

# IECRE PUBLICATION

**IEC System for Certification to Standards Relating to Equipment for Use in Renewable Energy Applications (IECRE System)**

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**Rules of Procedure for the Certification of Photovoltaic Systems according to the IECRE-PV Schemes**



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IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00  
info@iec.ch  
www.iec.ch

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INTERNATIONAL  
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## INTRODUCTION

This document defines the rules and procedures for conformity assessment and certification of photovoltaic (PV) power plants with respect to standards and technical requirements for photovoltaic equipment, as well as installation and operation of the system. It is intended to facilitate mutual recognition by participants (reciprocal acceptance) of inspection results and certificates issued by other participants for obtaining certification at a national or international level. It operates within the scope of the IEC TC82 standards and other relevant international standards.

The procedures in this document may refer to a certification scheme for components based on third party conformity assessment of a PV power plant at a specific location. Such certification scheme is deemed sufficient if it is equivalent to an ISO Type 5 Certification System, and a RECB may then issue an IECRE Certificate of Conformity.

In addition to design verification, this document provides information for the recognition of or assessment for certification of the supplier's quality system on the basis of regular surveillance of the supplier's quality system and quality plans.

The document is provided to assist applicants by reducing the number of steps necessary to obtain certification or approval at a national level, and to increase investor confidence.

### PV-OMC Terms of Reference

The PV-OMC terms of reference are defined in IECRE 02, Edition 2, Annex A.

## Solar PV Operating Management Committee (PV-OMC)

### Rules of Procedure for the Certification of Photovoltaic Power plants according to the IECRE-PV Schemes

#### 1 Scope

The PV-OMC mission is to define the certification schemes for the solar photovoltaic (PV) sector. The PV-OMC shall focus on issues that are specific to the PV sector and value that can be provided to investors and stakeholders within the sector.

This publication contains the Rules of Procedure of the Solar PV Sector (IECRE PV) under the IECRE Conformity Assessment System, hereinafter referred to as the "RoP", intended for use in solar energy applications and which comply with IEC or other International Standards. These Rules are used in conjunction with the Basic Rules of the IECRE System, as given in Publications IEC CA 01 and IECRE 01-S. A list of standards in use is published on the IECRE website: [www.IECRE.org](http://www.IECRE.org). This list reflects updates and transition periods not yet implemented in Operational Documents (OD's).

##### 1.1 Objective

In order to further assist working groups of the PV-OMC sector, this document defines the rules and procedures for conformity assessment and certification of photovoltaic (PV) power plants with respect to standards and technical requirements for photovoltaic equipment, as well as procedures described in this document to cover the assessment of photovoltaic power plant, including support structure/foundation designs, installation, commissioning, operation and maintenance activities covering various categories of power plants based on their application and location classes. It provides:

- Definitions of the elements in photovoltaic system conformity assessment and certification processes;
- Procedures for conformity assessment in a PV power plant certification;
- Procedures for surveillance;
- and

- Requirements for certification and inspection bodies operating as RECBs and REIBs.

The purpose of the rules of procedure is to provide a common basis for the conformity assessment and certification of photovoltaic power plants and to provide a basis for the acceptance of certification bodies and inspection bodies and to facilitate the mutual recognition of certificates.

## 1.2 Applicable Documents

The rules and procedures are to be used in conjunction with the relevant International Standards, ISO/IEC Guides, and other normative documents listed below. In many cases, there will be additional regulations (e.g., building codes and electrical codes) relevant to the local jurisdiction of the PV power plant as well as specific client requirements. IEC standards shall form the baseline for audit requirements but shall allow National or Regional Differences as approved by the local permitting agency. Certifying agencies shall therefore reach alignment with the designer or installer on applicable codes and standards relevant to the local site at the beginning of engagement.

## 2 Normative references

The following referenced documents are indispensable to the application of this document:

ISO/IEC 17000, *Conformity assessment - Vocabulary and general principles*

ISO/IEC 17020, *General criteria for the operation of various types of bodies performing inspection*

ISO/IEC Guide 2, *Standardization and related activities – General vocabulary*

ISO/IEC 17065, *Conformity assessment: Requirements for bodies certifying products, processes and services*.

