10th PV Performance Modeling and Monitoring Workshop Highlights

The 10th workshop was held in Albuquerque, NM May 1-2, 2018 at the Hotel Albuquerque in the heart of the historic Old Town. It was part of the 2018 PV Systems Symposium, which also included sessions and tutorials on grid integration issues. Presentations from industry experts covered a broad range of topics related to:

- PV performance modeling and monitoring (https://pvpmc.sandia.gov/resources-and-events/events/2018-10th-pv-performance-modeling-workshop/) and
- Grid integration (https://pvpmc.sandia.gov/resources-and-events/events/2018-pv-systems-symposium-grid-integration-track/).

Below are some of the highlights from each of the technical sessions.

Session 1: PV Measurements and Standards

- Dean Levi from NREL presented significant improvements made recently to reduce the uncertainties in module power rating at NREL. The Module Self-Reference (MSR) procedure combines three different testbeds to reduce the uncertainty in Pmp to +/- 1.14% at the 95th percentile.
- Kyumin Lee of CFV Solar Test laboratory presented a compelling case for why using datasheet values for constructing PAN files for PVsyst is not a good idea. Instead, lab measurements from modules sampled from the production batch provide a much more accurate result. Datasheet values are NOT production averages. They are prepared for certification BEFORE large-scale production starts.

Session 2: Solar Resource Assessment for PV

- Kees van den Bos from Hukseflux shared the latest developments in solar irradiance measurement devices.
- Patrick Keelin (CPR) and Julie Chard (GroundWork) presented results and methods for tuning satellite based data with ground-based irradiance measurements to reduce the uncertainty. For GHI, they showed uncertainty reduction from 5% to 3.2% after tuning.
- Manajit Sengupta of NREL provided information about the Version 3 of the NSRDB (1998-2016).

Session 3: Improving PV Performance

- Marios Theristis from the University of Cyprus showed a functioning system that is capable of detecting and classifying certain common PV faults and failures. They found that a Support Vector Machine algorithm worked best among the methods they tried.
- Jaewon Oh from Arizona State University showed how thermally conductive backsheets can reduce module operating temperatures and increase yields.

Session 4: PV Performance Models

- Ben Bourne of SunPower gave a 10-year retrospective on the state of the art in PV performance modeling.
- Bruno Wittmer provided a preview of new capabilities in PVsyst to model bifacial on single axis trackers.
- Peter Johnson provided an interesting analysis of how well to preconstruction yield estimates compare with measured performance at over 40 different plants. They showed that their initial estimates matched very well (within 0.3%) with measured performance (Standard deviation of 2.1% illustrates that there are still many site and system specific factors influencing this comparison.

Session 5: Open Source Tools for PV Modeling and Monitoring

- Dana Olson from DOE gave a pitch in support of open source modeling tool development.
- A number of open source tools were presented and then a moderated group discussion was held.