and repair remote area biogas facilities and infrastructure. 3. Complete maintenance and repair work reports | | | | |

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| Learning Outcome 1 (LO1) | Prepare to maintain and repair remote area biogas systems facilities and infrastructure. |
| Performance standards | <ol style="list-style-type: none"> 1.1. Identify and obtain the relevant <i>Occupational health and safety</i> (OHS) procedures; 1.2. Identify and follow established OHS <i>risk control measures</i> and procedures in preparation for the remote area facilities and infrastructure repair work. 1.3. Identify and report safety <i>hazards</i> in the remote area facilities and infrastructure and biogas system which have not previously been identified and seek advice on risk control measures from the work supervisor. 1.4. Seek advice from the work supervisor to ensure the repair work is coordinated effectively with fellow workers and the local community. 1.5. Establish the scope of repair work to be undertaken by seeking advice from the work supervisor to ensure the repair work is coordinated effectively; 1.6. Identify materials, tools, and equipment (including testing devices) which would be required for the repair work. |
| Learning Outcome 2 (LO2) | <p>Ascertain the kinds of remote area facility and infrastructure that need repair</p> <p><i>[Range include but not restricted to biogas system and components, fences and gates, doors, windows and louvres, gutter system and downpipes, locks, paintwork, essential services facilities such as lighting, water source, basic plumbing work]</i></p> |
| Performance Standards | <ol style="list-style-type: none"> 2.1 Obtain the nature and location of remote area facilities and infrastructure either from documentation or relevant others such as community members or work supervisor to establish the scope of repair work to be undertaken; 2.2 Identify sources of materials that may be required for the repair work and access materials in accordance with established routines and procedures; 2.3 Identify correct types and specifications for materials required for repair work; 2.4 Ascertain any prescribed limits, routines and procedures required for repair work; 2.5 Obtain the tools, equipment and testing devices needed to carry out the repair work and check for correct operation and safety. |
| Learning Outcome 3 (LO3) | Maintain and repair remote area facility and infrastructure |
| Performance Standards | <ol style="list-style-type: none"> 3.1 Follow established OHS risk control measures and procedures for carrying out the repair work; 3.2 Identify biogas system components which may require proper decommissioning in strict accordance OHS requirements and procedures; |

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| | <p>3.3 Identify and adhere to procedures for referring non-routine events to immediate supervisor for directions;</p> <p>3.4 Repair faulty and damaged biogas system components, and facility using routine procedures;</p> <p>3.5 Carry out maintenance and repairs efficiently within prescribed limits, routines, and procedures without waste of materials and energy and without damage to biogas system and components and the surrounding environment or services;</p> <p>3.6 Carry routine quality checks in accordance with biogas system repair instructions;</p> <p>3.7 Identify and comply with work site cleanliness and safety requirements.</p> |
| Learning Outcome 4 (LO4) | Complete maintenance and repair work report. |
| Performance standards | <p>4.1 Identify and follow OHS work completion risk control measures and procedures;</p> <p>4.2 Identify and follow procedures for referring maintenance issues beyond the scope of prescribed work to persons of higher authority;</p> <p>4.3 Identify <i>reporting line</i> and other requirements for reporting maintenance and repair work;</p> <p>4.4 Complete relevant report forms as required and consult line supervisors when necessary;</p> <p>4.5 Submit reports for completed maintenance and repair work in accordance with established requirements.</p> |
| Pre-requisites | N/A |
| Co-requisites | N/A |
| Underpinning skills and knowledge | <p>The following skills and knowledge underpin the unit:</p> <p><u>KNOWLEDGE</u></p> <ol style="list-style-type: none"> 1. Knowledge of basic operation of a rural and remote lifestyle in the Pacific Island communities. 2. Knowledge of basic civil and engineering works involved in biogas system operation. 3. Electrical knowledge including but not restricted to: <ul style="list-style-type: none"> • Identification and basic function of electrical components used for generating and distributing. • Electricity safety procedures when working with electricity. • Identification of faulty electrical components. • Reporting of faulty electrical components. |

4. Fire-fighting equipment knowledge including but not restricted to:
 - Fire extinguishers and signage
 - Types of fire extinguishers
 - Contents and colour
 - Correct identification
 - Use of fire extinguishers
 - Use of water hose and reel
 - Safety awareness
5. Telephone knowledge including but not restricted to:
 - Answer calls promptly and clearly.
 - Using designated business protocol procedure
 - Making and receiving telephone calls in a workplace context
 - Obtain accurate telephone numbers from an appropriate source.
 - Establish contact using designated business protocol procedures.
 - Convey purpose all call clearly and concisely.
6. Mathematical operations knowledge including but not restricted to:
 - Whole numbers.
 - Fractions
 - Decimals
 - Percentages
 - Ratios
 - Proportions