OD 401, *Conditional PV plant Certificate*

OD 402, *Annual PV plant performance Certificate*

OD 403, *PV plant Design Certificate (under development)*

OD 404, *PV plant operational status assessment*

OD 405, *IECRE Quality System Requirements for PV module Manufacturers*

OD 410s, *IECRE Quality System Requirements for PV plant installation and maintenance*.

Draft OD 408, *IECRE-PV Certified Equipment Scheme – Procedures for the Issuing of IECRE-PV Certificates of Conformity, IECRE-PV Test Reports and IECRE-PV Quality Assessment Reports (under development)*

OD 406, *Application Requirements for RECBs and REIBs*

IECRE OD-003, *Costs related to Peer Assessment Services*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply, together with the relevant definitions contained in ISO/IEC 17000, ISO/IEC Guide 2 and IEC TS 61836 Ed.2.

### 3.1 Applicant

Entity applying for certification

### 3.2 Certificate holder

Entity holding a certificate after the certificate is issued

NOTE: This entity may not be the original applicant but nevertheless is responsible for maintenance of the certificate.

### **3.3 Certification**

Independent verification that a PV power plant at a specific site conforms to the relevant international standards and relevant local regulations. See 5.5 of ISO/IEC 17000.

### **3.4 Certification body (RECB)**

Organization that conducts conformity assessments and issues Certificates of Conformity (CoC) of PV power plants. See 2.5 of ISO/IEC 17000.

### **3.5 Certification system**

Certification scheme type as described in ISO/IEC 17067. See A.4.3 of ISO/IEC 17000.

### **3.6 Conformity Statement**

Document issued upon successful completion of evaluation of assessment against the requirements of a specified standard. Procedural requirements for issuing a certificate or conformity statement are specified in the relevant OD's.

### **3.7 Commissioning**

Process that encompasses functional safety checks, connecting the PV power plant to the grid and putting it into operation

### **3.8 Engineering Procurement Constructions (EPC)**

Company in charge of the engineering, procurement and construction of the PV power plant.

### **3.9 Factory Auditor**

Person that performs conformity assessment of quality management system in the PV component suppliers and service providers to the relevant IEC standards.

### **3.10 IECRE- Member Body**

National member body of the IECRE

### **3.11 Inspection Body (REIB)**

Organization that performs inspection of PV power plants.

### **3.12 Final evaluation report**

Report containing the results of conformity evaluations relating to certification and the basis for the decision to issue the certificate

### **3.13 Inspection**

Examination of a product design, process or installation and determination of its conformity with specific requirements or, on the basis of professional judgement, with general requirements.

### **3.14 Installation**

Process that encompasses site preparation, component assembly and connection and assembly

### **3.15 Manufacturing**

Process that encompasses fabrication and assembly in a factory or workshop

### **3.16 Manufacturer**

Any legal entity manufacturing a product or has a product designed or manufactured, and markets that product under its name or trademark. It may be the entity manufacturing the PV power plant or, where relevant, main equipment of the PV power plant

### **3.17 Modification**

A new installation or changes to an existing installation, which changes the original design/specification

### **3.18 Operation and Maintenance (O&M)**

Operation and maintenance of PV plant

### **3.19 Annual PV plant performance certificate**

Document issued upon successful completion of PV plant annual performance evaluation.

Procedural requirements for issuing are specified in the OD 402.

### **3.20 Power conversion equipment (PCE)**

equipment and components for electronic power conversion of electric power into another kind of electric power with respect to voltage, current and frequency.

### **3.21 Product type certificate**

Document issued upon successful completion of a product certification according system 5 of ISO/IEC 17065.

Certificates of conformity issued under the IECEE CB and FCS scheme are accepted as valid for the purposes of the IECRE-PV scheme.

### **3.22 PV power plant (PV plant)**

Power plant for generating electrical power according the categories describe after, in which one or more PV inverters are connected to a PV array; including all elements of foundation, support structure, wiring and any other balance-of-system (BOS) equipment up to connection point with the utility (including medium voltage equipment as appropriate).

