

HORIZON EUROPE PROGRAMME
TOPIC HORIZON-CL5-2023-D3-01-02

GA No. 101136094

Sustainable Photovoltaics Integration in buildings and Infrastructure for multiple applications



SPHINX - Deliverable report

D3.1

Techno-economic analysis for semi-transparent modules



Funded by
the European Union

Deliverable No.	SPHINX D3.1	
Related WP	WP3	
Deliverable Title	Techno-economic analysis for semi-transparent modules	
Deliverable Date	30-04-2024	
Deliverable Type	Report	
Dissemination level	Sensitive (SEN)	
Author(s)	Laurianne Wendling (VOL)	14-02-2024
Checked by	Jacques Levrat	
Reviewed by (if applicable)	Gaétan Carrier (FSUNS)	25-04-2024
	Maria Planells (HLP)	26-04-2024
Approved by	Laurianne Wendling (VOL)	29-04-2024
Status	Final	

Document History

<i>Version</i>	<i>Date</i>	<i>Editing done by</i>	<i>Remarks</i>
<i>V1.0</i>	14-02-2024	VOL	Consolidated draft
<i>V1.1</i>	18-03-2024	VOL	Corrected version
<i>V1.2</i>	26-04-2024	VOL	Corrected Version

Public Summary

The techno-economic analysis presented in this deliverable focuses on semi-transparent modules with the half-cell and shingle technologies developed within the SPHINX project, emphasizing their crucial role in advancing building-integrated photovoltaic (BIPV) technology. The project, linked to Task 3.1, involves the deployment of modules with and without matrix shingle technology under identical conditions on carport structures, facilitating a comprehensive comparison between the two technologies.

A key feature of the semi-transparent modules is the incorporation of advanced coatings and encapsulant layers developed by CSEM, aimed at enhancing module performance by amplifying incident light conversion, bifacial power and mitigating temperature buildup behind the photovoltaic module. Additionally, aesthetic requirements tailored for carport structures, such as seamless integration, tunable transparency, and color customization, are addressed to ensure optimal functionality and visual appeal.

Performance evaluation demonstrates high efficiency and increased bifaciality, showcasing the modules' suitability for practical applications. A thorough cost analysis considers variations in raw material prices and production yields, providing insights into economic viability amidst fluctuating solar cell prices. Furthermore, the assessment of the carbon footprint highlights mitigation measures aimed at reducing overall emissions.

This deliverable contributes to the SPHINX project objectives by supporting the integration and validation of semi-transparent photovoltaic modules in the construction value chain, particularly in carport settings. It also aligns with major project exploitable results by promoting the development of innovative photovoltaic products for integration into various building structures.

Moving forward, recommendations include continued collaboration among project partners, long-term monitoring of module performance, development of market deployment strategies, further R&D to enhance module efficiency and durability, and stakeholder engagement to foster widespread adoption of semi-transparent modules.

To conclude, the insights gained from this deliverable underscore the significance of semi-transparent modules in advancing sustainable building practices and renewable energy solutions, positioning the SPHINX project at the forefront of BIPV technology innovation.

Disclaimer/ Acknowledgment



Copyright ©, all rights reserved. This document or any part thereof may not be made public or disclosed, copied or otherwise reproduced or used in any form or by any means, without prior permission in writing from the SPHINX Consortium. Neither the SPHINX Consortium nor any of its members, their officers, employees or agents shall be liable or responsible, in negligence or otherwise, for any loss, damage or expense whatever sustained by any person as a result of the use, in any manner or form, of any knowledge, information or data contained in this document, or due to any inaccuracy, omission or error therein contained.

All Intellectual Property Rights, know-how and information provided by and/or arising from this document, such as designs, documentation, as well as preparatory material in that regard, is and shall remain the exclusive property of the SPHINX Consortium and any of its members or its licensors. Nothing contained in this document shall give, or shall be construed as giving, any right, title, ownership, interest, license or any other right in or to any IP, know-how and information.

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101136094. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.