TESTARE

NEWSLETTER #3 JUNE 2026

Twinning for excellence in TEsting new generation PV: Long-term STAbility and field REliability

Dear Readers,

We are pleased to present the 3rd edition of the TESTARE Project Newsletter. This issue showcases activities, scientific events, collaborative achievements since our last newsletter edition, as well as new project developments that continue to strengthen the TESTARE mission in advancing reliable and sustainable perovskite photovoltaic technologies. Our consortium remains committed to fostering innovation, collaboration, and excellence in the field of next-generation PV systems.

If you would like to keep up to date with all the latest developments and our next steps in TESTARE, you can also follow us on:

project s website Facebook LinkedIn X

Kind Regards,
Dr. Maria Hadjipanayi (Project Coordinator)
on behalf of the TESTARE Consortium

University of Cyprus imec Fraunhofer ISE Ben-Gurion University of the Negev

Funded by the European Union

Coordinated by University of Cyprus

About TESTARE

Duration
3 years

Budget
€1,499,999

4
Partner Labs

TESTARE is a Horizon Europe project that aims to primarily stimulate excellence at the University of Cyprus (UCY) in the topic of new-generation PV technologies from the perspective of long-term stability and field reliability testing. In particular, the project aims to improve the research and innovation (R&I) capabilities of the DegradationLab, a new research strategic unit of the UCY which focuses on the study of degradation and failures of new and emerging solar PV devices.

To this end, UCY will link effectively with internationally leading research institutions, namely Interuniversity Microelectronics Centre (IMEC) in Belgium, Fraunhofer Institute for Solar Energy Systems (Fraunhofer) in Germany, and Ben-Gurion University of the Negev (BGU) in Israel.

Essentially the project targets to improve the R&I output of the DegradationLab in the defined domain, boost its success rate in research funding bids, enhance its reputation and visibility, develop long-term ties with the advanced partners, strengthen links with industry and with (Middle East and North Africa) MENA countries, as well as contribute to enhancing research management and administration capabilities at UCY towards making more sustainable its overall research ecosystem.

To achieve these targets joint activities between the twinning partners are foreseen including researcher exchanges, trainings, infrastructure sharing, a joint exploratory research project, PhD schools, webinars, networking, etc. TESTARE started on 01/01/2023 and is running for three years.

