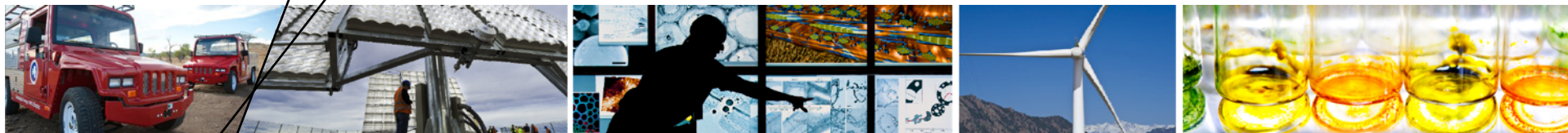




International PV Quality Task Force (PVQAT)



Sarah Kurtz (NREL)

Solar ABCs Workshop

Solar Power International

Anaheim, CA

Sept 17, 2015

Outline

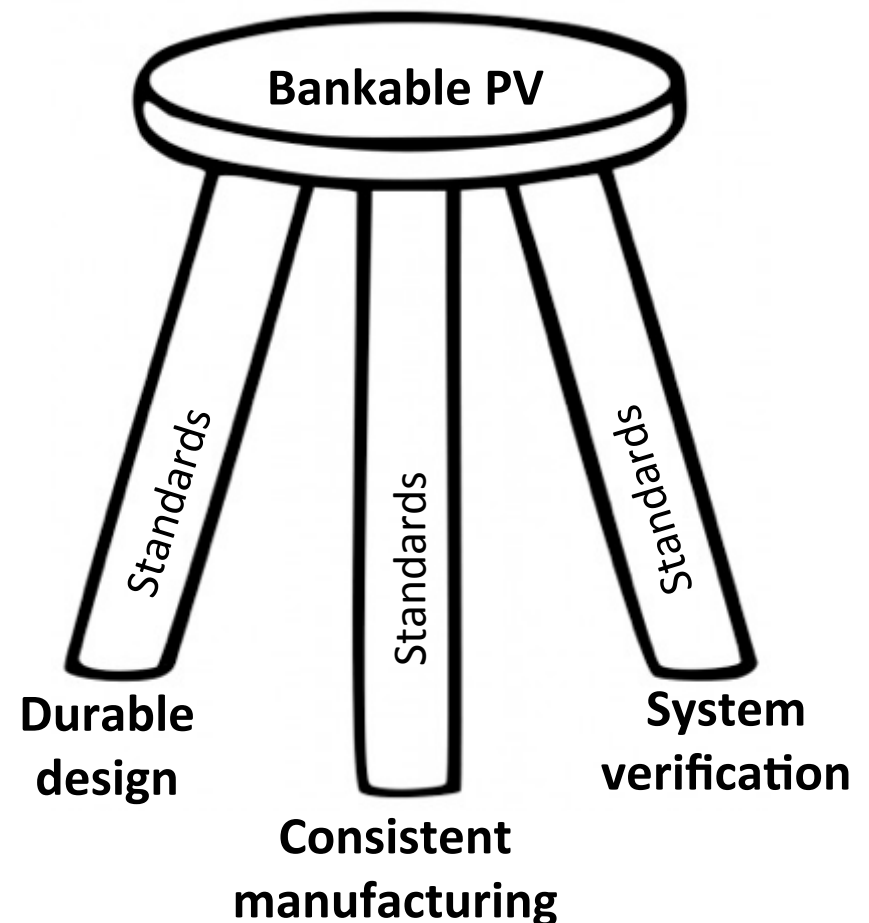
- **History of PVQAT**
- **Goals of PVQAT**
 - Climate-specific module qualification
 - Consistency of manufacturing
 - System certification
- **Structure of PVQAT**
 - Twelve task groups working to support IEC
- **Recent activities and future directions**
 - IEC 62941 – Quality management of module manufacturing
 - Technical studies
 - Proposed Climate-specific test
 - Vision/support for IECRE

