Performance and Electroluminescence Analysis on Reliability and Lifetime of Thin-Film Photovoltaics

Publieke samenvatting / Public summary

Aanleiding

Effective verification of the expected lifetime and performance quality of delivered PV modules prior to installation is often crucial. However, for thin film modules, pre-installment testing does not result in a useful lifetime estimation, as the current knowledge level is too limited for a reliable interpretation.

Doelstelling

The goal of this project is to reduce the cost of electricity from thin film PV plants, by reliably predicting the failure mechanisms in thin film (in particular CIGS) modules, thereby increasing the long term plant operating yield, reducing O&M costs, improving accuracy of investment models, and increasing the bankability of thin film PV projects.

Korte omschrijving

In order to predict the longer term performance of thin film PV modules, the ERANET PEARL TF-PV project aims to improve pre-installation tests and their interpretation. The electrical performance and electroluminescence images of over 1000 thin film modules will be determined before and during operation (Solar Tester, KiesZon, PI Berlin and EigenEnergie). Statistical analysis will allow translation of observed module defects into measurable quality indicators relevant to the market (FZJ, Straightforward). Moreover, controlled damaging of cells and modules will be performed, in order to analyse the influence of specific failure modes on the electrical and material properties and

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Algemene informatie / General information

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luminescence images (TNO, TU Delft, HZB, Crystalsol, PI Berlin). An analogue route will be followed for field degraded modules (TNO, PI Berlin), while standards for preconditioning will also be defined (AIT) to improve correlation of laboratory test results with in-field performance. The project will focus on CIGS, CdTe and CZTS, while in the Dutch consortium, the main focus will lay on CIGS PV.

Resultaat

This project will result in: 1. Publication of a comprehensive catalogue of electroluminescence images of thin film module failure mechanisms; 2. Improved standardised tests and technology-specific preconditioning methods: validated by comparison of in-field and nameplate data; 3. Development of a fast, imaging-based system for quality rating of field installed thin film modules.

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in samenwerking met de Topsector Energie ontsloten.
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