



# Technical Committee 82 Solar PV Energy Systems

**George Kelly, Secretary**  
**Liang Ji, Asst. Secretary**  
**Greg Ball, WG 6 Convenor**

**IEC/COPANT Webinar**  
**19 March 2021**  
**Online**

# What is TC 82?

- The IEC Technical Committee on Photovoltaics
  - One of **210** TCs and SCs within IEC



**Scope:** To prepare international standards for systems of photovoltaic conversion of solar energy into electrical energy and for **all the elements** in the entire photovoltaic energy system.

In this context, the concept "photovoltaic energy system" includes the entire field **from light input to a photovoltaic cell to and including the interface with the electrical system(s)** to which energy is supplied.

# TC 82 Summary

- Established 1981
- 43 participating (P-member) countries
- 11 observing (O-member) countries
- 525+ national experts
- 14 working groups (WG/JWG/PT)
- 162 publications
- **68 active projects**
  - Largest work program of all TCs in IEC



# TC 82 History



TC 82  
Annual Meeting

Cuernavaca, Mexico

December 1996

**Richard DeBlasio**  
Research Fellow Emeritus  
NREL

**Yasuji Sekine**  
Professor Emeritus  
University of Tokyo

**Heinz Ossenbrink**  
Doctor  
EC-JRC  
1998

**Michio Kondo**  
Innovation Coordinator  
FREA - AIST

# TC 82 Motivation



- **Industry growth**
  - Demand increasing exponentially worldwide
  - Significant increase in large commercial plants
  - Introduction of new technologies and applications
- **Concern for quality and bankability**
  - Need for confidence in existing standards
  - Need for improved understanding of reliability
  - Validation of product lifetime for investors

# Industry Participation

- **International PV Quality Assurance Task Force (PVQAT)**
  - Formed 2011; currently 15 task groups
  - Focused on scientific methods to characterize and predict possible failure modes
  - Work feeds into TC 82 for new standards