PVQAT (International PV Quality Assurance Task Force)

- **Formed in 2011, inspired by METI in Japan**
- **Informal organization encourages participation by all**
- **Emphasis on organizing and sharing research results toward how to test for different:**
 - **Climates (Desert, Tropical, Temperate)**
 - **Mounting configurations (rack- and roof-mount)**
- **www.PVQAT.org (English)**
- **www.PVQAT.com (Chinese)**

Three-prong effort addresses those questions

1. ***Qualification of durability of design of products*** for chosen climate and mounting
2. ***Guide for audit of consistent manufacturing*** of products built to that design
3. ***Certification process for system verification*** to ensure adequacy of design, installation, and operation



PVQAT (International PV Quality Assurance Task Force)



PVQAT

International PV Quality Assurance Task Force

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The International PV Quality Assurance Task Force (PVQAT, "PV cat") leads global efforts to craft quality and reliability standards including:

MODULE DURABILITY

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

MANUFACTURING CONSISTENCY

A guideline for factory inspections and quality assurance (QA) during module manufacturing

SYSTEM VERIFICATION

A comprehensive system for certification of PV systems, verifying appropriate design, installation, and operation

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PVQAT Timeline

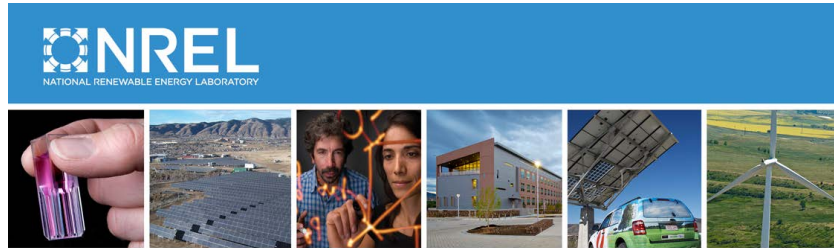


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PVQAT Task Groups – All supporting IEC

1. PV QA Guideline for Manufacturing Consistency
2. Thermal and mechanical fatigue including vibration
3. Humidity, temperature, and voltage
4. Diodes, shading and reverse bias
5. UV, temperature and humidity
6. QA Rating Communication
7. Snow and Wind Loading
8. Thin-film Testing
9. CPV Testing
10. Connectors
11. PV Systems
12. Soiling and Dust

PV-Specific ISO 9001



Updated Proposal for a Guide for Quality Management Systems for PV Manufacturing: Supplemental Requirements to ISO 9001-2008

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Sumanth Lokanath,⁵ Yoshihito Eguchi,⁶
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⁶ Mitsui Chemical

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⁸ National Renewable Energy Laboratory

NREL is a national laboratory of the U.S. Department of Energy
Office of Energy Efficiency & Renewable Energy
Operated by the Alliance for Sustainable Energy, LLC

This report is available at no cost from the National Renewable Energy
Laboratory (NREL) at www.nrel.gov/publications.

