

## PEarl

### PERC meets self-aligned selective emitter technologies based on inkjet printing and silver less plating

*Project duration: from 01.2018 to 09.2020*

*Report submitted: 03.2021*

#### **Publishable Summary**

The project focus was set on the exploitation of selective emitter's potential in passivated emitter and rear contact (PERC) silicon solar cells. Compared to PERC solar cells with a homogeneous emitter, those with selective emitter predict a significant increase in conversion efficiency of at least 1.0% absolute and, in consequence, would significantly increase the yield of PV systems, decrease the levelized cost of electricity, and the total cost of ownership. Therefore, Fraunhofer ISE, Meyer Burger, RENA, and Sun Chemical mixed together their complementary competences in the fields of solar cell processing, machine engineering, and material synthesis in order to develop self-aligned process techniques based on the steadily advancing inkjet and plating technology, whereby low Ag consumption has been in focus.

Within PEarl, the Technology Readiness Level (TRL) of PERC solar cells with selective emitter (at Fraunhofer ISE) could be increased from 4 up to 6. Based on specific PEarl processes and materials, especially mask&etch, solar cells with efficiencies of up to 21.7% could be processed in the industrially relevant pilot-lines of Fraunhofer ISE. Moreover, the utilization of innovative inks and machine setups led to a decrease in alignment accuracy inkjet/screen-printing of below  $\pm 20$   $\mu\text{m}$ . The principal feasibility of the revolutionary self-aligned process technique based on mask&etch, lift-off and plating could be evaluated. Upcoming research will focus an efficiency gain of 0.4%abs. compared to PERC with homogeneous emitter to reach significant competitiveness.

## Project consortium

Coordinator and all contact details:

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Participating countries and financing:

Country	Number of organisations involved	Project costs in EUR	Public funding in EUR
Germany	1*	518'980	415'132
United Kingdom	1	140'000	70'000
The Netherlands	1	208'679	104'340
<i>Total</i>		<i>867'659</i>	<i>589'472</i>

\* plus one project partner participating with own resources

## Funding agencies involved and contracts

Funding Agency	Contract N° and Title
PtJ	020ESOLARERANET5-25
Innovate UK	File Ref.: 620138
RVO	TESOL17005

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