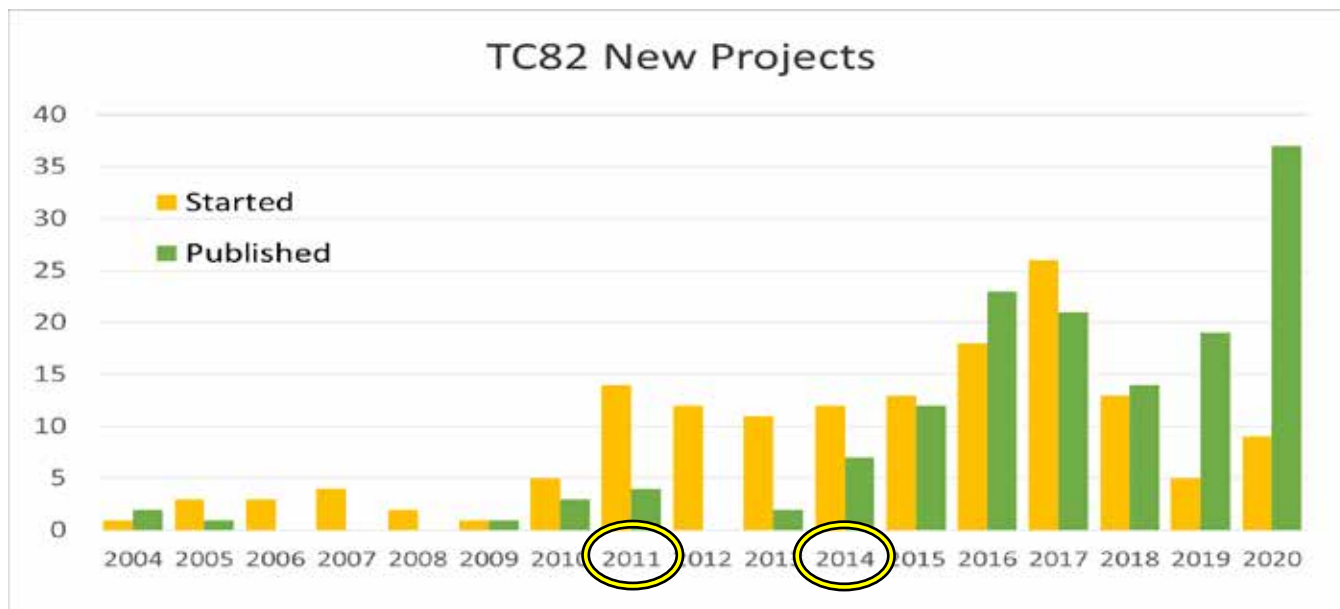


PVQAT

International PV Quality Assurance Task Force



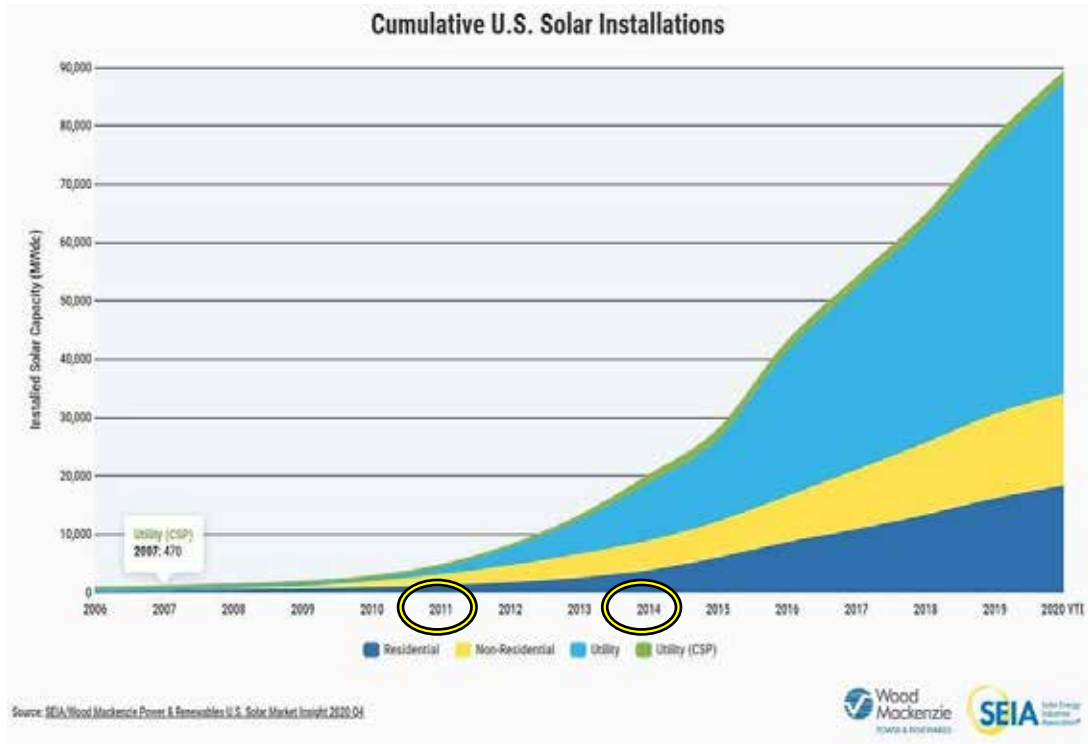
# “PVQAT Effect” on TC 82



- PVQAT formed in 2011; IECRE formed in 2014
- The most urgently needed standards are now published



# Impact of PV Standards



- PV industry **growth** is enabled by standards which provide **confidence** in the technology
- Widespread adoption requires **standardization**
- Good standards enable wider **adoption**

# IEC CO sales by TC/SCs



Figure 22 | IEC CO sales by TC/SCs (Q3 2019 to Q2 2020)

# TC 82 Officers and Convenors

- **Chairman -**  
**Michio Kondo, Japan**
- **Vice Chairman -**  
**Zhengxin Liu, China**
- **Secretary -**  
**George Kelly, US**
- **Assistant Secretary -**  
**Liang Ji, US**
- **WG 1 - Koichi Sakuta, JP**
- **WG 2 - Tony Sample, EC (JRC)**
- **WG 3 - Ted Spooner, AU & Martin Cotterell, GB**
- **WG 6 - Greg Ball, US & Vincente Salas Merino, ES**
- **WG 7 - Kenji Araki, JP & Shitao Wang, CN**
- **WG 8 - Hao Jin, CN**
- **WG 9 - Shitao Wang, CN & David Kresse, US**
- **JWG 1 - Leon Drotsche, NZ & Arne Jacobson, US**
- **PT 63092 - Thomas Moran, JP**

# Working Groups

- Working Groups are where most standards are developed
- A TC can organize as many WGs as it deems appropriate
- WGs are usually organized around a subset of the technology of the TC
- National Committees appoint members to the different Working Groups



# TC 82 Working Groups

- **WG 1** Terminology : 30 Experts
- **WG 2** PV Modules : 277 Experts
- **WG 3** PV Systems : 189 Experts
- **WG 6** Balance-of-System Components : 143 Experts
- **WG 7** Concentrator Modules : 63 Experts
- **WG 8** Photovoltaic (PV) Cells : 73 Experts
- **WG 9** Support Structures : 32 Experts
- **JWG 1** Off-Grid (Stand Alone) Systems : 50 Experts
- **PT 63092\*** Building Integrated PV (BIPV) : 44 Experts

\* Transforming into JWG with ISO TC 160

# Related Joint Working Groups

- **JWG 10** - Distributed energy resources connection with the grid
  - **Managed by TC 8**
- **JWG 4** - Grid code compliance assessment for grid connection of wind and PV power plants
  - **Managed by SC 8A**
- **JWG 5** - System issues regarding integration of wind and PV generation into bulk electrical grid
  - **Managed by SC 8A**
- **JWG 82** - Secondary cells and batteries for Renewable Energy Storage
  - **Managed by TC 21**
- **JWG 32** - Electrical safety of PV system installations
  - **Managed by TC 64**



# IEC TC 82 Working Group 1 & 2 Activities

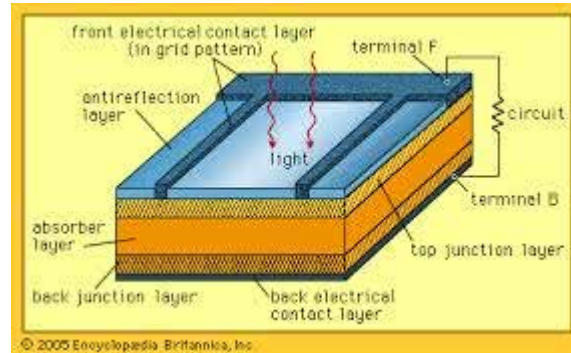
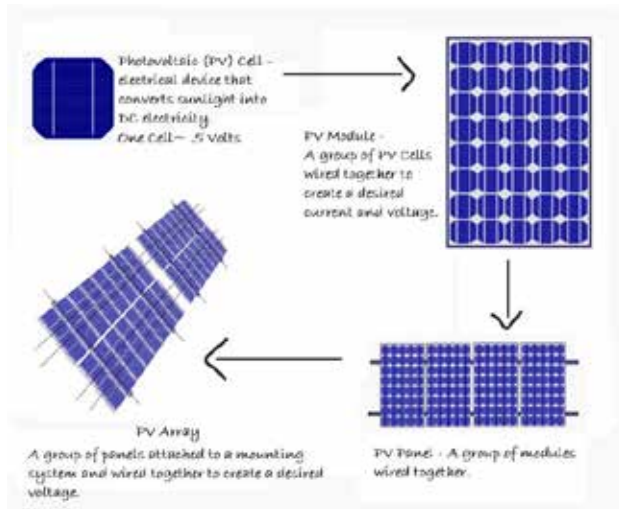
**Liang Ji**  
**Assistant Secretary**

