

Power management for 4T tandems (Power4T)

Publieke samenvatting / Public summary

Aanleiding

Low-cost very high-efficiency tandem PV has become an industrial prospect thanks especially to progress in perovskite solar cell technology. 4-terminal (4T) tandem PV is based on combining mainstream crystalline silicon and mainstream perovskite cell technologies. However, 4T tandem PV involves new module electrical design and new power electronics designs.

Doelstelling

The goal of the project is a thorough feasibility and performance assessment of possible 4T tandem electrical module designs with an efficient 2-terminal module output, including the required module level power electronics (MLPE). Practical tandem PV can strongly support the TKI UE objective of high energy yield per m².

Korte omschrijving

The project will analyze, by modeling, modules with internal 4-terminal tandem cell structure combined into a 2-terminal module output. MLPE will combine the cell strings into one output. TNO and Taylor will together do an inventory and selection of the many design options, the selection based on initial estimates regarding manufacturability, cost, performance, and market segment. Experimental analysis will be done to establish model parameters, in particular by TNO regarding effects of partial shading on perovskite cell-strings. TNO will provide the model and boundary conditions for the cell strings and module layout, while Taylor will provide assessment and designs of appropriate MLPE circuits, and provide the model for MLPE

Projectinformatie / Project information

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Subsidiebedrag / Grant amount

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Algemene informatie / General information

Penvoerder / Secretariat

TNO

Publicaties en materialen / Publications and attachments

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Eindrapportage Power4T

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performance. TNO will then model expected annual energy yield as well as shade tolerance. These results will be combined with analysis of cost and manufacturability to give an overall assessment.

Resultaat

Test results, model analysis, and overall assessments will be reported. The best choices for module designs for 4T tandem technology will be described, including the role of MLPE, the option of bifaciality, and cost/performance trade-offs. The results will clarify the role 4T tandem technology can play in the PV market.

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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