

IECRE PUBLICATION

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

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





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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. 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 Project Certificate*

OD 402, *Final Project Certificate*

OD 403, *Project Design Certificate (under development)*

Draft OD 404, *Project O&M Certificate (under development)*

Draft OD 405, *IECRE Quality System Requirements for Manufacturers*

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 17000.

3.4 IECRE- Member Body

National member body of the IECRE

3.5 Certification body (RECB)

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

3.6 Inspection Body (REIB)

Organization that performs inspection of PV power plants.

3.7 Certification system

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

3.8 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.

3.9 commissioning

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

3.10 final evaluation report

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

3.11 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.

3.12 installation

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

3.13 manufacturing

Process that encompasses fabrication and assembly in a factory or workshop

3.14 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

3.15 modification

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

3.16 photovoltaic power plant (PV power plant) Certificate of Conformity (CoC)

Document issued upon successful completion of project certification

Procedural requirements for issuing certificates of conformity are specified in the relevant OD's.

3.17 product type certificate

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

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

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

3.18 PV power 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).

3.19 repair

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

3.20 replacement

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

3.21 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

3.22 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.

3.23 conditional photovoltaic power plant (PV power plant) certificate

Document issued upon commissioning and initial operation of PV power plant.

3.24 SCADA (Supervisory control and data acquisition)

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

3.25 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

3.26 Engineering Procurement constructions

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

3.27 Factory Auditor

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

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 which 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 may 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 PV Certification and Inspection Bodies

5.1 Role and responsibility of the RECB and REIB

5.1.1 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.

5.1.2 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's 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 Inspector.

5.1.3 Role and responsibility of the Factory Auditor

The PV Factory Auditor is responsible for

- carrying out initial certification audits of the Quality Management System of PV suppliers including, but not limited to, module manufacturing, BOS manufacturing, and system installation, 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 is part of an audit team under a lead auditor and works for either RECB or REIB.

The PV Factory Auditor must successfully meet the requirements defined in OD 405-3, which include, but are not limited to:

- Satisfy the RECB qualification process in order to be authorized as PV Factory Auditor.
- Meet the minimum qualification requirements
- Successfully pass the supervision and training

5.2 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 peers' assessors are defined in IECRE OD (under development).

5.3 Prerequisites for Acceptance

- 5.3.1** A REIB may cooperate with more than one RECB in the same IECRE category.
- 5.3.2** The RECB and REIB shall be nominated for membership in the PV-OMC by its IECRE Member Body.
- 5.3.3** RECB and REIBs carrying out certification and/or inspection activities shall not be influenced by manufacturers, installers, EPC companies or designers. 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.

5.4 Application for Acceptance

- 5.4.1** An application for the acceptance of a RECB and REIB for one or more IECRE Categories shall be endorsed by its Member Body of the IECRE.
- 5.4.2** 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.
- 5.4.3** 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. REIB or RECB is only permitted to perform inspection and certification according to standards that are in their scope of accreditation.
- 5.4.4** 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
- 5.4.5** Processes and requirements for application, qualifications, authorization and registration of PV Factory Auditors are defined in OD405-3.

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 production versus production minimum thresholds, safety and 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 outside 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 Annex B;
- The applicant shall report to the certification body beforehand any modifications listed in Annex B 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 stage, as shown in Figures 1 and 2 below:

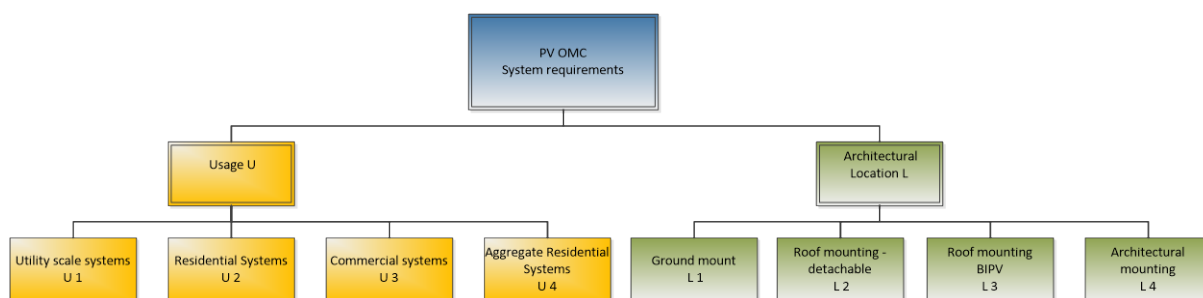


Figure 1 - Usage and Location categories

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)

