Standardisation and International Collaboration Activities of PVQAT

Dr. Tony Sample

Online RD20 Theme 1: Renewable energy
Dr. Tony Sample

- I have worked for more than 20 years at the European Commissions Joint Research Centre as part of the staff of the European Solar Test Installation (ESTI).

- I have been active in the areas of module measurement, testing and lifetime assessment.

- I am the convenor of IEC TC82 WG2 and of the CENELEC TC82 WG1.
IEC Technical Committee 82 Solar photovoltaic energy systems

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.

IEC standards are aimed too;

- facilitate trade on an international level
- achieve broadest possible acceptance in all countries
- respond to ... scientific and technological developments
- think globally, for as many stakeholders as possible in markets around the world.
IEC Technical Committee 82 (www.iec.ch)

There are currently 146 documents published by the IEC from Technical Committee 82 (established in 1981)

TC 82 has the largest work programme of any IEC Technical Committee

Reflecting the nature of the rapidly growing and innovative PV industry
TC 82 Solar photovoltaic energy systems

**Working Groups**

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**Project Teams**

- **PT 62994-1**: Environmental Health and Safety (EH&S) Risk Assessment for the sustainability of PV module manufacturing - Part 1. General principles and definition of terms
- **PT 63092**: Building Integrated Photovoltaics (BIPV)

**Joint Working Groups**

- **JWG 1**: Photovoltaic off grid systems, including decentralized rural electrification and hybrid systems
- **JWG 10**: Distributed Energy Resources Interconnection 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**: TC21/TC82 - Secondary cells and batteries for Renewable Energy Storage Managed by TC 21
- **JWG 32**: Electrical safety of PV system installations Managed by TC 64
How to expand the participation in standards development?

• It may be an obvious point, but standards are written by those who participate either directly within the IEC technical committees, or comment via their national committees.

• However, not all countries are represented at the IEC standard committees. TC 82 currently has 43 participating countries and 11 observer countries.

• Within the PV community it was asked some years ago, how to increase the input from research organisations, universities, companies, user groups, financiers, banks and insurance companies.

• As such AIST and NREL, with support from METI and DOE, set up the First International PV Module Quality Assurance Forum.

• The Forum looked, in particular, at the known major failure and wear out mechanisms for PV modules.
First International PV Module Quality Assurance Forum

The First International PV Module Quality Assurance Forum was held in July 2011 in San Francisco, California. The event fostered international participation to develop a rating system that meets the needs of all countries and customers. At the forum, the community expressed strong support for development of international PV QA standards, leading to the formation of The International PV Quality Assurance Task Force (PVQAT, "PV cat").

PVQAT strives to provide these benefits by coordinating international development of comprehensive technical standards for verifying PV component, system quality and bankability.

Initially 9 task groups were established to look at particular topics e.g.
• TG1 Manufacturing Consistency
• TG2 Thermal and Mechanical Fatigue Including Vibration.
• TG4 Diodes, Shading, and Reverse Bias
PVQAT: Initial approach to “Bankable PV”

- A rating system to ensure **durable design of PV modules** for the climate and application of interest.

- A guideline for factory inspections and **quality assurance (QA) during manufacturing**.

- A comprehensive system for **certification of PV systems**, verifying appropriate design, installation, and operation.
Development of PVQAT:

IEC
Establish Standards

IECRE
Establish Operational Documents

PVQAT
OPEN FORUM (Volunteers)
Collaborative Research
Web meetings

Support

PV Reliability workshops

International Energy Agency Photovoltaic Power Systems Programme
Tasks 13 + others
Impact of PVQAT on TC82 New Projects

PVQAT Established in 2011
Examples of PVQAT support to IEC TC82

Quality assurance (QA) during manufacturing

IEC TS 62941 Terrestrial photovoltaic (PV) modules - Guideline for increased confidence in PV module design qualification and type approval (2016)

IEC 62941 Terrestrial photovoltaic (PV) modules - Quality system for PV module manufacturing (2019)

Durable design of PV modules

IEC TS 62916 Photovoltaic modules - Bypass diode electrostatic discharge susceptibility testing (2017)

IEC 62979 Photovoltaic modules - Bypass diode - Thermal runaway test (2017)

PVQAT: International Contacts

- **Contact in Americas:** Ingrid.Repins@nrel.gov
- **Contact in Europe:** Tony.SAMPLE@ec.europa.eu
- **Contact in India:** naren@ee.iitb.ac.in
- **Contact in China:** chenxd@cgc.org.cn
- **Contact in Australia:** SPulsford@cleanenergycouncil.org.au

**Contact in Japan:** tadanori.tanahashi@aist.go.jp
How to get involved in standardization

National

• Contact your national committee to be included in the distribution and discussion of documents

International

• Via your national committee, volunteer to be a member of TC 82 working groups

If interested in experimental work and development of material standards, comparative testing or manufacturing QA then join

• International Photovoltaic Quality Assurance Task Force (PVQAT)

  https://www.pvqat.org
I would like to thank the many hundreds of volunteers within PVQAT. In particular the regional and task group leaders.