**COPANT Webinar**  
**19 March 2021**

# WG 1 Terminology

Projects: **Latest document circulated** -date – **project leader**

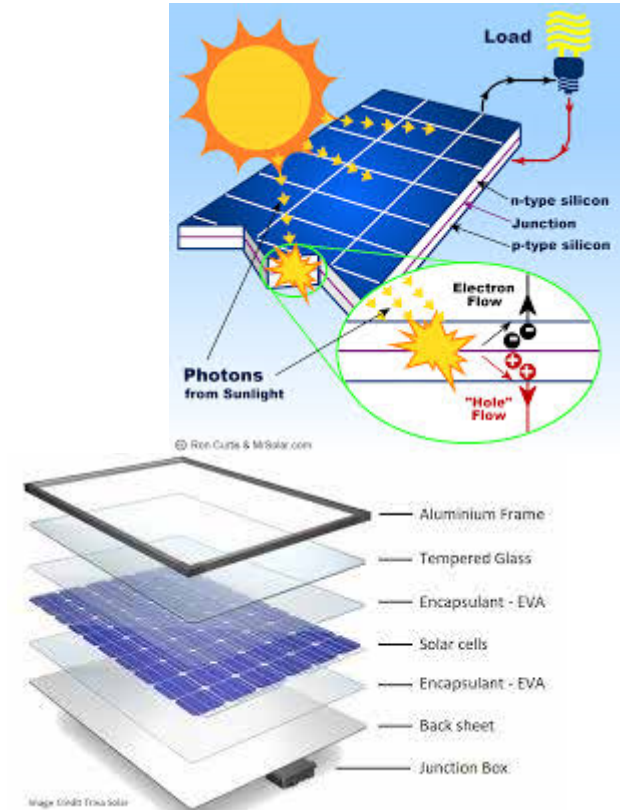
**IEC TS 61836 ED4: Solar photovoltaic energy systems - Terms, definitions and symbols** **82/1733/RR 05/20** **Nuria Martín Chivelet**





# WG 2 PV Modules

- **Technical Areas Covered:**
  - Measurement Principles
  - Qualification and Safety Tests
  - Energy Rating
  - Specialized Stress Tests
  - Module Components
  - Module Materials
  - Increased Reliability



# WG 2 PV Modules

## Publications 2020

### Measurement Principles:

**IEC 60904-1:2020** Photovoltaic devices - Part 1: Measurement of photovoltaic **current-voltage** characteristics

**IEC 60904-9:2020** Photovoltaic devices - Part 9: Classification of solar **simulator** characteristics

**IEC 60904-10:2020** Photovoltaic devices - Part 10: Methods of linear dependence and **linearity** measurements

**IEC TR 60904-14:2020** Photovoltaic devices - Part 14: Guidelines for **production line** measurements of single-junction PV module **maximum power** output and reporting at standard test conditions

### Module Components:

**IEC 62790:2020** **Junction boxes** for photovoltaic modules - Safety requirements and tests

**IEC 62852:2014+AMD1:2020 CSV Consolidated version** **Connectors** for DC-application in photovoltaic systems - Safety requirements and tests

# WG 2 PV Modules

## Publications 2020

### Module Materials:

**IEC 62788-1-4:2016+AMD1:2020 CSV Consolidated version** Measurement procedures for materials used in photovoltaic modules - Part 1-4: Encapsulants - Measurement of **optical transmittance** and calculation of the solar-weighted photon transmittance, yellowness index, and UV cut-off wavelength

### **IEC 62788-1-6:2017+AMD1:2020 CSV Consolidated version**

Measurement procedures for materials used in photovoltaic modules - Part 1-6: Encapsulants - Test methods for determining the **degree of cure** in Ethylene-Vinyl Acetate

**IEC 62788-1-7:2020** Measurement procedures for materials used in photovoltaic modules - Part 1-7: Encapsulants - Test procedure of **optical durability**

**IEC 62788-5-1:2020** Measurement procedures for materials used in photovoltaic modules - Part 5-1: Edge seals - Suggested test methods for use with **edge seal** materials

**IEC TS 62788-5-2:2020** Measurement procedures for materials used in photovoltaic modules - Part 5-2: **Edge seals - Durability evaluation** guideline

**IEC 62788-6-2:2020** Measurement procedures for materials used in photovoltaic modules - Part 6-2: General tests - **Moisture permeation** testing of polymeric materials

# WG 2 PV Modules

## Publications 2020

### Specialized Stress Tests:

**IEC 61701:2020** Photovoltaic (PV) modules - Salt mist corrosion testing

**IEC TS 62804-1-1:2020** Photovoltaic (PV) modules - Test methods for the detection of potential-induced degradation - Part 1-1: Crystalline silicon – Delamination

**IEC 62938:2020** Photovoltaic (PV) modules - Non-uniform snow load testing

### Increased Reliability:

**IEC TS 63126:2020** Guidelines for qualifying PV modules, components and materials for operation at high temperatures

**IEC TR 63279:2020** Derisking photovoltaic modules - Sequential and combined accelerated stress testing

# WG 2 PV Modules

## Publications 2021

### Module Qualification Tests:

**IEC 61215-1 ED2** Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1: **Test requirements**

**IEC 61215-1-1 ED2** Terrestrial PV modules - Design qualification and type approval - Part 1-1: Special requirements for testing of **crystalline silicon** photovoltaic (PV) modules

