

Solar PV Performance in Harsh Climates: Dust and Soiling Mitigation Research



A joint India-U.S. research consortium funded under the *Joint Clean Energy Research & Development Center (JCERDC)*

Scientific Achievement:

A unique solar PV module soiling test station was developed and is being deployed to collect and analyze dust samples, test commercially developed PV module coatings, and develop and evaluate new coatings based on nanotechnology approaches.

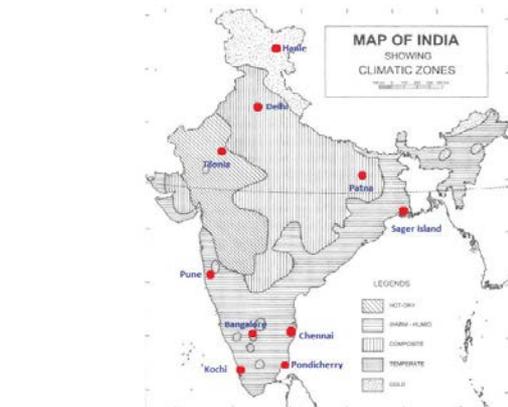
Significance and Impact:

Both India and the U.S. are deploying solar PV modules/coupons in representative environments with severe dust and soiling issues. Dust mitigation is a priority with immense benefit to both the Nehru Solar Mission and the SunShot Initiative.

Research Details:

- ASU and IITB have developed a special apparatus for monitoring dust accumulation on test PV coupons as a function of tilt angle.
- ASU has provided 24 and will provide additional 50 PV coupons for deployment by IITB at selected sites of Mumbai (IITB), Bangalore (IISc), Delhi (SEC), Chennai (IIT Madras), and sites in Gujarat and Rajasthan.
- Initial deployment at ASU and IIT-Bombay; will be positioned at other India sites (identified through the SERIUS Reliability Project). NREL is providing coupons coated with commercial and research dust mitigating films. IITB and SEC have collected the soil samples from PV systems covering 5 climatic zones in India for physical, chemical, and morphological analysis by NREL, IISc, and IIT-B.
- IISc team has been designing and fabricating various testing manifolds for dust characterization.

Publication(s): L.L. Kazmerski, "Dust in the Rajasthan Thar Desert: A Potential Showstopper for Solar Deployment," IEEE PVSC, Tampa, FL, June 16, 2013.



The sites (covering different climatic conditions) in India that the team from IIT B visited to collect dust samples and will serve as testing sites.



The apparatus that ASU and IITB developed for monitoring dust accumulation on test PV coupons as a function of tilt angle

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