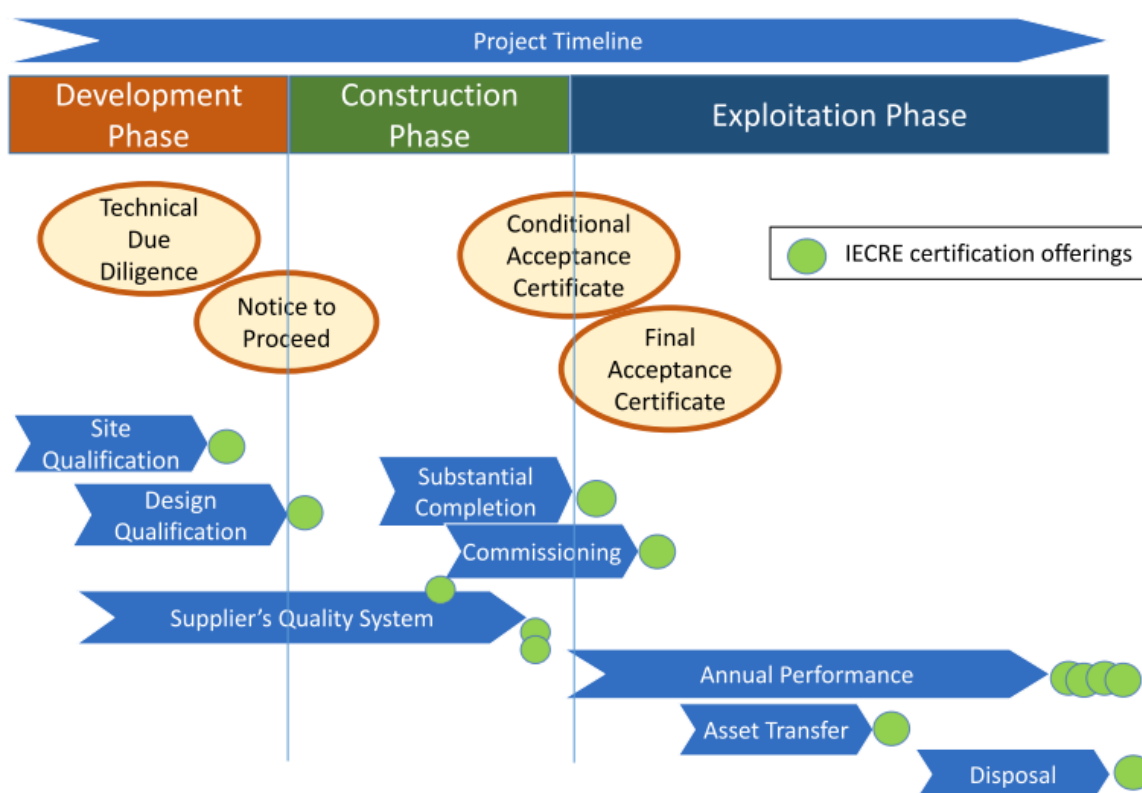


Figure 2 - PV power plant lifecycle stages. The timeline is only informative

7.1.2 System lifecycle categories

The System lifecycle category of the PV power plant, shall determine the relevant type of certificate for which evaluation is performed.

PV power plant categories by lifecycle stage are as follows:

D: Project design stage

C: “Conditional” certification for initial operation (usually one year)

A: “Annual” certification including validated annual energy production

O: “O&M” certification for a specific period of operation (e.g. 2-3 years)

7.2 PV power plant certificate types

A PV power plant Certificate documents conformity for all aspects of the PV power plant. The certificate is issued on the basis of the completeness and positive outcome of the evaluation reports, and certificates of conformity are issued as specified in the relevant OD's.

7.2.1 Project design certificate

A PV Project Design certificate 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 OD 403 PV Plant Design Qualification Certificate .

7.2.2 Certification of the supplier's quality system

A supplier's quality system certificate covers conformance of the supplier's quality system for the equipment specified in the design of the power plant with applicable international standards that has been evaluated against specified requirements defined in OD 405 IECRE Quality System Requirements for Manufacturers.

7.2.3 Conditional PV project certificate

A PV Conditional Project certificate of conformity covers the electrical and mechanical design of the PV power plant, installed equipment, and installation, commissioning and initial performance measurement at the site listed on the certificate that has been evaluated against specified requirements defined in OD 401 Conditional Project Certificate.

7.2.4 PV project commissioning certificate

A PV project commissioning certificate covers the design, equipment, operations and maintenance, and annual energy measurement of the PV power plant from a full year of operation after commissioning for final acceptance of a plant, at the site listed on the certificate that has been evaluated against specified requirements defined in OD 402 Annual PV plant performance certificate.

7.2.5 Annual performance certificate

An annual PV plant performance certificate of conformity covers the design, equipment, operations and maintenance, and annual energy measurement of the PV power plant, at the site listed on the certificate that has been evaluated against specified requirements defined in OD 402 Annual PV Plant Performance Certificate.

7.2.6 Project operations & maintenance certificate

A PV Project O&M certificate of conformity covers the operations and maintenance, and annual energy measurement of the PV power plant, at the site listed on the certificate, that has been evaluated against specified requirements defined in Draft OD 404 Project Operations & Maintenance Certificate (under development).

7.2.7 Project Asset Transfer certificate

A PV project asset transfer certificate helps to look at the future performance of the PV power plant, at the site listed on the certificate that has been evaluated against specified requirements defined in Draft OD 404 PV Asset Transfer Certificate. If the design certificate was never executed, this should be repeated.

7.2.8 Project Disposal certificate

Details tbd.

Annex A - Applicable Standards

For the list of standards within the scope of the PV-OMC, see:
<http://www.iecre.org/certification/iecstandards/>

Annex B- 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	7.2.1, 7.2.3, and 7.2.5 (applicable part)
Change of PV inverter model or manufacturer	7.2.1, 7.2.3, and 7.2.5 (applicable part)
Change of Solar Tracker model or manufacturer or alternative components	7.2.1, 7.2.3, and 7.2.5 (applicable part)
Change of Transformer model or manufacturer	7.2.1, 7.2.3, and 7.2.5 (applicable part)
Change of support structure type or model or additional reinforcements	7.2.1, 7.2.3, and 7.2.5 (applicable part)
Change to meteorological station utilizing lower accuracy or different measurement techniques	7.2.1, 7.2.3, and 7.2.5 (applicable part)

Annex C (informative) - Design documentation

This section is under development.

Annex D (informative) - 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.

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 may be provided online to the public at large.

Annex E (informative) – General

E.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.

E.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 Operations & Maintenance 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.

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