April 2024

AREP P4 Solar PV Accreditation

The Association for Renewable Energy Practitioners is home to the P4 Solar PV Quality Assurance Program

Introducing the P4

AREP's P4 is an industry-driven quality assurance programme applicable to the complete Solar PV (Photovoltaic) value chain. The program was created to address the need to improve the standard of solar PV installations and reduce the risks associated with financing, insuring and operating solar PV Systems. It aims to ensure that solar PV installations are designed, installed, and operated to the highest standards, delivering reliable, efficient and safe power generation for customers while adhering to local and international standards, best practices, and guidelines.

About AREP

The Association for Renewable Energy Practitioners (AREP) is a non-profit quality assurance organisation reg. nr. 224-033 NPO, created to promote the adoption of Renewable Energy.

As the fastest-growing renewable energy industry body in South Africa with more than 4000 members to date, AREP is uniquely positioned to positively influence this rapidly growing industry through its focus on quality assurance. AREP primarily serves SMMEs, shares relevant and up-to-date industry-related information and offers affordable Solar PV accreditation in the form of the P4 quality assurance program.

Standards and Compliance

The P4 program and AREP's accompanying Hybrid Test Report are aligned with local and international standards such as:

- South African National Standards (SANS) as hosted by the South African Bureau of Standards (SABS)
- International Electrotechnical Commission (IEC) standards
- NRS guidelines as produced by ESKOM

AREP
ASSOCIATION FOR RENEWABLE ENERGY PRACTITIONERS

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How to get Accredited	Costs
The first step to getting P4 Accredited is visiting www.arep.online and register as a member of AREP. Click on "My Tests" and follow the easy online instructions. Any questions about the P4 Solar PV Quality Assurance program may be directed to anne@areprac.org	P4 Solar PV accreditation is designed to be affordable and accessible. Visit www.arep.online and click on P4 > for the latest costs.

Stakeholder Recognition

AREP's P4 accreditation is widely recognised by industry stakeholders including the AMEU (Association of Municipal Electricity Utilities), SALGA (South African Local Government Association), local municipalities, financiers, insurers, distributors, installers, and end-users, to name a few.

Benefits of getting P4 Accredited:

1. Industry Trust and Credibility.
2. End-user assurance as a sales and marketing tool.
3. Exposure: P4 Level 2 practitioners and P4 Accredited Companies are added to the official AREP P4 Accredited Directory. End-users use this directory to find and hire trusted Solar PV Practitioners across South Africa.
    a. The use of the directory is actively marketed to the public by AREP.
4. Income opportunity: AREP aims to create a peer review mechanism through the P4 Company Accreditation and therefore P4 Accredited Companies may assess installations on AREP's behalf who will then issue P4 accreditation. Assessors will be remunerated per assessment.
5. Opportunity to influence the industry: P4 Accredited Companies assess other companies' installations and help raise the standard of work across the board.

Training and Accreditation

As a comprehensive quality assurance program, the P4 is a process for determining whether Solar PV installations and their installers comply with accepted best practices, standards and regulations. In its simplest form, the program drives training and assessment initiatives:

Training:

AREP is affiliated with select training providers (Approved Training Partners or ATPs) whose training material meets the requirements of the P4 program.

- Lilovat Technologies
- Mecer Inter-Ed
- PQRS
- SUNCY
- TDMI
- Tekki Investments, And others as may be approved from time to time.

Accreditation

The P4 quality assurance program has 5 tiers of accreditation:

- **P4 Sales Accreditation:** A basic understanding of Solar PV principles to assist sales and support personnel in the Solar PV industry.
- **P4 Level 1**: Solar design and installation principles
- **P4 Level 2:** Small-scale residential and commercial Solar PV design and installation principles.
    - Apply for you **P4 Level 2 Registered Practitioners Card**
- **P4 Level 3:** Level 2 Accreditation plus a practical assessment of one of the practitioner's installations.
    - **Peer Review Mechanism**
- **P4 Trainer Accreditation:** A person is fully accredited to train others on the content and requirements of the P4 quality assurance program.

As custodian of P4 accreditation, AREP regularly reviews all test questions and accreditation criteria and performs updates to match the latest developments and best practices.

