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Benjamin K. Tsai
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Introduction

The solar energy industry has been growing at a rate of 20% to 25% per year, and has generated $17.2 billion (US) in revenues in 2007. Production of high quality, reliable, and robust solar energy systems components for the market relies on the same fundamentals: careful measurements and good engineering models. Finding better ways to establish the quantity and quality of solar radiation resources depends upon good measurement technique and solar radiation models. New approaches to capturing, storing, and converting solar radiation into thermal and electrical energy begin with ideas, transition to theoretical models, and result in physical prototypes and finally production devices. Optical performance and properties measurements and models are crucial for advancing solar energy conversion system technologies.

The first two sessions on cells and systems modeling were chaired by Dr. Frank Vignola of the University of Oregon, manager of the university's Solar Monitoring Network. Topics included efficient characterization of photovoltaic cells in the production environment, anti-reflection, low concentration photovoltaics, nanostructured, dispersed, and composite selective coatings, quantum dot concentrators, and automatic parabolic concentrator focus control.

The two sessions on solar resource modeling and measurements were chaired by Dr. Christian Gueymard of Solar Consulting Services, internationally recognized author and solar modeling expert. Topics included infrared, spectral, and geometrical corrections in solar radiometry, fusion of ground and satellite estimates of solar radiation, optimal energy collection geometries, solar resource models for tilted surfaces, solar activity and atmospheric aerosols influences on solar resources, and solar resources over complex terrain.

Poster presentations and papers reporting on the measurement of the spectral content of flash solar simulators, laser based heliostat deflectometry, diffuse radiation over complex terrain, optimizing solar collection, and indoor characterization of photovoltaic modules rounded out the conference.

We thank the participants, the conference organizing committee, and the institutions sponsoring them, for the contributions resulting in an exceptional conference. The authors and program committee members represent the commitment of themselves and their respective institutions to building an economically stable future for our descendants, one new measurement, one new component, or one new model at a time.

Benjamin K. Tsai
Daryl R. Myers