### **3.23 Repair**

Restoration of a unit or a piece of equipment to its original design/specification

### **3.24 Replacement**

Substitution of a unit or a piece of equipment, in conformance with its original design/specification

### **3.25 Surveillance**

Continued monitoring and verification of the status of procedures, products and services, and analysis of records in relation to referenced documents to ensure specified requirements are met

### **3.26 Component**

A part of a PV power plant, with specific design, materials and parts, fabricated according to a common manufacturing process and uniquely described by a specific range of parameters and design. conditions.

### **3.27 SCADA (Supervisory control and data acquisition)**

a system operating with coded signals over communication channels so as to provide control of remote equipment

### **3.28 Abbreviations**

OD - operating documents to specify details of processes, procedures, and requirements under the IECRE;

PV-OMC - IECRE Solar PV sector Operating Management Committee;

REMC - Management Committee of the IECRE System

### **3.29 IECRE certificates**

Certificates are issued by RECB companies.

Procedural requirements for issuing conforming statements are defined in the relevant OD's.

## **4 Structure and Governance**

### **4.1 Introduction**

The basic rules governing the IECRE system are described in IEC CA 01 and IECRE 01-S, Basic Rules. The basic rules are the overarching basis for operation of the IECRE System, its management committee (REMC), the committees, and working groups working under it.

The Rules of Procedure put forth in the current document are for the operation of the Photovoltaic Energy Sector Scheme(s) (IECRE PV) governed by the REMC, and operated by the IECRE PV-OMC.

### **4.2 Membership and Participation**

IECRE Certification Bodies (RECBs) and IECRE Inspection bodies (REIBs) approved by the REMC in accordance with the IEC CA 01 and IECRE 01-S, Basic Rules, and associated IECRE and IECRE PV Operational Documents may participate in the IECRE PV Scheme(s).

Applications from organizations seeking acceptance as RECB or REIB for the purpose of issuing IECRE PV certificates and inspection reports, are permitted to be accepted from Member Bodies in an IECRE participating country. Reference is made to IEC CA 01 and IECRE 01-S, Basic Rules, regarding country membership of the IECRE System.

It is the duty of all parties operating in the IECRE PV Scheme(s), including manufacturers and other organizations seeking IECRE PV certificates, to conduct affairs in a professional and ethical manner, that does not result in actions, misleading information or claims that may bring the IECRE credibility into question.

### **4.3 Acceptance**

Certification bodies and Inspection Bodies are accepted to participate in the IECRE PV Scheme(s) following satisfactory assessment of their impartiality and competence by a team of peer assessors, endorsed by the IECRE PV-OMC, and subsequently with the approval of the REMC.

Successful assessment should provide adequate confidence in the certification scheme to regulatory authorities, users, manufacturers, testing laboratories and certification bodies.

Impartiality and competence are assessed with reference to ISO/IEC 17065, ISO/IEC 17020 and IECRE PV-OMC Operational Documents (ODs).

The IECRE PV-OMC is responsible for setting up and maintaining the pool from which the team of assessors for a specific assessment are selected. A training program for assessors will be developed and described in the relevant OD. The selection of the peer assessment team members for any given assessment is the responsibility of the Executive Secretary.

### **4.4 Voting**

The voting for the PV-OMC will be done by the IECRE member bodies, who have become members of the IECRE PV.

## **5 IECRE PV Certification and Inspection Bodies (RECB and REIB)**

### **5.1 Role and responsibility of The RECB**

The RECB is responsible for:

- providing the facilities and resources to support the PV certification activities,
- ensuring that the PV certification staff have technical competence and experience within their scope;

These responsibilities cannot be delegated or subcontracted by the RECB-.

### **5.2 Role and responsibility of the REIB (PV Inspection body)**

The REIB is responsible for:

- operating in compliance with all relevant requirements of the IECRE RECB- requirements, procedures and decisions;
- complying with the applicable ODs, procedures, and working instructions; maintaining technical competency for the accepted scope,
- being available, as appropriate, to be assessed under the peer assessment;
- maintaining accurate documentation regarding technical competency of its PV Inspectors for the accepted scope and informing the responsible RECB about any change in status;

These responsibilities cannot be delegated or subcontracted by the REIB.