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P4 Sales Accreditation

- ***Duration of Validity***: 12 Months
- ***Who is the accreditation for?*** Individuals
  PV Solar Sales & Customer Service personnel
- ***Prerequisite Accreditation:*** None
- ***Pass Rate Requirement:*** 80%+
- ***Test Format:*** Online Test
- ***Test Duration:*** 60min

- ***Test Content:***

1. Batteries
   - 1.1. Battery density
   - 1.2. Battery cell construction
   - 1.3. Battery safety
2. Bi-metallic corrosion
   - 2.1. Basic understanding of bi-metallic corrosion
3. Electricity Basics
   - 3.1. Electron flow
   - 3.2. Conductor resistivity
   - 3.3. Electron flow
   - 3.4. Ohm's law formula identification
   - 3.5. Series and parallel connection
   - 3.6. The basic differences between alternating current and direct current
   - 3.7. The difference between the unit for power and energy
4. Inverters
   - 4.1. Operation
   - 4.2. Power Quality
   - 4.3. Function
5. Irradiation
   - 5.1. Intensity of sunlight

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P4 Level 1

- ***Duration of Validity:*** 12 Months
- ***Who is the accreditation for?***
  - Individuals
  - PV Solar Practitioners
- ***Prerequisite Accreditation:*** None
- ***Pass Rate Requirement:*** 80%+
- ***Test Format:*** Online Test
- ***Test Duration:*** 60min

- ***Test Content:***

1. Electrical Theory
   - 1.1. Measuring Current flow
   - 1.2. Understanding and calculating Series and parallel
   - 1.3. Datasheets descriptions
   - 1.4. AC vs DC
2. Irradiation
   - 2.1. The solar constant
3. Efficiency
   - 3.1. Solar PV Technology vs Solar Thermal Technology
4. Module Technology
   - 4.1. An understanding and knowledge of the Impact of partial shading
   - 4.2. STC & NOCT
   - 4.3. Understanding Datasheets
5. Handling & Transporting Modules
   - 5.1. Transportation
   - 5.2. Standing on modules
   - 5.3. Fixing modules to mounting structures
   - 5.4. Cleaning modules

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P4 Level 2

- ***Duration of Validity:*** 36 Months
  - Successful candidates may apply for their P4 Level 2 Registered Practitioners Card
- ***Who is the accreditation for?***
  - Individuals
  - PV Solar Practitioners
- ***Prerequisite Accreditation***: P4 Level 1
- ***Pass Rate Requirement:*** 80%+
- ***Test Format:*** Online Test
- ***Test Duration:*** 120min

- ***Test Content:***

1. Electrical Theory
   - 1.1. Ohm's Law
   - 1.2. Series and Parallel
   - 1.3. Volt drop and Cable sizing
   - 1.4. Harmonics & Power Factor
2. Module technology
   - 2.1. Bi-facial, Floating
   - 2.2. Poly vs Mono vs Thin-film
   - 2.3. Quality – Tier 1 vs 3rd party testing
3. Irradiation
   - 3.1. GHI vs DNI
4. Surge Protection and Earthing
   - 4.1. Internal and External surge protection
   - 4.2. Risk analysis
5. Power and Energy
   - 5.1. Calculate Power requirement and Energy Requirement

6. Temperature Coefficients
   - 6.1. Aluminium, Modules and Copper
7. Mounting structures
   - 7.1. Thermal Breaks and Ballasted systems
   - 7.2. Glass glass vs framed modules
8. Electrical Switching & Safety
   - 8.1. Fuse calculation for batteries and PV
   - 8.2. AC vs DC Switching
   - 8.3. Fault current calculation
9. Batteries
   - 9.1. Energy densities
   - 9.2. Li-ion
   - 9.3. Lead acid
10. Standards & Safety
    - 10.1. Identify the correct wiring layout for a single 3kw Pure Grid tied inverter.
    - 10.2. Identify the correct wiring layout for a UPS-type hybrid inverter on a dedicated circuit.
    - 10.3. IEC & SANS standards
    - 10.4. Wind loads while working on roofs
    - 10.5. Working at heights
11. System Sizing
    - 11.1. Standards (NRS097 limitation)
    - 11.2. Consumption profile
    - 11.3. Load
12. Drawings and diagrams
    - 12.1. Circuit diagrams for Single-phase grid-tied system

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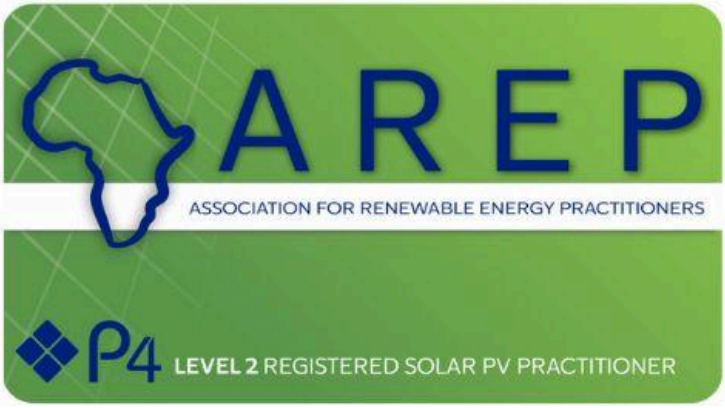
P4 Card

P4 Level 2 accredited Solar PV practitioners are eligible to apply for a P4 Level 2 Registered Practitioners card.

