EUROPEAN COMMISSION

HORIZON 2020 PROGRAMME
TOPIC H2020-LC-SC3-2019-RES-IA-CSA
Increase the competitiveness of the EU PV manufacturing industry

GA No. 857793

High-performance low-cost modules with excellent environmental profiles for a competitive EU PV manufacturing industry

HighLite- Deliverable report

D3.1- Production of sufficient cell precursors by month 12.

Disclaimer/ Acknowledgment

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 857793. The information and views set out in this publication does not necessarily reflect the official opinion of the European Commission. Neither the European Union institutions and bodies nor any person acting on their behalf, may be held responsible for the use which may be made of the information contained therein.

About HighLite

The HighLite project aims to substantially improve the competitiveness of the EU PV manufacturing industry by developing knowledge-based manufacturing solutions for high-performance low-cost modules with excellent environmental profiles (low CO_2 footprint, enhanced durability, improved recyclability). In HighLite, a unique consortium of experienced industrial actors and leading institutes will work collectively to develop, optimize, and bring to high technology readiness levels (TRL 6-7) innovative solutions at both cell and module levels.

HighLite consortium members

Document information

Deliverable No.	HighLite D3.1
Related WP	WP3
Deliverable Title	Production of sufficient cell precursors by month 12.
Deliverable Date	30 – 09 - 2020
Deliverable Type[i]	Demonstrator
Lead Author	Povilas Lukinskas (Valoe Cells, formerly SEG)
Co-Author(s)	Florian Buchholz (ISC), Samuel Harrison (CEA-INES)

Document history

Date	Revision	Prepared by	Approved by	Description
28/09/2020	1	Task Leader	WP leader	First draft
30/09/2020	2	WP Leader	Coordinator	Final

Dissemination level[ii]

PU	**Public**	X
CO	**Confidential, only for members of the consortium (including the Commission Services)**	

Publishable summary

Deliverable D3.1 is related to and is a part of task T3.1. The objective of this task is to produce sufficient quantities of cell precursors needed for the development of cells and modules in other tasks and work packages.

Valoe Cells (formerly SEG), in cooperation with ISC, was responsible for the production of large area IBC cells in its pilot line starting with patterning and screen-printing layouts optimized for assembly of ½ cut-cells. Due to the change of ownership and several unforeseen circumstances (Covid19, etc.) the upgrade of IBC cell production line at Valoe Cells factory was delayed. According to the original mitigation plan, ISC Konstanz has manufactured ZEBRA IBC solar cells in its pilot line as a stop-gap solution. Total of 8 runs of 144 wafers each were produced. For that the baseline ZEBRA process was used. The cells were processed in industry compatible process equipment, however without automation. Typical efficiency of produced cells was 22.4-23.0% with the best cell measuring at 23.18%. As further mitigation effort, ISC has acquired 2500 IBC solar cells and precursors (non-metallized cells) from a third party. Total amount of IBC cells, that were made available to partners (3677), was significantly higher than was actually requested by the partners in the first 12 months of the project. Currently, only 1989 IBC cells have been requested and shipped to partners whereas more than 1500 cells are still unclaimed. This number is significantly lower than was originally anticipated (5000), mostly due to the 3-4 months delay in T4.2 (Development of advanced equipment for assembly of IBC cut-cells), which was planned to be the main beneficiary of cells in M1-M12. The delay in T4.2 is not expected to impact the rest of the project implementation.

CEA-INES produced SHJ cells with a metallization pattern dedicated to shingle assembly (in T4.1). Main volume was dedicated to cell fabrication in shingle configuration (~3000 cells produced in total). Some splits were integrated in these batches, essentially on metallization configuration (interconnection design, different paste tests). Typical efficiency was in 22.2-22.8% range, depending on the metal scheme applied. Best cell produced was measured at 23.5%. Besides the specific shingle needs, alternative cell configurations were also manufactured, especially for the cut step optimization and edge repassivation trials (tasks 3.2). Cells with only partial or adapted process configuration (active layers only, TCO only) were also produced for this purpose. Similarly, cells with different metallization patterns (0, 5 or 6 busbars, half-cell or shingle configuration), were produced and exchanged with partners, either for characterization Round-Robin (WP7) or IV tool set-up developments (WP3.5, AMAT IV tool developments). Total of ~3700 SHJ wafers were effectively fabricated for the project and shipped to partners for their development needs in M1-M12. This number is very close to the initial assumptions (~ 4000-wafer need initially estimated), and slight differences can be easily explained by the Covid19 slow-down, and slight discrepancy between estimated and real research activities.