#### **5.2.1 Role and responsibility of the Factory Auditor**

The PV Factory Auditor is responsible for

- carrying out initial certification audits of the Quality Management System in PV suppliers including, but not limited to, module manufacturing, PCE manufacturing, system installation, and O&M services as well as routine surveillances (both pre-certification and post-certification) in accordance with the appropriate international standards, documented requirements, rules, guidelines, and procedures.
- complying with the applicable ODs, procedures, and working instructions;
- maintaining accurate documentation regarding technical competency of its PV Factory Auditor for the accepted scope and informing the responsible RECB about any change in status;

Typically the PV Factory Auditor works for either RECB or REIB.

The PV Factory Auditor must successfully satisfy the requirements defined in relevant ODs,

### **5.3 Role and responsibility of RECB/REIB Peer Assessors**

IECRE Lead Assessors and Technical Assessors, once registered as PV Peer Assessors, may be assigned by the Executive Secretary to carry out Peer Assessments of the RECBs or REIBs for acceptance and continued acceptance to operate in the IECRE System.

Provisions for handling costs of peer assessments are as specified in IECRE OD-003, Costs Related to Peer Assessment Services.

The requirements for the peer assessors are defined in the IECRE Scheme

## **5.4 Prerequisites for Acceptance**

**5.4.1** A REIB may cooperate with more than one RECB in the same IECRE category.

**5.4.2** The RECB and REIB shall be nominated for membership in the PV-OMC by its IECRE Member Body.

**5.4.3** RECB and REIBs carrying out certification and/or inspection activities shall not be influenced by manufacturers, installers, EPC companies or designers, and O&M servicers. Furthermore, the RECB and the REIB shall be impartial and not offer assistance or other services to the clients that may compromise the objectivity of its activities and decisions.

## **5.5 Application for Acceptance**

**5.5.1** An application for the acceptance of a RECB and REIB for one or more IECRE Categories shall be approved by the responsible IECRE-MB endorsed by its Member Body of the IECRE.

**5.5.2** The application shall be submitted to the Executive Secretary of the IECRE and shall be accompanied by the documentation as detailed in this chapter as far as applicable.

**5.5.3** The REIB shall be accredited according to ISO/IEC 17020 and RECB shall be accredited according to ISO/IEC 17065 by a signatory of the IAF MLA. Peer assessment shall be done every year if the applicant not has accreditation. If applicant has ISO/IEC 17065 / ISO/IEC 17020 accredited and apply as REIB/RECB peer assessment to perform every 3 years shall focus in non-accredited part. REIB or RECB is only permitted to perform inspection and certification according to standards that are in their scope of accreditation.

**5.5.4** In addition to a successful assessment, the REIB shall have the experience of at least three (3) prior inspections of PV power plants, and the RECB shall have the experience of at least three (3) prior certifications according to 5.4.3

**5.5.5** Processes and requirements for application, qualifications, authorization and registration of PV Factory Auditors are defined in OD405-3.

## **5.6 Scope extension**

The responsible IECRE working group will verify if a new standards shall be including into an OD. OD will thus include this new standard.

Standard thus added to OD's shall then be included into the IEC list of applicable standards.

RECB/REIB's shall apply these new standards after a one year transition period

## **6 Management of the certification system**

### **6.1 General**

The certification system shall be managed and operated in accordance with ISO/IEC 17065 and the applicable Rules of Procedure and Operational Documents of the IECRE System.

### **6.2 Agreement on certification**

A certification body shall, upon request, be prepared to take on work for certification PV power plants according to the rules of this procedure. The services of the certification body shall be available to all applicants without undue financial or other conditions.