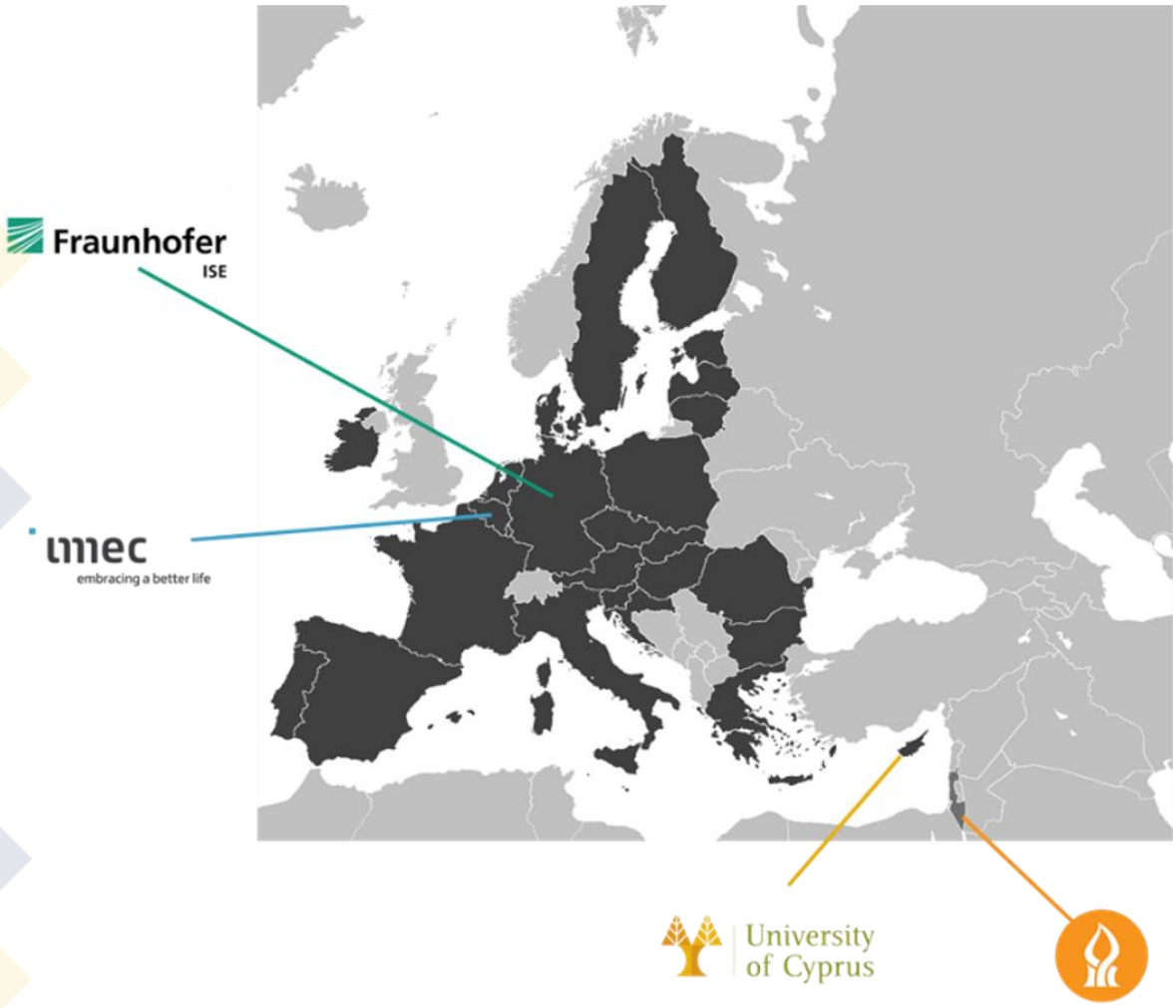
Objectives

- To enhance the quality of and increase the R&I output of the DegradationLab by strengthening its capabilities in human resources and advanced PV metrology.
- To strengthen the reputation and networking capabilities of DegradationLab by introducing it to key players allowing for the participation in scientific consortia for high-quality R&I proposals and projects.
- To boost success rate in funding in the field submitted by the DegradationLab.
- To have long-term ties and infrastructure-sharing between partners.
- To contribute to bridging the academia-industry gap through building local and global links with businesses / industry.
- To strengthen links to MENA countries.
- To strengthen research management and administrative skills of UCY.

Overall, the aim will be to achieve all the above through gaining new scientific knowledge in perovskite PV particularly on testing and aging novel perovskite/silicon PV modules, developing appropriate indoor and outdoor measurement protocols, and addressing critical issues regarding their long-term stability and field diagnostics.

Project consortium

The project consortium comprises of four partners, working towards the goals of TESTARE project. The University of Cyprus (UCY; Coordinator) is joined by three advanced partners from Europe and Israel (imec, Fraunhofer ISE, and BGU), with the objective to enhance the capabilities of the DegradationLab team of UCY. An additional objective of TESTARE is to build an inclusive research environment, where gender and overall diversity is prevalent.



Project highlights (2025-26)

Where you may have seen us

1 January 2025

A milestone was achieved in January 2025 when the UCY TESTARE team secured funding through the Clean Energy Transition Partnership (CETP) Joint Call 2023. CIRCULAR-PV aims to develop long-lived, recyclable perovskite photovoltaic modules through innovative circularity strategies and environmentally responsible manufacturing approaches. The developed eco-designed modules will be investigated under real outdoor conditions to explore the relationship between degradation pathways and material recovery processes. Consortium: UCY (Coordinator), University of Freiburg, Forschungszentrum Jülich, SOLARONIX, and Dyenamo.

3-7 March 2025

The TESTARE partners (UCY, Fraunhofer ISE, Ben Gurion University of the Negev, and IMEC) co-organised a well-attended 2-day RECIPE Symposium on "Reliability and Circularity of Perovskite-Based Photovoltaics", as part of the Materials for Sustainable Development Conference (MATSUS 2025), which took place in Seville, Spain.

20-22 May 2025

From 20–22 May 2025, UCY hosted the FuturePV Workshop in Nicosia under the theme “Future-Proofing Perovskite PV: Innovations in Upscaling, Reliability, and Circularity.” Researchers, industry representatives, and European project partners gathered to discuss challenges and opportunities related to industrial-scale manufacturing, tandem devices, reliability testing, metastability measurement protocols, and sustainability. Organized by TESTARE and 13 other European projects, the workshop strengthened collaboration across the photovoltaic ecosystem and contributed to shaping future research and innovation priorities.

Project highlights (2025-26)

Where you may have seen us

01 June 2025

TESTARE organised a specialised training visit for UCY researcher Dr. Norton to Fraunhofer ISE focused on outdoor testing procedures for perovskite-based devices. Participants received hands-on training using the consortium's common measurement platform, laying the groundwork for future outdoor measurement campaigns and enhancing the technical capabilities of researchers involved in the project.

