

SHINE PV: Brightening the Future of Europe's Photovoltaic Manufacturing



Sustainable, High-throughput, Industry-ready, Next-generation technology for European manufacturing leadership in PV



SHINE PV Kick-off meeting | Applied Materials Italia, Treviso (IT) | January 13-14, 2025

The transition from fossil fuel energy sources to renewables is crucial in achieving climate neutrality, a goal the EU is committed to reaching by 2050. Photovoltaics (PV) are currently among the cheapest low-carbon energy technologies, yet they account for only 4.5% of total power demand.

This is where SHINE PV comes in. The project is developing disruptive PV manufacturing technologies to enhance solar power capacity and accelerate the shift from fossil-based energy systems to more sustainable, low-carbon solutions. Beyond improving cell efficiency, SHINE PV will create new opportunities for EU manufacturers to strengthen their position in the global PV market.

Over the next four years, this Horizon Europe-funded initiative will establish and demonstrate complete back-end PV manufacturing lines for Silicon Heterojunction (SHJ) and Tunnel Oxide Passivated Contact (TOPCon) cells - two of the most promising solar cell technologies.

“By focusing on optimizing costly steps in PV manufacturing - such as metallization, post-processing, and interconnection- SHINE PV aims to reduce target module costs by up to 10% for SHJ and 8.5% for TOPCon compared to the current Cost of Ownership (CoO).”

Dr. Victor Acinas, Project Coordinator

For metallization, SHINE PV will introduce parallel dispensing and plating as high-volume manufacturing (HVM) alternatives to traditional screen printing, aiming to partially or fully replace silver (Ag) with copper (Cu) - a crucial step toward achieving terawatt-scale production. The project will also improve efficiency through cell post-processing, implementing light soaking in HVM and recovering cutting-induced losses via edge re-passivation.

In the module assembly phase, SHINE PV will innovate interconnection processes by integrating Twill and Shingling techniques using HVM equipment.

These advances, together with optimised metallisation and post-processing steps, will improve electrical performance, aesthetics, reliability and compatibility with premium module designs.

The project aims to increase solar cell (or module) efficiency by 0.5% (absolute) compared to the reference process while reducing CoO by up to 10%, driven by lower material costs and improved equipment productivity. SHINE PV will demonstrate these integrated innovations both virtually and through physical pilot implementations at industrial partner sites, reaching TRL7.

“ Shine PV consortium brings together the key industry expertise in both research and equipment, developing complete solutions for advanced manufacturing including parallel dispensing, plating, edge re-passivation, light soaking, Shingling and Twill interconnect. The partners will demonstrate suitable combinations of such technologies at customer sites to realize the future solar module designs using a unique and fully European supply chain. ”

Dr. Marco Galiazzo, Technical Coordinator

By driving innovation in PV manufacturing, SHINE PV aims to strengthen Europe's position in the global solar industry, paving the way for a more sustainable, energy-independent future.

About SHINE PV **“Sustainable, High-throughput, Industry-ready, Next-generation technology for European manufacturing leadership in PV”**

The project started on January 1st, 2025 and will run for 48 months, coordinated by Applied Materials.

SHINE PV consortium consists of 17 European partners including research organisation, universities, and private companies:

Applied Materials Ireland Limited, Applied Materials Italia srl, CEA - Commissariat à l'Energie Atomique et aux Energies Alternatives, Fraunhofer Gesellschaft zur Forderung der Angewandten Forschung EV, Highline Technology GmbH, IMEC - Interuniversitair Micro-Electronica Centrum, Arkema France SA, PCCL - Polymer Competence Center Leoben GmbH, IPTE Automation OÜ, Soltech, HoloSolis SAS, Univerza v Ljubljani, EnginSoft Spa, Kiwa PI Berlin AG, TNO - Nederlandse Organisatie voor toegepast-natuurwetenschappelijk onderzoek, AMIRES the Business Innovation Management Institute z.ú. and BeDimensional SPA. Additionally, SHINE PV has 6 associated partners: 3SUN s.r.l., CSEM - Centre suisse d'électronique et de microtechnique SA, M10 Industries AG, RENA Technologies GmbH, Plasma Electronic GMBH, Hanwha Q CELLS GmbH.



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