Prior to starting certification work an agreement between applicant and certification body shall be made. In addition to financial and other usual contract conditions, the agreement shall include:

- The scope of work definition. A RECB and associated REIB must ascertain that the scope of work is within their respective scope of acceptance;

- The identification of collaborating bodies (inspection or testing bodies), their accreditation and their responsibilities;
- Whether the applicant has an established quality management system;
- Whether a surcharge applies for manufacturers from non-member countries;
- Estimation of costs and time to complete project;
- Determination of any special requirements, e.g. travel for site audit etc.;
- Agreement on method and system of payment by applicant, in accordance with RECB's own policy and quality system;
- The set of technical requirements to which conformity shall be evaluated;
- Definition of documentation to be provided at different stages; and
- Requirements for on-site work, including safety & environmental compliance training and conditions for reporting and investigating incidents.

### **6.3 Issue of certificates and conformity statements**

The certification system covers the issue of certificates and conformity statements.

A certificate or conformity statement is based on evaluation of PV power plant documentation and the results of inspection, surveillance or testing, as applicable. The results of evaluation shall be documented in a final report. A certificate or a conformity statement shall be issued on the basis of an assessment of the completeness and correctness of an evaluation report or reports.

Procedural requirements for issuing a certificate or conformity statement are specified in the relevant OD's.

### **6.4 Security of relevant documentation**

The certification body shall keep a file of all received material that is relevant to the certificate or conformity statement. This file shall be kept in a place with restricted access for the period of validity of the certificate. Subsequently the file and any copies shall be returned to the applicant or destroyed with written notice thereof.

### **6.5 Validity, maintenance and expiration of certificates**

#### **6.5.1 General**

The scope, validity and expiration of each type of certificate is defined in the applicable Operational Document for that certificate type.

Critical issues and substantial changes to the site and PV power plant may require re-certification at the discretion of the RECB. Critical issues are those that substantially affect power plant performance, , safety or environmental requirements.

In the case of a provisional certificate or conformity statement, the period during which all outstanding issues shall be documented by the applicant and evaluated by the certification body shall not exceed one year.

#### **6.5.2 Maintenance of PV power plant certificate**

A PV power plant certificate is issued for PV power plant as installed at the site specified in the certificate at the date of issue.

A REIB, under the supervision of RECB, shall perform operation and maintenance surveillance, in order to confirm that operation and maintenance is carried out according to O&M manuals at specified periodic intervals or as otherwise indicated. Failures (see 6.6) of the PV power plant which affect safe operation or performance out of the tolerance limits shall be reported. Modifications of the PV power plants to address critical issues shall obtain the certifier approval beforehand.

In order to maintain a PV power plant certificate the applicant and the certification body shall meet the following requirements:

- The applicant shall maintain a configuration record including all approved changes to date for the certified project to be sent to the certification body for review upon request. The report shall include information on installed PV equipment and additional installation(s) as installed at the site, deviant operating experience known to the certificate holder and minor modifications not listed in 1.1;
- The applicant shall report to the certification body beforehand any modifications listed in 1.1 intended to be made to the certified PV power plant. In case the certificate holder intends to update the certificate, the update of all documents affected by the modification shall be provided; and the RECB shall issue a notice of approval to the application that shall be filed with the prior power plant assessment documents
- A certification body shall perform operation and maintenance surveillance in conjunction with the periodic performance assessment, with the purpose to ascertain that a PV power plant is operated and maintained in conformity with the relevant manuals included in the design documentation and conducts the required surveillance according to these rules. The period of review shall be annually to facilitate documentation of annual performance testing. The RECB shall issue a renewed conformance report and certificate that shall be filed with the prior power plant assessment documents

## **6.6 Incident Reporting**

The certification body shall be informed without delay if, from log-book data or other information brought to the attention of the certificate holder, a PV power plant in question is shown not to function according to the design specifications and/or other criteria relevant to the certificate. Incidents known to the certificate holder where the safety of a project or the surroundings is involved shall be reported to the certification body in a timely manner on occurrence prior to any corrective action implementation.

If after preliminary evaluation the certification body determines a serious defect affecting the power plant level capacity performance of a PV power plant or safety of its components in question, the certificate shall be immediately suspended. The certification body shall subsequently carry out a thorough evaluation of the defect. This evaluation may result in reissuance or withdrawal of the certificate.

## **7 The extent of certification**

### **7.1 Categories of certificates**

The approach given in this procedure has a tiered structure in order to account for requests for conformity statements regarding specific aspects (e.g. design evaluation) of a PV power plant.