Technical Report
NREL/TP-5J00-63742
March 2015

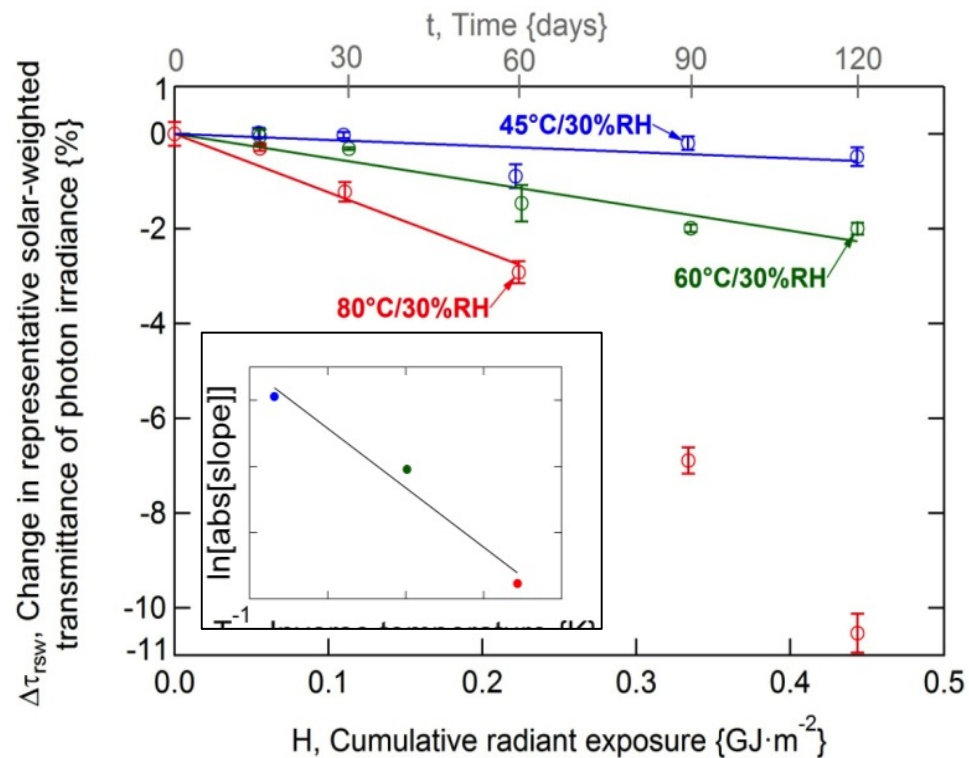
Contract No. DE-AC36-08GO28308

- Goal is to take ISO 9001 a level deeper by adding PV-specific requirements
- Guide for PV Quality Management System
<http://www.nrel.gov/docs/fy15osti/63742.pdf>
- Builds on Japanese standard*
- Expect publication in early 2016 – next need to launch

*JIS Q8901-2012 Terrestrial photovoltaic (PV) modules-Requirement for reliability assurance system (design, production, and product warranty)