21-26 September 2025

TESTARE was represented at the 42nd European Photovoltaic Solar Energy Conference and Exhibition (EUPVSEC 2025) in Bilbao, Spain, by Jonathan Parion (imec). His presentation focused on advanced characterization techniques and simulation tools to investigate degradation mechanisms in perovskite solar cells under both indoor accelerated testing and real outdoor exposure. By comparing ISOS testing protocols with long-term outdoor measurements conducted in Cyprus, the work provided valuable insights into the relationship between laboratory testing and real-world device performance.

29-Sep – 01 October 2025

TESTARE researchers participated in ISOS-16, the International Summit on Organic and Hybrid Photovoltaics Stability, held in Genk, Belgium.

Key contributions included:

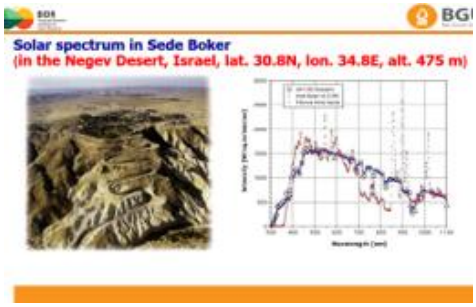
- Mirella Al-Katrib (IPVF): Temperature-dependent metastability in perovskite modules
- Maria Hadjipanayi (UCY): Indoor light cycling and outdoor assessment of metastability
- Jonathan Parion (imec): Novel S-Voc and S-FF metrics for analysing outdoor degradation
- Vasiliki Paraskeva (UCY): Insights from coordinated indoor and outdoor testing campaigns across multiple countries

Collectively, these contributions emphasized the importance of robust testing methodologies, metastability understanding, and improved outdoor evaluation protocols.

Project highlights (2025-26)
Where you may have seen us

02 October 2025

TESTARE organised with imec and Hasselt University the 2nd TESTARE PhD School focused on Stability of Perovskite cells and modules. The 1-day event took place at EnergyVille, Genk, Belgium and provided a valuable platform for networking, scientific exchange, and collaboration discussions among early-career researchers and established researchers working in the field of perovskite photovoltaics.



13 November 2025

A very successful 3rd TESTARE webinar took place in November which attracted 84 participants online. The webinar focused on long-term outdoor stability of perovskite photovoltaics. Experts from imec, Fraunhofer ISE, and Ben-Gurion University presented recent findings from TESTARE project on degradation-induced metastability, outdoor stability of tandem modules, and testing under desert environmental conditions.

20 November 2025

TESTARE organised a very insightful online workshop focused on promoting inclusive and supportive research environments for researchers and project managers. This was a joint initiative with Horizon Europe projects TWIN2EXPAND, LAPERITIVO, SOLMATES, DemosAxia, and APPROACH. Speakers from a number of institutions including UCY, FORTH, TNO, imec, Bequerel Institute, and Fraunhofer ISE shared their experiences and best/worst practices on inclusiveness towards learning from each other and improving. Participants explored practical strategies for fostering inclusiveness, improving collaboration, and supporting researchers at different career stages across Europe.

11 December 2025

Dr. Maria Hadjipanayi represented TESTARE at the University of Cyprus Twinning Projects Workshop, "Lessons Learned from Research Project Management". The event brought together six Horizon Europe Twinning projects to discuss experiences and best practices in project implementation. Key topics included staffing models, research administration support, project management structures, and institutional reforms needed to enhance the effectiveness of EU-funded research projects.

Project highlights (2025-26)

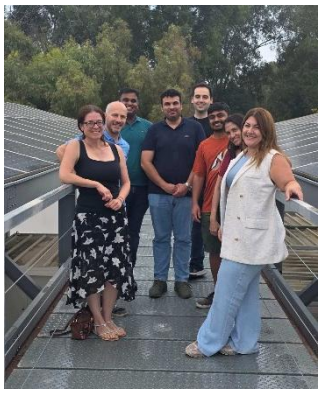
Where you may have seen us

27 April 2026

TESTARE organised an online networking event aimed at strengthening collaboration between Cyprus and Israel in the fields of energy and sustainability. Bringing together researchers, industry representatives, policymakers, and innovation experts from both countries, the event provided a platform for discussing emerging energy challenges, fostering cross-border partnerships, and exploring new opportunities for joint research and innovation activities.

18-29 May 2026

The University of Cyprus researcher Mr. Sumeet Mujumdar visited IMEC at EnergyVille, Belgium, as part of TESTARE's 7th research exchange and training activity. The visit focused on the lamination and characterisation of perovskite mini-modules prior to outdoor ageing tests. The programme also included a visit to Hasselt University, where advanced material characterisation techniques were presented, further supporting knowledge transfer between project partners.



