NCPRE NEWS

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A Project of the Ministry of New and Renewable Energy at IIT Bombay

NCPRE Module Reliability Group

NCPRE Module Reliability Group has been conducting 'All India Survey of PV Modules' since 2013. This is aimed to assess the performance of PV modules in different climatic zones across India. This year's survey was done in two phases. The first phase was carried out from March to May 2018 where the survey team performed the field inspections in different parts of India covering diverse climatic zones except the cold zone. The survey team traveled nearly a distance of 14,000 km in order to assess the performance of nearly 37 sites and 1200 modules, which included different technologies like multi crystalline, mono crystalline, thin film, HIT, and IBC. The majority of sites were large scale power plants. In this survey, different types of installations like ground mounted, roof mounted and floating PV power plants were included. The team performed various tests on fielded modules which included I-V (Measurement of Current and Voltage), Infrared Imaging (to detect any hotspots and module operating temperatures), EL Imaging (Electroluminescence to detect dead cells and cell cracks), Insulation Resistance test, and detail Visual Inspection for visible degradation of any module components on all selected modules. The second phase of All India Survey of PV Module Reliability 2018 was conducted from 11th September to 20th September, in Leh and Hanle of Jammu Kashmir to cover the cold and sunny climatic region of India. Analysis of the data is now in progress. The survey was done jointly by NCPRE at IIT Bombay and National Institute of Solar Energy (NISE), Gurgaon, Haryana.

File photo of survey team during flag-off ceremony at IIT Bombay

File photo of survey team during survey

Dynamic Mechanical Load (DML) Testing System

NCPRE has developed a unique 'Dynamic Mechanical Loading' (DML) Testing System in-house. With the DML system, PV modules can be put through a series of pre-programmed mechanical stresses for variable durations, while also simultaneously measuring several other parameters. This was designed, developed and built by our students. The need for this kind of a tool became evident as we observed during our survey, that cracks in the silicon solar cells were a major cause of module degradation in India. This equipment will enable us to systematically study the genesis and propagation of cracks and micro-cracks in PV modules. The DML system developed at NCPRE is one of the most sophisticated tool of this kind available anywhere. Prof. Khakhar (Director, IIT Bombay) inaugurated the DML System on May 09, 2018.

DML System inauguration event at NCPRE Module Lab, IIT Bombay

Participation in International PV Workshops and Conferences

NCPRE researchers participated in leading International photovoltaic workshops and conferences throughout the year. Oral presentations and posters were showcased at the 7th World Conference on Photovoltaic Energy Conversion (WCPEC-7) / 45th IEEE Photovoltaic Specialists Conference, held in Waikoloa, Hawaii, USA in June, 2018. Prof. Vasi delivered a keynote talk on "Global Co-operation in Photovoltaic through the International Solar Alliance" in plenary opening session. Other oral presentations by NCPRE Module Group were "On-Site Electroluminescence Study of Field-Aged PV Modules" by Rajiv Dubey, "Revising the Bypass Diode Test to Incorporate the Effects of Photovoltaic Module Mounting Configuration and Climate of Deployment" by Prof. Shiradkar, and "Mitigation of Soiling by Vertical Mounting of Bifacial Modules" by Sonali Bhaduri.

NCPRE-DuPont Joint Survey for Backsheet Degradation Study

NCPRE Module Reliability Group carried out a joint research study with DuPont to analyze performance of modules with different types of backsheets under different field conditions. Several backsheet materials are used for making PV modules. Performance of field modules has not been very well understood in relation to the component materials used in making them. DuPont with the help of NCPRE would like to study the correlation between backsheet degradation and power loss. As a pilot for this study, NCPRE and DuPont jointly carried out in-field inspection of a few selective sites. NCPRE team carried out I-V measurements, IR Imaging and Visual Inspection of randomly selected PV modules.

File photo for NCPRE – DuPont joint survey for backsheet degradation study

PV Power Plant affected by Flood

This year's floods in Kerala caused huge damage to the solar powered airport in Kochi. NCPRE team visited the Cochin International Airport PV power plant to inspect the post flood status and performance of PV modules. NCPRE students and staff conducted this survey from December 5th -9th. The team carried out I-V measurement, EL imaging, IR Imaging and visual inspection of selected modules from the ground mounted plant, canal top installations. Currently, the team is analyzing the data.

File photo of site for Dec 2018 survey at Cochin International Airport PV power plant