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#### interviewed in serves of Act S2 of 1995

## SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

In accordance with regulation 24(c) of the National Standards Bodies Regulations of 28 March 1998, the Standards Generating Body (SGB) for

### Electrical Engineering and Construction

Registered by NSB 12, Physical Planning and Construction, publishes the following qualifications and unit standards for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the qualification and unit standards upon which qualifications are based. The full qualification and unit standards can be accessed via the SAQA web-site at <u>www.saqa.org.za</u>. Copies may also be obtained from the Directorate of Standards Setting and Development at the SAQA offices, Hatfield Forum West, 1065 Arcadia Street, Hatfield.

Comment on the unit standards should reach SAQA at the address **below and no later than 12 April 2004.** All correspondence should be marked **Standards Setting – SGB Electrical Engineering and Construction** and addressed to

> The Director: Standards Setting and Development SAQA *Attention: Mr. D Mphuthing* Postnet Suite 248 Private Bag X06 Waterkloof 0145 or faxed to 012 – 431-5144 e-mail: <u>dmphuthing@saqa.co.za</u>

JOE SAMUELS DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

# Elective Renewable Energy Unit Standards for the Registered National Certificates in Electrical Engineering – NQF Level 2, 3 and 4

#### **Unit Standards Titles at NQF Level 2**

| Titles 1: | Demonstrate an understanding of climate and weather in the context of      |
|-----------|--|
|           | renewable energy   |
| Titles 2: | Demonstrate an understanding of renewable energy sources                   |
| Titles 3: | Identify, select and understand the function of the components in a stand- |
|           | alone photovoltaic supplied system   |
| Titles 4: | Install, wire and commission a stand-alone photovoltaic supplied system    |
|           |  |

## Unit Standards Titles at NQF Level 3

| Titles 5: | Maintain a stand-alone photovoltaic supplied system |
|-----------|---|
| Titles 6: | Install and maintain a solar hot water system       |
|           |   |

Titles 7: Demonstrate an understanding of energy efficiency

## Unit Standards Titles at NQF Level 4

| Titles 8: | Install connect and commission a stand-alone battery charging wind |
|-----------|--|
|           | turbine  |
|           |  |

Titles 9: Select a back-up generator for a stand-alone renewable energy system

## Unit Standards Titles and associated specific outcomes at NQF Level 2

| 1. | Title: | Demonstrate an understanding of climate and weather in the |
|----|--------|--|
|    |        | context of renewable energy                                |

Specific Outcome 1:1 Understand the sun as the primary factor in the earth's climate and weather

Specific Outcome 1.2: Understand the weather and climate as a source of renewable energy sources

Specific Outcome 1.3: Understand the role of the earth's declination and rotation

Specific Outcome 1.4: Make an assessment of site specific, viability of solar and wind energy sources on the basis weather and climatic conditions

| 2. Title: Demo            | onstrate an understanding of renewable energy sources  |
|---------------------------|--|
| Specific Outcome 2: 1     | Understand how photovoltaic and solar thermal systems function and operate   |
| Specific Outcome 2.2      | Demonstrate an understanding of how solar thermal systems operate and function   |
| Specific Outcome 2.3      | Demonstrate an understanding of how wind turbines operate and function   |
| Specific Outcome 2.4      | Demonstrate an understanding of how micro hydro-electric turbines operate and function                                       |
| 3. Title: Identi<br>stand | fy, select and understand the function of the components in a  |
| Specific Outcome 3:1      | Demonstrate an in-depth understanding of batteries used in photovoltaic supplied systems                                     |
| Specific Outcome 3.2:     | Identify charge regulators used in photovoltaic supplied systems and describe of the differences between them                |
| Specific Outcome 3.3:     | Identify inverters used in photovoltaic supplied systems and describe of the differences between them                        |
| Specific Outcome 3.4:     | Identify and select the most appropriate photovoltaic panel for an application   |
| 4. Title:                 | Install, wire and commission a stand-alone photovoltaic supplied system  |
| Specific Outcome 4.1:     | Plan to install, wire and commission a stand alone photovoltaic supplied system  |
| Specific Outcome 4.2:     | Prepare to install, wire and commission a stand alone photovoltaic supplied system   |
| Specific Outcome 4.3:     | Install the relevant components of a stand-alone photovoltaic supplied system as per drawings, diagrams and job instructions |
| Specific Outcome 4.4:     | Wire a stand alone photovoltaic supplied system  |
| Specific Outcome 4.5:     | Commission a stand-alone photovoltaic supplied system  |
| Specific Outcome 4.6      | Complete the wiring and commissioning of a stand-alone   |
|                           | photovoltaic supplied system as per the relevant sections of the   |
|                           | SANS standards and safety regulations  |

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#### Unit Standards Titles and associated specific outcomes at NQF Level 3

#### 5. Title: Maintain a stand-alone photovoltaic supplied system

Specific Outcome 5:1: Plan to maintain a stand-alone photovoltaic supplied system Specific Outcome 5.2: Prepare to maintain a stand-alone photovoltaic supplied system Specific Outcome 5.3: Maintain stand-alone photovoltaic supplied system Specific Outcome 5.4: Conclude the maintenance of a stand-alone photovoltaic supplied system

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### 6. Title: Install and maintain a solar hot water system

Specific Outcome 6:1 Plan to install solar heating system Specific Outcome 6.2: Prepare to install and maintain solar heating system Specific Outcome 6.3: Install solar water heater Specific Outcome 6.4: Connect associated electrical devices Specific Outcome 6.5: Service and maintain a solar water heater Specific Outcome 6.6: Conclude the maintenance of a solar water heater

## 7. Title: Demonstrate an understanding of energy efficiency

Specific Outcome 7:1 Demonstrate an understanding of energy efficiency Specific Outcome 7.2: Demonstrate an understanding of energy management Specific Outcome 7.3: Demonstrate an understanding of energy savings Specific Outcome 7.4: Demonstrate an understanding of energy efficient devices

## Unit Standards Titles and associated specific outcomes at NQF Level 4

## 8. Title: Install connect and commission a stand-alone battery charging wind turbine

Specific Outcome 8:1: Plan to install, connect and commission a wind turbine Specific Outcome 8.2: Prepare to install, connect and commission a wind turbine Specific Outcome 8.3: Install and connect a wind turbine Specific Outcome 8.4: Connect wind turbine to charge regulator Specific Outcome 8.5: Commission a wind turbine

Specific Outcome 8.6: Complete installation, connection and commissioning of a wind turbine

# 9. Title: Select a back-up generator for a stand-alone renewable energy system

Specific Outcome 9:1 Assess wind and solar data to determine the need for a standby generator

Specific Outcome 9.2: Assess the load to determine the need for a standby

generator

Specific Outcome 9.3: Determine the rating of a standby generator

Specific Outcome 9.4: Understand and make provision for the logistics in respect of a standby generator