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# **Sustainable Photovoltaics Integration in buildings and Infrastructure for multiple applications**



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## **SPHINX - Deliverable report**

### **D3.6 – Final reliability assessment of SPHINX products**



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<b>0.1</b>	June	WP3 partners	Addition of tests results, data and information
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<b>0.3</b>	27/06/2025	CEA, ETW	Internal review, minor checks and improvements
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## Public Summary

As part of the SPHINX project, three innovative photovoltaic products were developed in collaboration with industrial partners: semi-transparent solar modules by Voltec, solar roof tiles by FreeSuns and lightweight shingle-matrix modules by Heliup. These products are designed to combine aesthetics, performance, and integration flexibility for next-generation solar energy solutions.

To ensure long-term reliability, each product underwent rigorous environmental testing based on international standards. These tests simulate years of exposure to harsh conditions such as heat, humidity and UV radiation, with the goal of limiting power loss to less than 5% after accelerated aging.

The FreeSuns solar tiles performed well, successfully passing all reliability tests. Voltec's semi-transparent modules encountered challenges due to cell cracking during the lamination process, which affected the performance of full-size modules. However, smaller-scale tests confirmed the reliability of the materials used. Heliup's lightweight modules showed promising results in most tests but experienced interconnection issues in the shingle matrix during thermal cycling. Several mitigation strategies are currently being implemented through design improvements to resolve this issue before entering the production phase.

Overall, the SPHINX project has made significant progress in advancing three new PV technologies, with final reliability validations underway and preparations for industrial-scale production ongoing.

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### Project partners:

#	Partner short name	Partner Full Name
1	VOL	VOLTEC SOLAR
2	ETW	ETWAY S.R.L.
3	HLP	HELIUP
4	M10	M10 INDUSTRIES AG
5	UNR	UNIRESEARCH BV
6	Fraunhofer	FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV
7	ICARES	ICARES CONSULTING
7.1	BI	BECQUEREL INSTITUTE FRANCE
8	CEA	COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES
9	FSUNS	Freesuns SA
10	CSEM	CSEM CENTRE SUISSE D'ELECTRONIQUE ET DE MICROTECHNIQUE SA - RECHERCHE ET DEVELOPPEMENT
11	EPFL	ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE
12	SOP	SOPREMA

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