Contact anne@areprac.org to apply for your card today.



P4 Level 3

- ***Duration of Validity:*** 36 Months
- ***Who is the accreditation for?***
  - Individuals
  - PV Solar Practitioners
- ***Prerequisite Accreditation:*** P4 Level 1, P4 Level 2
- ***Pass Rate Requirement***: 80%+
- ***Format:*** Practical Assessment
- ***Duration:*** 120min

- ***Assessment Criteria:***

1. *Practical Assessment*
   - 1.1. Solar PV Installation must have been completed within the last 24 months
   - 1.2. Installation size must be < 16kw
   - 1.3. Solar PV Installation must pass the AREP Hybrid Test Report with a score of 100%
2. *The Assessor will:*
   - 2.1. Do a visual assessment according to the AREP Hybrid Test Report. The candidate being assessed must complete the required electrical tests in the presence of the Assessor.
   - 2.2. Submit the Report plus photos of the installation to AREP for final review.
   - 2.3. Review the accuracy of the SLD vs the actual installation.
   - 2.4. Randomly select elements of the mechanical installation to review (eg. check the bolts on the mounting structure).

Earning Additional Income

Once P4 Level 3 accredited practitioners are eligible to join the AREP peer review mechanism and earn additional income. Participating practitioners have the opportunity to assess the installations of candidates newly applying for P4 Level 3 accreditation. AREP will pay assessors a fee for each fully completed assessment submitted to AREP.

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P4 Trainer Accreditation

- ***Duration of Validity:*** 36 Months
- ***Who is the accreditation for?***
  - Individuals
  - PV Solar Training Instructors
- ***Prerequisite Accreditation***:
  - P4 Level 1, P4 Level 2
  - Pass Rate Requirement: 95%+

- ***Accreditation Requirements***:

Candidates who have successfully passed both their P4 Level 1 and P4 Level 2 assessments with 95%+ may apply for P4 Training Accreditation.

Contact anne@areprac.org for more information on how to become a P4 Accredited Trainer.

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FAQ

What is the difference between SAPVIA, the PV GreenCard, AREP, and the P4?

AREP and SAPVIA are both non-profit industry bodies created for the benefit of the renewable energy industry. Both organisations fulfil various roles in the industry, and both offer a Solar PV quality assurance program.

The P4 and the PV GreenCard are both Solar PV quality assurance programs created to address the need to improve the standard of Solar PV installations. These programs offer a form of training and accreditation specifically focused on Solar PV practitioners.

What does P4 accreditation guarantee?

Candidates who want to achieve P4 accreditation undergo evaluation as per the requirements of each tier of P4 accreditation. When a candidate has successfully passed these evaluations, the assumption is that candidates gained valuable information in the process, enabling them to understand solar as a technology.

Is the P4 program formally recognised?

AREP's P4 is an informal quality assurance program widely accepted by key industry stakeholders including the AMEU (Association of Municipal Electricity Utilities), SALGA (South African Local Government Association), local municipalities, financiers, insurers, distributors, installers, and end-users, to name a few.

Are all P4 accreditations the same?

No. P4 accreditation has 5 tiers:

P4 Sales Accreditation: A basic understanding of Solar PV principles to assist sales and support personnel in the Solar PV industry.

P4 Level 1: Basic solar design and installation principles

P4 Level 2: Small-scale residential and commercial Solar PV design and installation principles.

P4 Level 3: Level 2 Accreditation plus a practical assessment of one of the practitioner's instalments.

P4 Trainer Accreditation: A person is fully accredited to train others on the content and requirements of the P4 quality assurance program.

What is the recommended P4 qualification?

AREP recommends that installers/ Solar PV practitioners have a minimum of a P4 Level 2 qualification.

Does the P4 program comply with all necessary standards and regulations?

Yes. The P4 program and AREP's accompanying Hybrid Test Report are aligned with local and international standards including:

- South African National Standards (SANS) as hosted by the South African Bureau of Standards (SABS)
- International Electrotechnical Commission (IEC) standards
- NRS guidelines as produced by ESKOM

How can I find out more about P4 Accreditation?

- Visit www.arep.online and click on P4
- Read this comprehensive program summary
- Contact AREP directly
    - Anne Nel | Accounts Manager | anne@areprac.org | 063 442 1320

For how long is P4 Solar PV Accreditation valid?

The P4 Sales Certificate is valid for 12 months
The P4 Level 1 Certificate is valid for 12 months.
The P4 Level 2 Certificate is valid for 36 months.
The P4 Level 2 Registered Solar PV Practitioner's Card is valid for 36 months.
The P4 Level 3 Certificate is valid for 36 months.
The P4 Trainer Certificate is valid for 36 months.