

Customized Smart Mismatch-Tolerant Module

Publieke samenvatting / Public summary

Aanleiding

Varying irradiation conditions across photovoltaic (PV) modules may lead to nonlinear power losses due to the interconnection topology of solar cells within modules. This mismatch may lead to highly localized power dissipation (hotspot), and local heating which can cause irreversible damage to the module.

Doelstelling

- To develop a smart module that considerably mitigates mismatch effects, including partial shading and temperature differences for different cells.
- To perform hot spot detection and design hotspot protection.
- To design and develop integrated electronic circuitry for a unique smart module.
- To perform financial analysis for large-scale manufacturing.

Korte omschrijving

We propose the development of a smart module that is mismatch resilient, and which is equipped with a multi-objective algorithm to both maximize the harvested energy and fulfill the DC bus requirements. Moreover, UU will investigate hot spot phenomena by both IR thermography and we will propose a novel hot spot detection method. After analysis, an active hot spot protection method will be proposed to protect the module in real time via I-V curve analysis. Kameleon Solar will prepare customized smart modules with dedicated design electronic circuits developed with Heliox and UU that are expected to prolong the lifetime of the module and therefore will generate more energy than a comparable non-smart module. This will be

Projectinformatie / Project information

Projectnummer / Project number

TKITOE1721102

Subsidiebedrag / Grant amount

€ 90.000,00

Algemene informatie / General information

Penvoerder / Secretariat

UU

Publicaties en materialen / Publications and attachments

- 01.06.2023

Publieke eindrapportage CSMTM 1721102

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tested outdoors by UU. Also, all partners will perform a rigorous analysis of cost-efficient manufacturing to prepare the module for the market and mass production.

Resultaat

The project will deliver a technically unique and financially go-to-market, prototype module expected to perform efficiently under different mismatch conditions and not to show hot spots. The final product should be equipped with a customized electronics circuit with minimum heat generation and the highest possible efficiency and energy rating.

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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