

## RHINO

### Realization of High efficiency Industrial N-type solar cells

*Project duration: from 01.2018 to 12.2020*

*Report submitted: 07.2018*

#### Publishable Summary

This project targets the development of an industrially feasible manufacturing approach for an n-type cell structure that has demonstrated above 25% efficiency in a cleanroom environment. Key elements of the cell structure are a selective boron-doped emitter and a full area passivated rear contact. For these key elements, production capable processes and high throughput production tools will be developed and implemented in a lean solar cell production process. Reducing the front carrier recombination losses by the selective emitter structure will increase the efficiency of the developed industrial solar cell from currently ~21% to values approaching 23% with open circuit voltages close to 700 mV while using screen printed metallization and established production equipment. Test modules fabricated from these bifacial cells will demonstrate high bifaciality factors of 90%, outperforming current passivated emitter and rear (PERC) modules in terms of efficiency and bifacial properties. Modeling of bifacial module operation will enable a reliable prediction of energy yields depending on system configuration and ambient conditions. This will also increase the energy harvest and thus will help to further reduce the levelized costs of PV electricity and system turn-key costs (by reduced BOS) in Europe.

#### 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	2	1'499'607	1'019'361
The Netherlands	1	647'000	323'500
France	1	171'000	76'950
<i>Total</i>	<i>4</i>	<i>2'317'607</i>	<i>1'419'811</i>

**Funding agencies involved and contracts**

<b>Funding Agency</b>	<b>Contract N° and Title</b>
PTJ	0324224A und 0324224B
RVO	TESOL17007
ADEME	1805C0014