SKILLS

7. Essential services facilities lighting:
 - Incandescent lamps - replacement
 - Fluorescent tubes - replacement
 - Fluorescent light starters - replacement
 - Compact fluorescent lamps - replacement
 - Diffusion devices – replacement, maintenance
 - Safety awareness
 - Disposal of faulty lamps
8. Essential services facilities safety and security and emergency checks:
 - Broken windows
 - Faulty lighting
 - Damaged gates
 - Logging the inspections
 - Notification of the situation
9. Repair and maintenance to fences and gates:
 - Emergency repairs

- Locks and catches
- Security fencing
- Fence maintenance
- Gates
- Safety awareness

10. Maintenance of paintwork:

- Preparation of surfaces
- Block work
- Concrete
- Timber
- Steel
- Paint selection
- Brush and roller selection
- Paint application
- Clean up process
- Paint and accessories storage
- Safety awareness

Assessment requirements

Methods of assessment:

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:

1. Direct observation of students performing a seminar or performing certain tasks stated under context of assessment
2. Oral questions to test relevant skills and knowledge during observation (e.g., Interviews)
3. Written assessment such as:
 - a) Maintenance and repair reports;
 - b) 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.
 - c) Reviews of workplace attachment reports (e.g., Supervisor/third party reports; testimonials from Project manager or supervisor)

Context of assessment:

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 *Tonga Electricity Commission (TEC)*, *Tonga Power Limited (TPL)* and other trusted licensed private energy and electricity entrepreneurs in the assessment of the required

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| | <p>competencies. 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 maintain and repair remote area biogas systems facilities and infrastructure. b) LO2: Ascertain the kinds of remote area facility and infrastructure that need repair c) LO3: Maintain and repair remote area facility and infrastructure d) LO4: Complete maintenance and repair work report. <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 a national qualification; |

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| | <p>a) Samples of assessed activities are submitted for moderation; b) Moderation (external) forms are available on request</p> |
| <p>Resource requirements</p> | <p>1) Biogas plant: At least one of the following types:</p> <ul style="list-style-type: none"> • Balloon plant • Fixed dome plant • Floating drum plant • Horizontal plant • Earth-pit plant • Ferro-cement plant <p>2) Simulation of remote facilities and infrastructure;</p> <p>3) Electrician’s Tool Kit includes a sturdy tool-case containing the following:</p> <ul style="list-style-type: none"> a) Electric drill and bit sets b) Ratchet handle, universal joint, c) Sockets d) Coupler e) Extension bar f) Insulated screwdrivers (approved for electrical safety) g) Combination spanner (approved for electrical safety) h) Pliers (approved for electrical safety) i) Electric tester j) Hammer k) Measuring tape |
| <p>Requirements to complete this unit</p> | <p>There are four (4) Learning outcomes and twenty-three (23) Performance standards to measure competence.</p> <p>To demonstrate competence, the person studying this unit is:</p> <ul style="list-style-type: none"> a. Required to demonstrate all LOs to the expected standards; b. Required to attain an <i>Achieved</i> Grade (Competent) to fulfil the requirements of the Unit Standard; c. Eligible to three (3) attempts to achieve the required competency within 14 days of the first attempt. <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>Important notes and definitions</p> | <p>Legislation</p> <p>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.</p> |

2. If local legislations are not available, relevant legislations or policies from New Zealand or Australian are to be used for training.

Definition.

1. *Biogas* is a mixture of different gases produced by the breakdown of organic matter in the absence of oxygen. Biogas can be produced from raw materials (feedstock) such as agricultural waste, manure, municipal waste, plant material, sewage, green waste, or food waste. Biogas is a renewable energy source and, in many cases, exerts a very small carbon footprint.
2. A *biogas plant* is an anaerobic digester that produces biogas from feedstock.
3. *Civil Works* refers to work that involves civil engineering and construction of concrete base and digester including ducting for the biogas system, construction of digestate collection tanks and livestock pens.
4. *Essential services* refer to services, if interrupted or ceased, could endanger the life, health, or safety of members in a population (e.g., water supply, electricity, gas, health services;
5. *Hazard* is a potential source of harm or adverse health effect on a person or persons.
6. *Occupational health and safety (OHS)* refers to the practice of dealing with all aspects of health and safety in the workplace, with a strong focus on preventing workplace hazards.
7. *OHS control measures (or risk control measures)* are actions that can be taken to reduce the potential of exposure to workplace hazards. It could be as simple as removing the hazard (so as to reduce the likelihood of the risk of exposure to that hazard).
8. *Remote area* in this unit refers to a community (e.g., village or island community with no regular scheduled flights, no or limited access roads, minimal telephone or radio services.
9. *Reporting line* - the way the people in a company, organization etc. are organized in order to specify how authority, accountability and responsibility are allocated.
10. *Risk* refers to the likelihood that a person may be harmed or suffers adverse health effects if exposed to a hazard.

**Public
comments on
unit**

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.