UC San Diego
UC San Diego News Center

September 26, 2012 | By Ioana Patringenaru

New and Improved Solar Variability Model in High Demand

ego researchers have improved a software tool that ate fluctuation in the solar grid caused by changes in cover.

Engineers at the University of California, San Diego, have released a new, more accurate version of a software program that allows power grid managers and solar power plant developers to easily model fluctuations in solar power output caused by changes in the cloud cover. The program uses a solar variability law discovered by graduate student Matthew Lave, in the lab of Jan Kleissl, a professor at the Jacobs School of Engineering at UC San Diego.

The new version of the software only needs data from one sensor on the ground, rather than a network of sensors. The improvement was made possible by taking into account cloud speed data extracted from National Oceanic and Atmospheric Administration models. The development will make the software more useful to solar power plant developers, who are likely to have access to just one ground sensor, rather than a network.

The new software is currently in high demand from developers who are working to meet a new requirement set by the Puerto Rico Power Electric Power Authority. The agency wants any new utility-scale power plant operator to commit to limiting changes in power output to 10 percent per minute – a tall order for photovoltaic power plants where a single panel could fluctuate by more than 70 percent per second.

Because of the demand, Kleissl's team has partnered with Eric Harmsen, a professor at the University of Puerto Rico's Mayaguez campus and member of the NOAA CREST Research Group to set up a solar sensor called a pyranometer and collect local data for the model. Kleissl's team had been using data collected on Oahu to approximate conditions in Puerto Rico.

UC San Diego is offering to run the model for free for developers if information on plant layout and solar radiation data is provided. Licensing agreements are sought to transition the software to a commercial offering. The model was originally published in 2011 and recently validated at Sempra Generation's 48 MW PV plant in Nevada.

The research was funded by the Department of Energy under the American Recovery and Reinvestment Act.