The normative documents, against which conformity shall be evaluated in the certification process, shall be IEC or ISO standards, when available. The scope of a specific certification shall be relevant to the specific PV power plant, usage category, location category, and project lifecycle phases, as shown in Figures 1 and 2 below:

#### **7.1.1 System usage and location categories**

The Usage category (U) and Location category (L) of the PV power plant, shall be recorded on the certificate and any associated test or inspection reports.

PV power plant categories by usage are as follows:

U1: “Utility” scale” Operated by commercial organization on commercial property, >1000kWp

U2: “Residential” Operated by private individual, disaggregated, <25kWp

U3: “Commercial” Operated by commercial organization on commercial property, ≤1000kWp

U4: "Aggregate Residential Power plants" Operated by private individual or professional on private property, standardized procedures, standardized contract procurement, standardized design, standardized construction, standardized commissioning, standardized monitoring

PV power plant categories by architectural location are as follows:

L1: Ground mounted, not part of a building

L2: Roof mounted, not part of the building envelope (e.g. rack or pan mount)

L3: Roof mounted, part of building envelope (e.g. BIPV)

L4: Combined use (e.g. car-port)

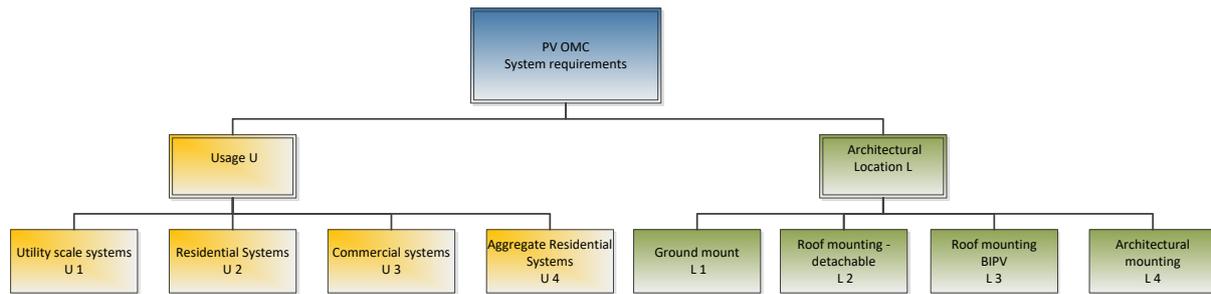


Figure 1 - Usage and Location categories

### 7.1.2 System lifecycle phases

The System lifecycle phase of the PV power plant shall determine the relevant type of certificate for which assessment is performed.

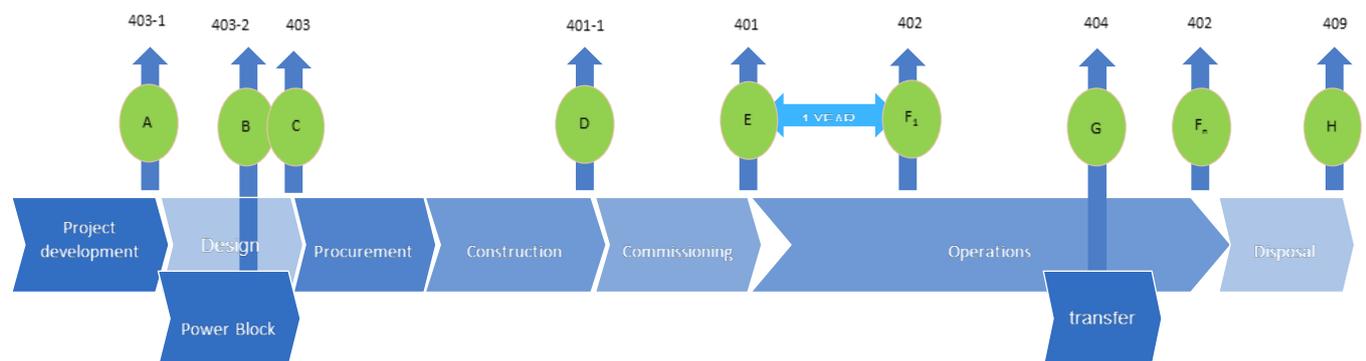


Figure 2 - PV power plant lifecycle milestones indicated in capital letters A through H. The corresponding OD document designators are indicated above the graph (e.g. 403-1) The timeline is not to scale and only informative