**IEC 61215-1-2 ED2** Terrestrial PV modules - Design qualification and type approval - Part 1-2: Special requirements for testing of thin-film Cadmium Telluride (**CdTe**) based photovoltaic (PV) modules

**IEC 61215-1-3 ED2** Terrestrial PV modules - Design qualification and type approval - Part 1-3: Special requirements for testing of thin-film **amorphous silicon** based photovoltaic (PV) modules

**IEC 61215-1-4 ED2** Terrestrial PV modules - Design qualification and type approval - Part 1-4: Special requirements for testing of thin-film **Cu(In,Ga)(S,Se)<sub>2</sub>** based photovoltaic (PV) modules

**IEC 61215-2 ED2** Terrestrial PV modules - Design qualification and type approval - Part 2: **Test procedures**

# WG 2 PV Modules

Projects: **Latest document circulated** –date - project leader

**IEC 60891 ED3:** Photovoltaic devices - Procedures for **temperature and irradiance corrections** to measured I-V characteristics **82/1735/CDV 10/20 Christos Monokroussos**

**IEC 60904-5: Amd1 to Ed2 Amendment 1** - Photovoltaic devices - Part 5: Determination of the **equivalent cell temperature** (ECT) of photovoltaic (PV) devices by the open-circuit voltage method **82/1822/CD 2/21 Guangchun Zhang**

**IEC 60904-8: Amd1 to Ed3 Amendment 1** - Photovoltaic devices - Part 8: Measurement of **spectral responsivity** of a photovoltaic (PV) device **82/1512/RR 11/18 Stefan Winter**

# WG 2 PV Modules

Projects: **Latest document circulated** –date - project leader

**IEC 61730-1/AMD1 ED2 Amendment 1** - Photovoltaic (PV) **module safety** qualification - Part 1: Requirements for **construction** **82/1813/CDV 3/21 Nancy Phillips**

**IEC 61730-2/AMD1 ED2 Amendment 1** - Photovoltaic (PV) **module safety** qualification - Part 2: Requirements for **testing** **82/1814/CDV 3/20 Guido Volberg**

**IEC 61853-2/AMD1 ED1** Photovoltaic (PV) module **performance testing** and energy rating - Part 2: Spectral responsivity, incidence angle and module operating temperature measurements **82/1382/RR 1/18 Werner Herman**

**IEC 62759-1 ED2** Photovoltaic (PV) modules - **Transportation** testing - Part 1: Transportation and shipping of module package units **82/1701/CD 05/20 Guido Volberg**

**IEC 62788-1-1 ED1** Measurement procedures for materials used in photovoltaic modules – Part 1-1: Polymeric materials used for **encapsulants** **82/1655/CD 6/19 David Miller**

# WG 2 PV Modules

Projects: **Latest document circulated** –date - **project leader**

**IEC TS 62788-2/AMD1 ED1 Amendment 1** - Measurement procedures for materials used in photovoltaic modules - Part 2: Polymeric materials - **Frontsheets and backsheets** **82/1846/CD 4/21** **Peter Pasmans**

**IEC 62788-2-1 ED1** - Measurement procedures for materials used in photovoltaic modules - Part 2-1: Polymeric materials - **Frontsheet and backsheet - Safety requirements** **82/1815/CDV 3/21** **Peter Pasmans**

**IEC 62788-5-1/AMD1 ED1 - Amendment 1** - Measurement procedures for materials used in photovoltaic modules - Part 5-1: Edge seals - Suggested test methods for use with **edge seal** materials **82/1751/CD 8/20** **Michael Kempe**



# WG 2 PV Modules

Projects: **Latest document circulated** –date - project leader

**IEC TS 62788-6-3 ED1** Measurement procedures for materials used in photovoltaic modules - Part 6-3: **Adhesion testing** of interfaces within PV modules **82/1435/CD 8/18**  
**Nancy Phillips**

**IEC TS 62788-7-2/AMD1 ED1 Amendment 1** - Measurement procedures for materials used in photovoltaic modules - Part 7-2: Environmental exposures - **Accelerated weathering** tests of polymeric materials **82/1823/RR 11/20** **Nancy Phillips**

**IEC 62788-7-3 ED1** Measurement procedures for materials used in photovoltaic modules – Part 7-3: Environmental exposures - **Accelerated abrasion** tests of PV module external surfaces **82/1591/CD 5/19** **David Miller**

# WG 2 PV Modules

Projects: **Latest document circulated** –date - **project leader**

**IEC TS 62804-2 ED1** Photovoltaic (PV) modules - Test methods for the detection of **potential-induced degradation - Part 2: Thin-film** **82/1574/CD 6/19** **Peter Hacke**

**IEC TS 62915 ED2** Photovoltaic (PV) modules - Type approval, design and safety qualification – **Retesting** **82/1651/RR 11/19** **Itai Suez**

**IEC TS 63109 ED1** Measurement of **diode ideality** factor by quantitative analysis of **electroluminescence images** **82/1724/CD 7/20** **Keizo Asaoka**

**IEC TS 63140 ED1** Photovoltaic (PV) modules – **Partial shade endurance** testing for **monolithically integrated** products **82/1804/DTS 12/20** **Tim Silverman**

# WG 2 PV Modules

Projects: **Latest document circulated** –date - project leader

**IEC 63163 ED1** Terrestrial photovoltaic (PV) modules for **consumer products** - Design qualification and type approval **82/1774/CD 10/20 Paul Robusto**

**IEC TS 63209-1 ED1** **Extended-stress testing** of photovoltaic modules for risk analysis **82/1820/DTS 2/21 Sarah Kurtz**

**IEC TS 63209-2 ED1** Extended-stress testing of photovoltaic modules for risk analysis – Part 2: **Durability characterization** of polymeric component materials and packaging sets **82/1599/NP 9/19 Nancy Phillips**

**IEC 63342 ED1** Light and elevated temperature induced degradation (**LeTID**) test for c-Si Photovoltaic (PV) **modules**: Detection **82/1771/NP 9/20 Max Köntopp**



# IEC TC 82 Working Group 3 & 6 Activities

**Greg Ball**  
Convenor, WG 6

**COPANT Webinar**  
19 March 2021

# WG 3 PV Systems

## Scope:

Photovoltaic system design, construction and maintenance. The Working Group should incorporate the existing standards on the functional blocks that are different from the photovoltaic array field, and promote the production of new specific standards when necessary.



