

PV Standards Work: Photovoltaic System and Component Certification, Test Facility Accreditation, and Solar Photovoltaic Energy Systems International Standards

T.S. Basso
National Renewable Energy Laboratory

S. Chalmers
PowerMark Corporation

H.O. Barikmo
Sunset Technologies, Inc.

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PV Standards Work: Photovoltaic System and Component Certification, Test Facility Accreditation, and Solar Photovoltaic Energy Systems International Standards

Thomas S. Basso,¹ Steve Chalmers,² and Howard O. Barikmo³

¹National Renewable Energy Laboratory, Golden Colorado, Thomas_Basso@nrel.gov

²PowerMark Corporation and ³Sunset Technologies, Inc., both in Phoenix Arizona

ABSTRACT

This paper discusses efforts led by two companies (PowerMark Corporation and Sunset Technologies Inc.) to support both U.S. domestic and international photovoltaic (PV) system and component certification and test facility accreditation programs and the operation of the International Electrotechnical Commission (IEC) Technical Committee 82 (TC-82) *Photovoltaic Energy Systems*. International and national PV certification/accreditation programs are successfully facilitating entry of only the highest quality PV products into the marketplace. Standards also continue to be a cornerstone for assuring global PV product conformity assessment, reducing non-tariff trade barriers, and ultimately improving PV products while lowering cost.

1. Objectives

The intent of certification and accreditation programs is to provide confidence that certified PV systems and components meet manufacturers' claims for lifetime, reliability, and performance, and also to acknowledge test labs that are recognized worldwide as qualified to ascertain conformance to standards. The objective of supporting the IEC/TC82 is to bolster TC-82 Secretariat efforts to effectively manage the Working Groups (WG) of TC82 developing IEC standards. Standards are a strategic business tool helping develop new global markets. U.S. participation in standard setting ensures foreign market access for U.S. technology. Such participation also helps to eliminate non-tariff trade barriers and to keep U.S. companies on the cutting edge of current technology and market trends.

2. Technical Approach

Supporting PV system and component certification and test facility accreditation programs includes ensuring domestic and international reciprocity, validating test results, and accrediting test laboratories. PowerMark Corporation (PMC) has implemented the NREL/DOE criteria for certification and laboratory accreditation^{1,2} and continually engages the PV industry in promoting the manufacture of only the highest quality PV products for domestic and international application. The PMC³ has an established board of directors as well as committees of experts from U.S. manufacturers, designers, and participants in industry R&D and standards. It also maintains liaison with domestic and international standards groups.

The IEC is a leading global organization that prepares and publishes international standards for all electrical, electronic, and related technologies. Also, the IEC and the Institute of Electrical and Electronics Engineers (IEEE) have a formal dual-logo arrangement for IEC to adopt IEEE standards for electronics, telecom, and power generation for international use. In addition, IEC provides for IEC standards to serve as a basis for national standardization and as references when drafting international tenders and contracts. And through its members, IEC promotes international cooperation on electrotechnical standardization and related matters, including assessment of conformity to standards, in the fields of electricity, electronics, and related technologies. IEC/TC82 *Solar Photovoltaic Energy Systems*⁴ working groups and their tasks include:

- WG1: Glossary—task: to prepare a glossary
- WG2: Modules, Non-Concentrating—task: to develop international standards for non-concentrating, terrestrial photovoltaic modules
- WG3: Systems—task: to give general instructions for PV system design, construction, and maintenance
- WG4: PV Energy Storage Systems—task: to develop international standards for PV energy storage systems
- WG6: Balance-of-System (BOS) Components—task: to develop international standards for balance-of-system components for PV systems
- WG7: Concentrator Modules—task: to develop international standards for PV concentrators and receivers
- JWG TC82/TC88/TC21/SC21A—task: to prepare guidelines for decentralized rural electrification systems projects being implemented in developing countries.

3. Results and Accomplishments

3.1 PV Product Certification/Test Lab Accreditation

PMC has established two accredited U.S. testing laboratories—Arizona State University PV Testing Laboratory and the Florida Solar Energy Center—that are recognized worldwide (reciprocity) to establish certified PV components and systems. The only other accredited PV certification laboratories in the world are ESTI/ISPRIA in Italy and TUV in Germany. PMC has established a procedure for certification of PV modules, with Solarex and USSC now having PMC-listed and labeled modules. PMC has also developed

a procedure for certification of PV-battery charge controllers although no manufacturers have yet sought certification for these. This past year, PMC became an official representative (licensee) for the Global Approval Program for Photovoltaics (PV GAP⁵), whose product listing is recognized worldwide. PV-GAP is dedicated to the sustained growth of global PV markets. In the United States, the Solar Energy Industry Association (SEIA), as recognized by PV-GAP, has designated PMC as a PV-GAP licensee. Generally, PMC administers certification and accreditation programs and harmonizes them on a national and international basis. Currently in the United States, interstate organizations and other stakeholder groups are discussing PV product certification and solar rebate programs. PMC is participating in such activities and offers its global marketplace expertise to help our domestic PV industry and solar programs move forward. Additionally, the PMC Executive Director, Mr. S. Chalmers, serves as the U.S. IEC/TC82 Technical Advisor to the American National Standards Institute to establish U.S. comments and position on documents and issues in regards to IEC/TC82.

3.2 IEC PV Standards

Progress and activities of the IEC/TC82 Secretariat include maintenance and development of IEC PV documents (currently 32 published IEC PV standards), conducting IEC/TC82 and IEC/TC82 working group meetings, maintaining rosters, establishing and circulating committee drafts and compendiums of feedback comments, and writing IEC/TC82 Maintenance Cycle Reports. This past year, Sunset Technologies, Inc. President, Mr. H.O. Barikmo was appointed as IEC/TC82 Secretary.

4. Conclusions

For national and international entities considering PV product or test facility accreditation, PMC can:

- Manage PV certification programs appropriately tailored to states' or nations' declared mandates
- Coordinate these PV product certification programs with state incentive programs
- Serve as a certification body (CB) where necessary utilizing existing CBs where possible
- Continue to accredit PV test laboratories
- Continue as U.S. Licensee for PV GAP
- Further define and extend PV product certification requirements
- Expand state, national and international roles as appropriate
- Promulgate reciprocity and provide coordination.

For PV international standards, IEC/TC82 upcoming issues and activities include the following priority standards development efforts: WG2 (Modules)

Traceability of PV Reference Devices and Power and Energy Ratings; WG3 (Systems) defining performance and test requirements for small, stand-alone PV systems and performance monitoring, efficiency measurements, and acceptance testing at the system level; WG6 (BOS) inverter standards; and WG7 (concentrators) design qualification and type approval. Additionally, the IEC has a "System for Conformity Testing and Certification of Electrical Equipment (IECEE)" that includes an Expert Task Force-9 (ETF-9) that is developing a specific IECEE PV Scheme and has already accepted four standards within the IECEE PV Scheme. The IEC/TC82 Secretary is a member of ETF-9 and will be closely observing the market acceptance by manufacturers of the IECEE PV Scheme venue of qualification testing and client assessment.

The efforts reported herein and dedicated engagement in the ongoing issues and activities should help ensure that U.S. PV interests are carried forth in both the national and global arenas. PV standards help to improve global industrial efficiency, develop world trade, and provide the framework for economies of design, greater product and service quality, more interoperability, and better production and delivery efficiency. Further, conformity assessment and product certification schemes at the national level ensure a certified product has been manufactured and tested to well-established standards. The end-user is assured that the product meets stringent standards and need not be concerned with redundant testing or evaluation of the product.

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