6th PV Performance Modeling Workshop Highlights

There were a number of exciting modeling results announced at this workshop. Below is a summary of a few of these. All the great presentations can be downloaded here: https://pvpmc.sandia.gov/resources-and-events/events/2016-6th-pv-performance-modeling-workshop/

Session 1. Solar Resource Data and Uncertainty

- Marcel Suri of SolarGIS presented a new way of illustrating uncertainties in PV performance modeling, namely on a map. This spatial uncertainty arises from a number of factors including: clouds, aerosol optical depth, total water vapor, snow coverage, terrain variability, distance to water bodies, anthropogenic pollution, and satellite pixel distortion. Their resulting uncertainty map shows that uncertainty magnitudes range from a background error of 3% to regionally specific values as high as 8%. One bit of good news is that most of the areas with lower uncertainties correspond to regions with high yield potentials. Check out their methodology and maps (http://www.slideshare.net/sandiaecis/uncertainty-of-the-solargis-solar-radiation-database)
- Jan Remund of Meteotest presented a new model for downscaling hourly irradiance data and transforming it into simulated 1-minute data. Such data is useful for evaluating ramp rates from PV plants and planning for the integration of energy storage. Check out his presentation here: http://www.slideshare.net/sandiaecis/generation-of-one-minute-data

Session 2: Forecasting for PV Integration

- Richard Perez of ASRC presented a methodology of assessing the value of increasing the accuracy PV forecasts by quantifying the cost of making the PV system capable of delivering the forecasted output by using a combination of curtailment, storage, load shaping, and geographic dispersion. Check out his presentation here: http://www.slideshare.net/sandiaecis/producing-a-perfect-pv-fleet-forecast-at-what-cost

Session 3: PV Modeling Applications: Modeling Tool Updates

This session included a number of updates on PV performance modeling software packages including PVsyst, PlantPredict, Helioscope, and NREL's System Advisor Model. A highlight was PVsyst's new model for simulating the performance of bifacial PV systems.

Session 4: Field Monitoring and Model Validation

- Karel DeBrabandere of 3E presented a study on how well long term yield assessments done on over 40 PV plants performed prior to the building and financing of the plant compare to actual measured yields. He found that actual performance generally agreed with initial estimates within +/- 5% to +/- 10%. These uncertainties are reduced significantly by considering a large portfolio of plants. A major source of uncertainty comes from plant unavailability due to unplanned outages and grid curtailment. This uncertainty is of the same magnitude as uncertainty in solar resource. Check out his presentation here:

http://www.slideshare.net/sandiaecis/validation-of-longterm-yield-estimates-and-their-level-of-confidence

Session 5: Advanced Modeling: Ray-Tracing to Address Bifacial PV Arrays and Shade

- Matthieu Chiodetti from EDF R&D presented new modeling results on using ray tracing methods for simulating bifacial PV performance at a number of spatial scales. They found that the presence of a frame on bifacial modules significantly reduces the power output due to uneven irradiance on the back side of the module. Check out his presentation here: http://www.slideshare.net/sandiaecis/enhanging-bifacial-pv-modeling-with-raytracing

Session 6: PV Performance Characteristics

- Bruce King from Sandia National Laboratories presented a new, simpler method for calibrating the Sandia PV Array Performance Model that reduces the number of outdoor tests that have to be performed. Check out his presentation here: https://pvpmc.sandia.gov/download/5427/