## Co-Convenors

- Ted Spooner, Australia,
  - Martin Cotterell, UK
- 
- **200 experts**
  - **34 countries**
  - **35-50 typical meeting attendance**



# WG 3 PV Systems

## Publications 2020

**IEC 62446-2:2020** Photovoltaic (PV) systems - Requirements for testing, documentation and maintenance - Part 2: Grid connected systems - Maintenance of PV systems

**IEC TR 63292:2020** Photovoltaic power systems (PVPSSs) - Roadmap for robust reliability

**IEC TR 63227:2020** Lightning and surge voltage protection for photovoltaic (PV) power supply systems

# WG 3 PV Systems

Projects: **Latest document circulated** -Date – **project leader**

IEC 61724-1 ED2 Photovoltaic system performance - Part 1: Monitoring **82/1790/CDV**  
**1/21 Michael Gostein**

IEC TS 61724-2 ED2 Photovoltaic system performance - Part 2: Capacity evaluation  
method **82/1713/RR 3/20 Michael Gostein**

IEC TS 61724-3 ED2 Photovoltaic system performance - Part 3: Energy evaluation  
method **82/1714/RR 3/20 Michael Gostein**

# WG 3 PV Systems

Projects: **Latest document circulated** -Date – **project leader**

**IEC 62446-1 ED 2** Photovoltaic (PV) systems - Requirements for testing, documentation and maintenance - Part 1: Grid connected systems – Documentation, commissioning tests and inspection **82/1741/CD 8/20** **Martin Cotterell**

**IEC TS 62446-4 ED1** Photovoltaic (PV) systems - Requirements for testing, documentation and maintenance - Part 4: Electroluminescence Measurement of Photovoltaic Arrays **82/1799/NP 9/20** **Xiulan Pang**



# WG 3 PV Systems

Projects: **Latest document circulated** -Date – **project leader**

IEC 62548 ED2 Photovoltaic (PV) arrays - Design requirements **82/1710/CD**  
**6/20 Ted Spooner**

IEC TS 63265 ED1 Reliability practices for the operation of photovoltaic power systems **82/1837/CD closing 4/21 Roger Hill**

IEC TR 63226 ED1 Managing fire risk related to photovoltaic (PV) systems on buildings  
**82/1500/DTR Adrian Haering**

# WG 3 PV Systems

## Upcoming Work

NP – Pluggable Generators – discussion with JWG 32

NP – Float-o-voltaics – New TR or incorporate in IEC 62738

NP – EMC Installation/Commissioning Tests

NP – PV Systems Above Low-Voltage (>1500Vdc, > 1000Vac) up to 5kV

IV curve Tracing by Inverters/PCE – will be added to IEC 62446-1 and -2, and later IEC 61829.

# WG 6 BOS components

## Scope:

Develop BOS standards in the general areas of performance Safety, environmental durability (reliability), quality assurance and Quality assessment criteria.

## Co-Convenors

- Greg Ball (US)
- Vicente Salas (Spain)

- 146 experts
- 28 countries
- 35-50 typical meeting attendance



# WG 6 BOS components

## Publications 2020

**IEC 62109-3:2020** Safety of power converters for use in photovoltaic power systems -- Part 3. Particular requirements for electronic devices in combination with photovoltaic elements

**IEC 62891:2020** Maximum power point tracking efficiency of grid connected photovoltaic inverters

**IEC 62910 ED 2:2020** Test procedure of Low voltage Ride-Through measures for utility-interconnected photovoltaic inverter

**IEC TS 63106-1:2020** Simulators used for testing of photovoltaic power conversion equipment - Recommendations - Part 1: AC power simulators

**IEC TS 63156:2021** Photovoltaic systems - Power conversion equipment performance - Energy evaluation method

# WG 6 BOS components

Projects: **Latest document circulated** -Date – project leader

**IEC 62093 ED2** Power conversion equipment for photovoltaic systems - Design qualification testing **82/1652/CD 2/20 Hironobu Igarashi**

**IEC 62109-1/ED2** Safety of power converters for use in photovoltaic power systems - Part 1: General requirements **82/1422/RR 4/18 Tim Zgonena**

**IEC 62109-2/ED2** Safety of power converters for use in photovoltaic power systems - Part 2: Particular requirements for inverters **82/1423/RR 4/18 Tim Zgonena**

# WG 6 BOS components

Projects: **Latest document circulated** -Date – **project leader**

**IEC 62920/AMD1 ED1** Amendment 1 - Photovoltaic power generating systems - EMC requirements and test methods for power conversion equipment  
**82/1835/FDIS 2/21 Yasutoshi Yoshioka**

**IEC 63027 ED1** DC arc detection and interruption in photovoltaic power systems  
**82/1636/CDV 1/20 Nicolas Bogdanski**

**IEC TS 63106-2 ED1** Basic requirements for simulator used for testing of photovoltaic power conversion equipment - Part 2: d.c. power simulator  
**82/1732/DTS 7/20 Hirofumi Shinohara**

# WG 6 BOS components

Projects: **Latest document circulated** -Date – **project leader**

**IEC 63112 ED1** Safety, functionality and classification of Photovoltaic Earth Fault Protection (PV EFP) equipment **82/1729/CDV 8/20 Jim Eichner**

