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A New PV Module Reliability Laboratory In Qatar: First Results Of Outdoor Exposure

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Abstract

Short introductive summary:
Local hot and dusty environmental conditions in Qatar may seriously handicap the power yield and even the life span of PV modules.
Qatar Foundation, GreenGulf and Chevron partnered in 2010 to establish the Solar Test Facility. Its purpose is to determine which solar technologies are most suited to Qatar, by measuring their energy production and response to heat and dust.
The 35,000 m2 site was installed with crystalline silicon, thin film and concentrating PV technologies from multiple manufacturers.
This site was commissioned in December 2012, and data has been recorded since March 2013.
Preliminary results about the effect of soiling on power output of c-Si modules are presented in this work.
Purpose of the work
Local hot and dusty environmental conditions in Qatar may seriously handicap the power yield and even the life span of PV modules.
QEERI is a new R&D institute, holding from Qatar Foundation, engaged in the boosting the deployment of renewable energy technologies in Qatar through research activities on the adaptation of solar equipment to the local conditions.
Accelerated aging techniques, both indoor and outdoor, allow obtaining results in reasonably short testing periods for both:
* Degradation of existing PV panel products
* Validation of new solutions
This works is intended to present first results of PV module outdoor performance under local weather conditions in Qatar.
Approach
1. Collect field data about most relevant environmental factors with an influence on PV module degradation:
* UV spectrum within solar radiation on ground
* Dust composition and deposition rate
* Other chemicals in the atmosphere, aerosols, salinity....
* Meteorological variables: temperature, relative humidity.
2. Design and implement engineering solutions to prevent PV modules performance and lifespan to be handicapped in hot climates as Qatar's one.
3. Set-up indoor and outdoor labs for accelerated aging and performance testing of PV modules, in addition to existing ones from the local company 'GreenGulf'.
4. Commercialize solutions through Qatar Foundation's dedicated mechanisms
Scientific innovation and relevance