Generally PV power plant lifecycle stages are grouped in categories as follows:

A through C: Project development phase

D: Construction phase prior to initial operation

E to H: Exploitation phase: from initial operation up to decommissioning of the plant F  
Decommissioning and disposal.  
PV power plant certificate types

A PV power plant milestone certificate confirms conformity of all aspects of the PV power plant safety and performance as determined by the relevant IECRE and IEC standards identified in the pertaining OD.

The certificates are issued on the basis of the completeness and positive outcome of the evaluation reports.

Certificates of conformity are issued as specified in Draft the relevant OD's for milestones during the PV power plant lifecycle phases.

### **7.1.3 PV Plant Design Qualification Certificate: Part 1 - PV Site Qualification**

The certificate provides the basis to create a plan for a project at a specific site including data needed for civil engineering. It determines land access (road, zoning, flood zone, earthquake) and soil composition, grid access, available solar resource, identification of permitting issues, property, or right of individual or party.

This document is under development.

### **7.1.4 PV Plant Design Qualification Certificate: Part 2 - PV Power Block Design Qualification**

Provides confidence in for a power block that could be deployed in multiple locations, the power block is a standard design that is site agnostic. Relevant OD of OD403-2 is under development.

**7.1.5 PV Plant Design Qualification certificate** PV Project Design certificate design review/notice to proceed; includes both the design and a specific location for implementation. The contractors are also identified and technical aspects of due diligence. of conformity covers the electrical and mechanical design of the PV power plant, and the equipment specified, at the site listed on the certificate that has been evaluated against specified requirements defined in PV Plant design Qualification certificate. Relevant OD of OD403-2 is under development.

### **7.1.6 Conditional PV plant certificate**

A PV Conditional Project certificate of conformity covers the electrical and mechanical work of the PV plant and assess if they are installed and functioning as designed against specified requirements defined in OD 401 Conditional PV plant Certificate . This certificate coupled with the initial performance measurement may be used for the Final Acceptance of the PV plant.

### **7.1.7 Annual PV plant performance certificate**

Annual performance certificate covers ongoing performance of the PV power plant, at the site listed and reports performance data from a full year of operation so as to quantify the observed performance of the system as well as documenting the maintenance costs to achieve stated performance and availability. Evaluation is performed against specified requirements defined in OD 402 Annual performance certificate

### **7.1.8 PV plant operational status assesment**

PV plant transfer certificate covers the past performance, current condition and anticipated future performance of a PV plant based on an assessment that includes OD-402 Annual PV Plant Performance Certificate and relevant IEC standards. or similar, In addition, the assessment includes

historical plant documentation (such as as-built documentation, historical weather and plant-performance data, and operations and maintenance plan for the future). The assessment may be applied to any PV plant using Class A, B, or C accuracy, as defined in IEC 61724-1 for the performance assessments. Similarly, the review of maintenance and other records will have expectations aligned with the type of assessment: U1, U2, U3, or U4.

### 7.1.9 Quality Management certificate

A supplier's and service provider's quality management certificate covers conformance of the their quality system for the equipment specified in the design of the power plant and services for installation and O&M to the relevant IEC standards or equivalent. Requirements for certification are defined in OD 405, OD410, and OD4XX (to be published).

#### 7.1.9.1 Quality management certificate for PV module manufacturer

Quality management certificate for PV module manufacturer covers all the process of PV module manufacturing and after-sales services. Requirements for certification are defined in IEC 62941 and OD 405s.

#### 7.1.9.2 Quality Management Certificate for PCE manufacturer

Quality management certificate for of PCE manufacturer covers all the process of PCE manufacturing and after-sales services. Requirements for certification are defined in IEC 63157 and OD 4XXs (to be published).