**IEC TS 63217 ED1** Utility-interconnected photovoltaic (PV) inverters – Test procedure of high-voltage ride-through measurements **82/1865/CD 4/21 Chenhui Niu**

**IEC 63257 ED1** Power line communication for DC shutdown equipment **82/1585/NP 7/19 Christian Fasthuber**

# WG 6 BOS components

Projects: **Latest document circulated** -Date – **project leader**

**IEC 63349-1 ED1** Photovoltaic direct-driven appliance controllers –Part 1: General Requirement **82/1779/NP 10/20** **Lingyun Fan**

**IEC TS 63349-2 ED 1** Photovoltaic direct-driven appliance controllers – Part 2: Operation Modes and an Example of Display **82/1780/NP 10/20** **Lingyun Fan**



# WG 6 BOS components

## Upcoming Work

IEC 62109-4 Safety of power converters for use in photovoltaic power systems – Part 4: Particular requirements for dc to dc converters

NP - PV Array Shutdown Equipment

NP - Module electronics - efficiency in partial shading

NP - PV Systems Operating Above Low Voltage (Components)

NP – System Anti-PID measures



# IEC TC 82 Working Group 7,8,9 Activities

**Liang Ji**  
**Assistant Secretary**

**COPANT Webinar**  
**19 March 2021**

# WG 7 Concentrators

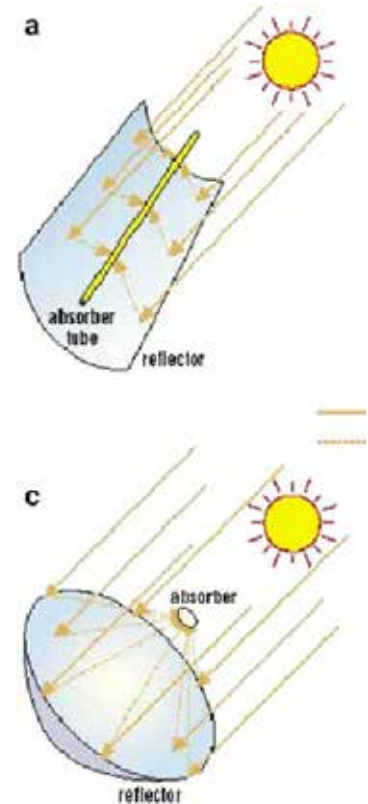
Projects: **Latest document circulated -date** – **project leader**

IEC 60904-9-1 ED1 Photovoltaic devices - Part 9-1: **Collimated beam solar simulator** performance requirements **82/972/NP**  
**8/15 Steve Askins**

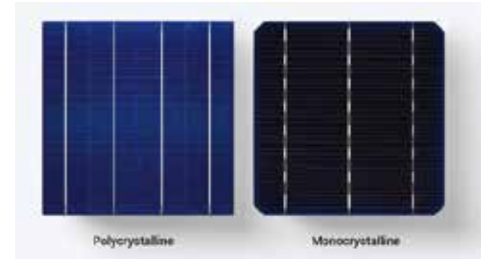
IEC 62108 ED3 Concentrator photovoltaic (**CPV**) modules and assemblies - Design qualification and type approval  
**82/1695/CD 5/20 Kenji Araki**

PNW TS82-1860 **Fire test** for concentrator PV modules  
**82/1860/NP 3/21 Kenji Araki**

PNW 82-1866 **Hybrid CPV/PV** modules: General characteristics and measurement procedures - Part 1: Performance measurements and power rating - Irradiance and temperature **82/1866/NP 4/21 GianLuca Timo**



# WG 8 PV Cells



Projects: **Latest document circulated -date** – **project leader**

**IEC 63202-2 ED1** Photovoltaic cells - Part 2: **Electroluminescence image** for crystalline silicon solar cells **82/1703/CD 5/20** **Christos Monokroussos**

**IEC TS 63202-3 ED1** Photovoltaic cells - Part 3: Measurement of current-voltage characteristics of **bifacial** photovoltaic cells **82/1800/NP 12/20** **Fangdan Jiang**

**IEC 63202-4 ED1** Photovoltaic cells - Part 4: Measurement of **light and elevated temperature** induced degradation of crystalline silicon photovoltaic cells **82/1797/NP 12/20** **Fangdan Jiang**

**IEC TS 63371-1 ED1** Materials used in photovoltaic (PV) cells - Part 1: Specifications for electrical characteristics of crystalline **silicon wafers** **82/1782/NP 10/20** **Tao Zhang**

**IEC 63202-6 ED1** Photovoltaic Cells – Part X: **Water Boiling** Test for Crystalline Silicon Solar Cells **82/1781/NP 10/20**

# WG 9 Support Structures



This is the newest TC 82 Working Group; formed in 2020

Projects: **Latest document circulated** -date – **project leader**

IEC 63104 ED1 Solar trackers - **Safety** requirements  
**82/1427/CD** 7/18 **Shitao Wang**

IEC 62817-1 ED1 Solar photovoltaic tracking systems  
- Part 1: **Design qualification** for horizontal one-axis  
solar tracking system **82/1722/NP** 7/20 **Shitao Wang**

IEC TS 63348 ED1 Evaluation of Photovoltaic (PV)  
Module to Mounting Structure **Interface** **82/1740/NP**  
**8/20** **Sumanth Lokanath**



# IEC TC 82 Joint Working Group Activities

**Greg Ball**  
Convenor, WG 6

**COPANT Webinar**  
19 March 2021

# JWG 1 Off-grid systems

## Publications 2020

Renewable energy and hybrid systems for rural electrification - Part 9-8: Integrated systems - Requirements for stand-alone renewable energy products with power ratings less than or equal to 350 W

