Welcome and Introduction to the Workshop

PVPerformance MODELING COLLABORATIVE

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Sandia National Laboratories





6th PV Performance Modeling Workshop
Fraunhofer ISE, Freiburg, Germany October 24, 2016

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U.S. DEPARTMENT OF ENERGY

NNSA

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Background

- Welcome to the 6th PVPMC Workshop!
- Aim is to bring together international experts on PV performance modeling and monitoring to discuss new trends and present research results to the community.
  - Focus on technical issues. Information transfer between researchers and industry
  - Support discussion, networking, and partnerships
  - Identify gaps and opportunities for improving models (and technology)

Previous and Future Workshops

1.	2010	Albuquerque, NM
2.	2013	Santa Clara, CA
3.	2014	Santa Clara, CA
4.	2015	Cologne, Germany
5.	2016	Santa Clara, CA
6.	**2016**	**Freiburg, Germany**
7.	*2017 (30 Mar)*	*Lugano, Switzerland (Module model focus)*
8.	*2017*	*USA (TBD)*

Feedback Results from 5th Workshop

We tried an online feedback form and only got 25 responses out of ~160 attendees.

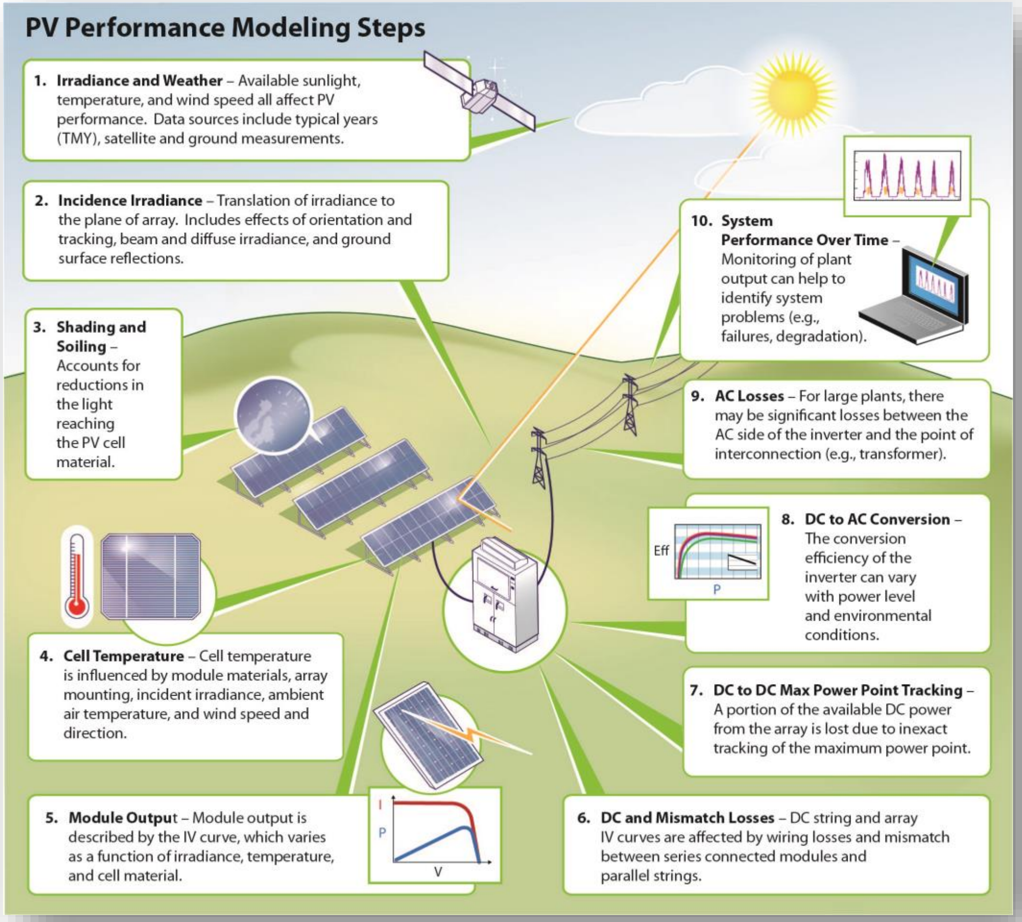
- Many attendees from previous workshops return
- How do attendees use PV models?
  - Yield estimates for projects (68%)
  - Research (44%)
  - Monitoring (36%)
  - Design (24%)
  - Education (16%)

- Which models do you use?
  - PVsyst (64%)
  - SAM (52%)
  - PVLIB Matlab (36%)
  - PVLIB Python (28%)
  - Helioscope (24%)
  - PVWatts (20%)

PV Performance Modeling and Monitoring Landscape

PV performance is modeled by following the flow of energy from the sun to the meter.

- Each step in the journey is represented with a model.
- Comparison of monitoring data to model predictions helps to detect failures and degradation
- The PVPMC aims to document and improve these models so that best practices are available and used by the solar PV industry.



Stein, J. S. and B. H. King (2013). Modeling for PV plant optimization. *Photovoltaics International, Solar Media Ltd.* ***19th: 101-109.***

Topics for this workshop

1. Solar Resource Data and Uncertainty
   - Instrumentation and standards
   - Uncertainty methods
   - Temporal characteristics
2. Forecasting for PV Grid Integration
   - Time scales
   - Uncertainties
   - Value of PV forecasts for grid integration
3. Modeling Tool Updates
   - Insel, PlantPredict, PVsyst, Helioscope, and SAM
4. Field Monitoring and Model Validation
   - Degradation studies
   - Shading studies
5. BIPV and Bifacial PV Modeling
   - New technologies are challenging many of the assumptions in current PV performance models.
6. PV Performance Characteristics
   - Soiling
   - Predicting mismatch
   - Model parameter estimation

Protocols

- Speakers
  - Time limits will be enforced!
  - Ensure presentations are uploaded well before your scheduled session.
  - We would like to be able to post/share presentation materials after the workshop. If there are restrictions, please notify organizers.
- Audience
  - Silence cell phones
  - Return from breaks on time
  - Ask questions
  - Participate in discussion sessions
  - Meet colleagues and network during breaks

Thank You and Enjoy the Workshop!

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