#### 7.1.9.3 Quality Management Certificate for PV plant installer and O&M service provider

Quality management certificate for PV plant installer and O&M service provider covers all the process of PV plant installation and O&M service execution. Requirements for certification are defined in IEC 63049 and OD 410s.

## 7.2 Modifications requiring recertification

The table below lists the evaluation required for recertification following modifications to the PV power plant.

Modifications	Section to review
Change of PV module power rating, model or manufacturer	7.1.6 and 7.1.7.(applicable part)
Change of PV inverter model or manufacturer	7.1.6 and 7.1.7.(applicable part)
Change of Solar Tracker model or manufacturer or alternative components	7.1.6 and 7.1.7.(applicable part)
Change of Transformer model or manufacturer	7.1.6 and 7.1.7.(applicable part)
Change of support structure type or model or additional reinforcements	7.1.6 and 7.1.7.(applicable part)
Change to meteorological station utilizing lower accuracy or different measurement techniques	7.1.6 and 7.1.7.(applicable part)
Change or replace of SCADA components for annual energy, yield measurement including climate observation, irradiance, PV module back surface, temperature, air temperature.	7.1.6 and 7.1.7 (applicable part)

## **Annex A (informative) - Design documentation**

This section is under development with input from PVQAT TG11.

## **Annex B (normative) - Reporting of system performance data for statistical aggregation and analysis**

Results of the conformity assessments (including power plant performance metrics, significant findings, validity of certificates, governing limitations etc.) are intended to be made publicly available for all industry stakeholders to monitor and drive value-based activities.

Data reporting generally follows the conventions, definitions and formats identified in document OD407.

OD 407 provides for consistency in technical and financial reporting and enables statistical treatment across the industry. Many financial and some technical data named and identified in the document are not defined in IEC or IECRE documents but the naming is consistent with industry practice and widely understood.

Details of the mechanisms and the system through which such reports and data will be available are currently under development.

General goals of PV system data reporting include:

- reporting and publication guidelines
- All certifications and limitations will be made available to stakeholders upon legal release by the contracting parties

Anonymous data will be provided online to the public at large.

## **Annex C (informative) – General**

### **C.1 General**

The certification procedures specified in this document constitute a complete third party independent engineering assessment of a PV system at a specific location, from design evaluation to monitoring of installation, commissioning, operation and maintenance.

The purpose of PV system certification is to evaluate whether the constructed PV system including all equipment, components, structural elements, procedures, contracts and other elements (such as software) conform with applicable IEC or other international standards, contractual requirements, applicable construction and electrical codes and other requirements relevant to a specific site.

### **C.2 Applicability**

The following types of products and power plants can be certified under these RoP:

- Modular Power plant product blocks or kits that are scalable with certified configurations.
- New, upgraded or refurbished PV power plants
- Various PV technologies, such as PV, PV/Thermal and CPV
- Various DC operating voltage designs (e.g. DC 600 V, DC 1000V, DC 1500 V)
- Designs of different topologies (e.g. string inverter, micro inverter, central inverter)
- Various PV power plant systems (with or without storage, on-grid, off-grid, micro grid etc.)

PV system certification shall confirm, for a specific site, that type-certified PV equipment or equivalent and particular civil, mechanical, structural and electrical designs meet requirements applicable to site-specific conditions and comply with international or national standards, applicable local codes and other requirements relevant to the site.

PV system certification also confirms that installation and commissioning and O&M provisioning conform to applicable standards, relevant contractual obligations and other requirements as defined by the project scope, and that the PV system is monitored, operated and maintained in conformity with relevant manufacturer manuals, integrator instructions and applicable standards.

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

3, rue de Varembé  
PO Box 131  
CH-1211 Geneva 20  
Switzerland

Tel: + 41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

IEC SYSTEM FOR CERTIFICATION TO  
STANDARDS RELATING TO EQUIPMENT FOR  
USE IN RENEWABLE ENERGY APPLICATIONS

IECRE Secretariat c/o IEC  
3, rue de Varembé  
PO Box 131  
CH-1211 Geneva 20  
Switzerland

Tel: + 41 22 919 02 11  
[secretariat@iecre.org](mailto:secretariat@iecre.org)  
[www.iecre.org](http://www.iecre.org)