Recommendations for renewable energy and hybrid systems for rural electrification - Part 12-1: Laboratory evaluation of lamps and lighting appliances for off-grid electricity systems



# JWG 1 Off-grid systems

Projects: **Latest document circulated** – date - project leader

**IEC TS 62257-1 ED4** Recommendations for renewable energy and hybrid systems for rural electrification - Part 1: General introduction to IEC 62257 series and rural electrification **82/1694/CD 4/20 Leon Drotsché**

**IEC TS 62257-2 ED3** Recommendations for renewable energy and hybrid systems for rural electrification - Part 2: From requirements to a range of electrification systems **82/1519/RR 11/18 Wuthipong Suponthana**

**IEC TS 62257-3 ED3** Recommendations for renewable energy and hybrid systems for rural electrification - Part 3: Project development and management **82/1520/RR 11/18 Chris West**

**IEC TS 62257-4 ED3** Recommendations for renewable energy and hybrid systems for rural electrification - Part 4: System selection and design **82/1521/RR 11/18 Geoff Stapleton**



# JWG 1 Off-grid systems

Projects: **Latest document circulated** – date - project leader

**IEC TS 62257-5 ED3** Recommendations for renewable energy and hybrid systems for rural electrification - Part 5: Protection against electrical hazards **82/1522/RR 11/18 Geoff Stapleton**

**IEC TS 62257-6 ED3** Recommendations for renewable energy and hybrid systems for rural electrification - Part 6: Acceptance, operation, maintenance and replacement **82/1523/RR 11/18 Wang Sicheng**

**IEC TS 62257-6-2 ED1** Renewable energy and hybrid systems for rural electrification - Part 6-2: Testing for selection of Photovoltaic Individual Electrification Systems (PV-IES) **82/1754/RR 6/20 Arne Jacobson**

**IEC TS 62257-7-2 ED1** Recommendations for renewable energy and hybrid systems for rural electrification - Part 7-2: Generator set – Off-grid wind turbines **82/1562/CD 4/19 Charlie Dou**

# JWG 1 Off-grid systems

Projects: **Latest document circulated** – date - project leader

**IEC TS 62257-9-1 ED3** Renewable energy and hybrid systems for rural electrification - Part 9-1: Integrated systems - Micropower systems  
**82/1610/RR 7/19 Geoff Stapleton**

**IEC TS 62257-9-4 ED3** Renewable energy and hybrid systems for rural electrification - Part 9-4: Integrated systems - User installation **82/1611/RR 7/19 Geoff Stapleton**

**IEC TS 62257-9-5 ED5** Renewable energy and hybrid systems for rural electrification - Part 9-5: Integrated systems - Laboratory evaluation of stand-alone renewable energy products for rural electrification **82/1612/RR 7/19 Arne Jacobson**

# TC 8 and SC 8A/B/C

## SC 8A: Grid integration of renewable energy generation

Develops technical reports, specifications and standards as well as a standardization roadmap for RE

Covers forecasting & operations (WG2), grid code compliance testing (JWG4) and grid application issues such as weak grid stability, sub-synchronous oscillations & resonance, fast frequency response, behavior during faults (JWG5). New subjects will include development of generic models for RE and hybrid plants.

## SC 8B: Decentralized Electrical Energy Systems

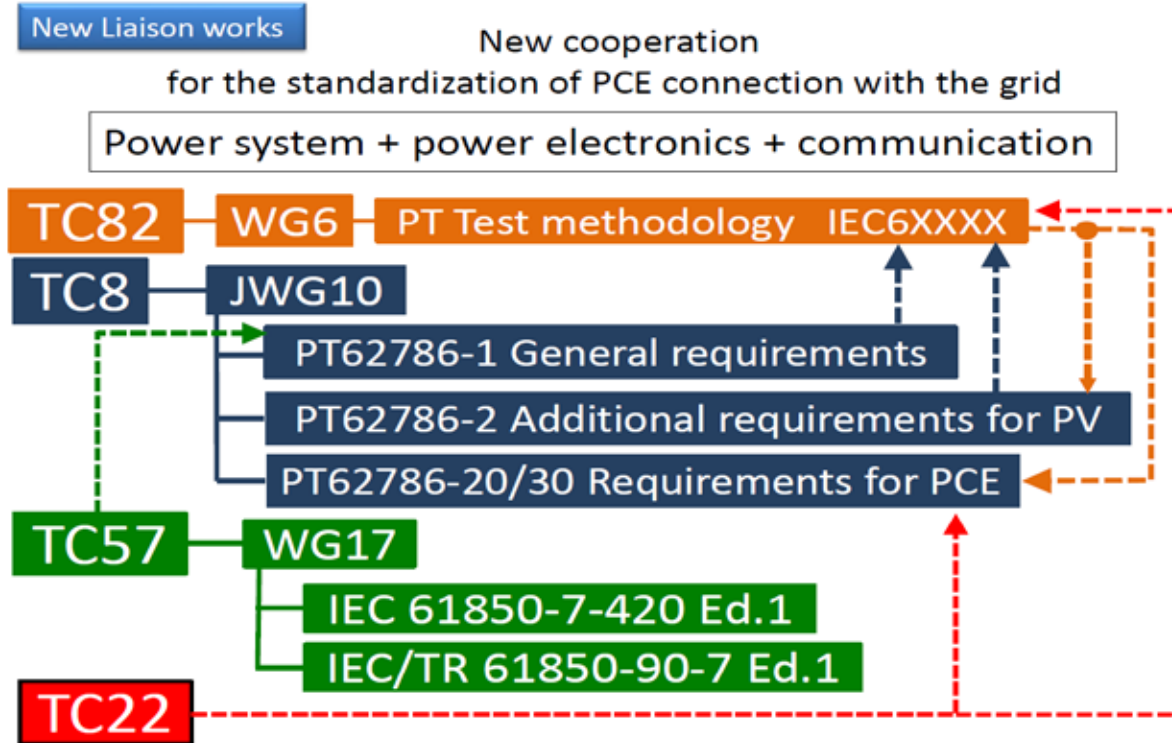
Covers design and system impact of decentralized systems, including a standardization roadmap, technical requirements for microgrids, aggregation and virtual power plants, hosting capacity evaluation and DC distribution systems

## SC 8C: Network Management

Develops guidelines for network design, planning, operation & control.

