Inherent High-Yield PV Element

Publieke samenvatting / Public summary

Aanleiding

PV systems have a significantly lower output under partial shading conditions. A shadow of 1% on a module can drop its output by 30%. This hampers application in the built environment, where shade is often present. The current state-of-the-art to tackle this problem is either by adding electronics to the system, or by re-designing the module to make it less sensitive to shade. The first solution has led to significantly better output under shading conditions, but still needs to prove itself in terms of costs. Adaptation of the module design has led to increased manufacturing complexity or reliability issues.

Doelstelling

To develop a PV module which shows linear response under shading conditions, without adding manufacturing complexity. The module has low current and higher voltage, and can be combined with a lean micro-inverter and thinner cables. The aim is to demonstrate the manufacturing feasibility, and the feasibility of such a PV laminate on the LCOE level (<1€/Wp on system level leading to <0.14 €/kWh at the end of the project).

Korte omschrijving

The consortium will use the existing back contact technology of ECN and Eurotron. By cutting the back contact cell in smaller pieces, the current will be reduced and the voltage increased. The same manufacturing equipment as for standard back contact modules can be used, with a small adaptation to the manufacturing line. Hence, the modules can be manufactured without adding

Projectinformatie / Project information

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Algemene informatie / General information

Penvoerder / Secretariat
ECN

Publicaties en materialen / Publications and attachments

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manufacturing complexity. The linear shading response is achieved by the electrical interconnection of the cells. The exact design will be optimized in this project. Because of the different PV module output (low current and high voltage), a dedicated inverter is required. The inverter topology can be much simpler than a standard one, as only small currents need to be dealt with and no voltage boost is required. Heliox will design and manufacture the inverters. ECN will set-up a yield- and cost model. Stafier will place a system of 6 modules on a test roof and determine the output under controlled shading conditions, which will be used to verify the yield and cost model.

Resultaat

A Module design for PV laminate and design for lean micro-inverter B Yield prediction model for the new PV element, under various shading conditions C 10 PV element prototypes, including micro-inverter D Cost of ownership model to demonstrate LCOE E Monitoring and yield verification for module+micro-inverter and for a system of 6 modules+micro-inverters, under controlled shading conditions

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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