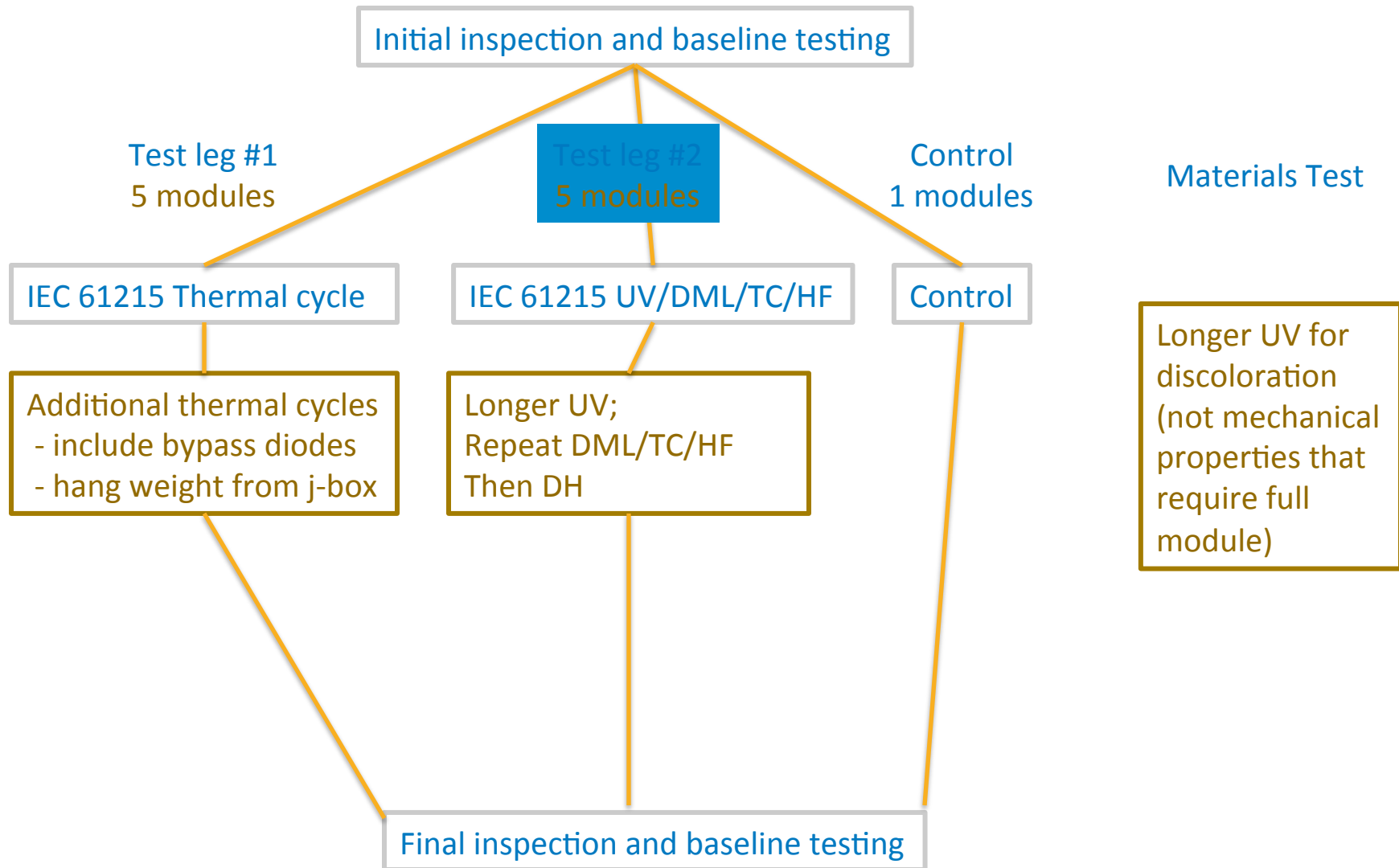
Recent progress – quantitative studies

- **PVQAT study quantifies temperature dependence of UV-induced discoloration**



Miller, et al, PVSC 2015

Proposed climate-specific test – details under discussion



System Verification – IECRE

IEC has formed IECRE for Renewable Energy System verification

PV Standards for testing all aspects of PV Systems:

- Component quality (IEC 61215, IEC 61730, IEC 62891, IEC 62109, IEC 62093, IEC 61439, IEC 60947, IEC 60269, new?)
- System:
 - Design (IEC TS 62548, IEC 60364-7-712, IEC 61634-9-1, IEC 62738)
 - Installation (IEC 62548, IEC 60364-7-712)
 - Commissioning (IEC 62446)
 - Operation (First draft completed)
- Training of personnel

Plan to be able to issue first certificates in 2016

IECRE value - vision

- **Reliable components**
 - Type testing
 - Quality management (IEC 62941)
- **System installation**
 - Quality management of installation
- **Consistent metrics for system performance**
 - Define annual prediction based on stated annual irradiation
 - Measure annual electricity produced and availability
 - Report performance index and availability along with measured

Saudi Arabia has adopted tests for hot climates

- **Start with IEC Qualification tests**
- **Add “Qualification Plus” test**
- **Increase temperatures for some tests**

- **India, Mexico, Kuwait, Qatar, United Arab Emirates, and others are seeking to work together to define an international standard for hot climates**
- **PVQAT and IEC will facilitate and implement**

Conclusion

PVQAT is on path to comprehensive technical standards

1. Durable design
2. Consistent manufacturing
3. System verification

Available in 2016

Proposals are being developed:

1. Climate-specific test protocol
2. PV-specific QMS
3. Oversight of QMS for installation
4. Consistent performance metrics

www.pvqat.org

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Thank you to dozens of volunteers!