Covers requirements for network operation, balancing, reserve sharing, requirements for reliability, adequacy, security, stability and resiliency analysis

# JWG 10 with TC 8: DER connection with the grid



# Building Integrated PV (BIPV)

**TC 82 Project Team 63092 will be transformed into a JWG with ISO TC 160 (Glass in Buildings)**

- Voting closed 12 March 2021

## **Publications 2020:**

**IEC 63092-1:2020** Photovoltaics in buildings - Part 1: Requirements for building-integrated photovoltaic modules

**IEC 63092-2:2020** Photovoltaics in buildings - Part 2: Requirements for building-integrated photovoltaic systems

## **New Project:**

**IEC 63092-3 ED1** Photovoltaics in buildings - Part 3: Evaluation methodology of Solar Heat Gain Coefficient (SHGC) for Building integrated photovoltaic modules with various designs

# IEC TC 82 Final Words

**George Kelly**  
Secretary

**COPANT Webinar**  
19 March 2021

# TC 82 Dashboard

The screenshot displays the IEC TC 82 Dashboard for Solar photovoltaic energy systems. It includes a navigation bar with links like 'Advanced search', 'Webstore', and 'Contact us'. Below the navigation, there's a breadcrumb trail: 'Home / Standards development / Technical committees and subcommittees / TC 82 Dashboard'. The main content area is titled 'TC 82 Solar photovoltaic energy systems' and contains a table of work programme items. The table has columns for Project Reference, Document Reference, File Date, Current Stage, Next Stage, Working Group, Project Leader, and First Publ. Date.

Project Reference	Document Reference	File Date	Current Stage	Next Stage	Working Group	Project Leader	First Publ. Date	
IEC 62502-2 ED1	Photovoltaic cells - Part 2: Measurement of light and evoked temperature induced degradation of crystalline silicon photovoltaic cells	621767NP 487 kB	2021-01	ACD 2021-01	CD 2021-07	WG 8	Fangjun Jiang	2023-03
PAW TS 62-1782	Photovoltaic Cells - Part 3: Specifications for electrical characteristics of crystalline silicon wafers	621792NP 429 kB		Pr/N 2020-10	2020-10	WG 8		2023-10
IEC TS 62502-2 ED1	Photovoltaic cells - Part 2: Electroluminescence image for crystalline silicon solar cells	621793CD 1081 kB	2018-06	ACTS 2020-08	TEIS 2020-11	WG 8	Christine Manakouskas	2022-01
IEC TS 62502-3 ED1	Photovoltaic cells - Part 3: Measurement of current-voltage characteristics of bifacial photovoltaic cells	621803NP 537 kB	2021-01	ACD 2021-01	CD 2021-02	WG 8	Fangjun Jiang	2022-06

Information about TC 82 can be found at this link:

[http://www.iec.ch/dyn/www/f?p=103:23:0:::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:1276,25](http://www.iec.ch/dyn/www/f?p=103:23:0:::FSP_ORG_ID,FSP_LANG_ID:1276,25)

# Project Details

- Click on the title of any project to find more details and copies of documents circulated at each stage of development

The screenshot shows the IEC website interface. At the top, there is a navigation bar with links for 'Advanced search', 'Webstore', 'e-tech', 'Online learning', and 'Contact us'. Below this is the IEC logo and the text 'International Electrotechnical Commission'. The main content area is titled 'TC 82 Solar photovoltaic energy systems'. Underneath, there are tabs for 'Scope', 'Structure', 'Projects / Publications', 'Documents', 'Votes', 'Meetings', and 'Collaboration Platform'. The 'Projects / Publications' tab is active, showing a table of project details. The table has columns for 'Committee', 'Working Group', 'Project Leader', 'Current Status', 'Final Pub. Date', and 'Stability Date'. The first row shows 'TC 82', 'WG 2', 'Ms Ingrid Repins', 'B/PUB', '2021-03', and '2024'. Below the table is a 'History' section with a table showing the progression of the project through various stages: AGO, GD, PCC, ACCV, ACCV, and TCDV. Each stage includes the document title, size, decision date, and target date. On the right side of the page, there is a 'Project' section with the title 'IEC 61215-1 ED2 Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1: Test requirements' and a 'Related Projects' section.

Committee	Working Group	Project Leader	Current Status	Final Pub. Date	Stability Date
TC 82	WG 2	Ms Ingrid Repins	B/PUB	2021-03	2024

Stage	Document	Downloads	Decision Date	Target Date
AGO	82/1332/R01	124 kB	2017-08-28	
GD	82/1453/GD	1322 kB	2018-07-27	2017-08
PCC			2018-09-21	2018-09
ACCV	82/1492/CC	847 kB 545 kB	2018-10-26	2018-04
ACCV	82/1492A/CC	349 kB 568 kB	2018-10-26	2019-04
TCDV			2018-08-30	2018-10



# TC 82 Welcomes You



- Friendly working relationships result in better standards
- We look forward to meeting in person before the end of 2021



**George Kelly, Secretary**  
**Liang Ji, Asst. Secretary**  
**Greg Ball, WG 6 Convenor**

**IEC/ COPANT Webinar**  
**19 March 2021**  
**Online**