Development of high-efficiency metal wrap-through silicon heterojunction PVPV modules

Publieke samenvatting / Public summary

Aanleiding

c-Si heterojunction (SHJ) solar cells have demonstrated record efficiencies. However, SHJ is not compatible with traditional module technology and has high metallisation cost due to low conductivity of the necessary silver paste. This has slowed down the introduction of HJ in the market. Back-contact foil technology (BCF) is the most efficient and elegant solution for interconnection, especially suited for the needs of SHJ. Recently, back contacted foil technology has made headways into the market improving on bankability and costs. Products are available on the Dutch market and new production companies have started with Exasun, based in the Netherlands, Silfab in Canada, and Asian products through several whole salers. TNO successfully developed the combination of the best of these two technologies: the WHOOPER module which combine SHJ with Metal Wrap Thorough (also known as MWT-SHJ). Record efficiency of over 23% have been achieved with the whooper cells and recently half-fabricate from a pilot line have been finalized into cells at TNO.

Doelstelling

The goal of the Whooper project is the final development needed to combine the best of both industrial technologies, SHJ and MWT. Both lead to higher efficiencies and to improved manufacturability of highest efficiency cells and modules. With the combined technologies, an ultra-high efficiency mass manufacturable solar energy technology will become available, reducing overall

Projectinformatie / Project information

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Algemene informatie / General information

Penvoerder / Secretariat
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Publicaties en materialen / Publications and attachments

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kWh costs and opening up more difficult markets with these high efficiencies.

Korte omschrijving

The back-contact cell process, developed and patented by TNO, will be optimised for pilot production line at CIE. Several cell runs will be made to optimize the production process and make a final production line design for implementation after the project. This is essential to manufacture sufficient amount of cells to demonstrate the reliability and bankability of the technology. Eurotron and TNO will optimize the solar panel production process for the heterojunction solar cells made in pilot production by CIE and finalized by TNO with TNO technology. Eurotron will produce solar panels on an automated line and the production process and bill of materials will be evaluated. The produced modules are needed to carry out accelerated and reliability test according to IEC standards to qualify for sales and bankability. Furthermore, a PV system will be built by GroenLeven and installed at the Solar Innovation and Experience Center including the produced modules and TNO will assess the outdoor performance of the Whooper modules. Furthermore, all partners will analyse the costs and benefits of Whooper modules for small scale as well as for commercial scale.

Resultaat

The project will result in an integrated cell and module architecture leading to a 350 Wp module power. This will include a complete bill of materials. The technology will have proven reliability and proven industrialisation up to TRL 7. Overall, the result will lead to an 8% higher power and a reduction in levelized cost of electricity compared to the SDE+ calculation by 5% due to a 3% increase in module production costs in moving from PERC to WHOOPER 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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