8-12 June 2026

TESTARE had the pleasure of hosting Sujith Reddy from imec at the University of Cyprus as part of the last TESTARE Project research exchange visit. During the visit, we carried out experimental studies on the outdoor performance of perovskite PV modules under partial shading conditions in Cyprus. This collaboration provided valuable insights into the behavior and performance of emerging photovoltaic technologies in real-world operating environments.

Project Publications

(1) Ebner, R., Mittal, A., Ujvari, G., Hadjipanayi, M., Paraskeva, V., Georghiou, G. E., Hadipour, A. Aguirre, A., Aernouts, T., Zardetto, V. Characterization and Degradation of Perovskite Mini-Modules. Inorganics 2024, 12(8), 219. https://doi.org/10.3390/inorganics12080219

(2) Erdil, U., Khenkin, M., Bernandes, M., Emery, Q., Lauermann, I., Paraskeva, V., Norton, M., Vediappan, S., Kumar, D. K., Gupta, R. K., Visoly-Fisher, I., Hadjipanayi, M., Schlatmann, R., Abate, A., Katz, E. A., Ulbrich, C. Delamination of Perovskite Solar Cells in Thermal Cycling and Outdoor Tests, Energy Technology, 2025, 13, 2401280. https://doi.org/10.1002/ente.202401280

(3) Paraskeva, V., Norton, M., Livera, A., Kyprianou, A., Hadjipanayi, M., Peraticos, E., Aguirre, A., Ramesh, S., Merckx, T., Ebner, A., Aernouts, T., Krishna, A., Georghiou, G. E. Diurnal changes and machine learning analysis of perovskite modules based on two years of outdoor monitoring, ACS Energy Letters 2024, 9, 5081-5091. https://doi.org/10.1021/acsenergylett.4c01943

(4) Gupta, R. K., Kumar, D. K., Sudhakar, V., Beckedahl, J. M., Abate, A., Katz, E. A., Visoly-Fisher, I. Seasonal Effects on Outdoor Stability of Perovskite Solar Cells. Adv. Energy Mater. 2024, 2403844. https://doi.org/10.1002/aenm.202403844

(5) Parion, J., Ramesh, S., Paraskeva, V., Peraticos, E., Norton, M., Hadjipanayi, M., Merckx, T., Duerinckx, F., Aguirre, A., Radhakrishnan, H., Aernouts, T., Poortmans, J., Lauwaert, J., Vermang, B. A novel way of analyzing perovskite outdoor degradation: the S-Voc, EES Sol., 2025, Advance Article. https://doi.org/10.1039/D5EL00079C

(6) Vishwanathreddy, S., Ramesh, S., Aguirre, A., Aernouts, T., Poortmans, J., Daenen, M. Unraveling Reverse Bias Induced Degradation Pathways in Perovskite Solar Cells and Modules, ACS Applied Energy Materials, 2026 9 (3), 1354-1360. https://doi.org/10.1021/acsaem.5c03834

(7) Harit, A.K., He, ZF., Kuang, Y. et al. Taking perovskite photovoltaics from promise to product, Nat. Rev. Clean Technol. 2, 453–466 (2026). https://doi.org/10.1038/s44359-026-00173-2

Upcoming activities

FuturePV2 Workshop, 29 June 2025, Nicosia, Cyprus

TESTARE project is organizing its final workshop titled Future PV2 Workshop in a hybrid format at the University of Cyprus in Nicosia, Cyprus. This event is a sequel of our very successful FuturePV workshop 2025. This year's event targets to bring together experts from academia, industry, and research organisations to explore progress in emerging PV technologies, discuss innovation pathways, and exchange knowledge on the future of sustainable energy solutions. Participants will have the opportunity to engage with leading researchers and stakeholders working across the renewable energy and photovoltaic sectors. **Register** for the event here.

TESTARE project will continue to disseminate its latest research findings at other major international scientific events in 2026. Project partners will present key outcomes and recent results on perovskite photovoltaic reliability, stability, and degradation mechanisms at the following conferences. Look out for us in the following events!

43rd European Photovoltaic Solar Energy Conference and Exhibition, Rotterdam, 14-18 September 2026

TESTARE will be represented at EUPVSEC 2026 by Dr. Maria Hadjipanayi who will discuss knowledge gained regarding degradation of perovskite-based PV devices. Find out more at the Poster Session 2CV.3/ Topic 2.2 (16th September 2026), Visual Presentation Title: "Insights into the Degradation of Hybrid Lead Halide Perovskite Thin Films and Solar Cell Devices During Outdoor Exposure".

17th International Summit on Organic and Hybrid Perovskite Solar Cell Stability, Paris, 20-23 September 2026

Dr. Matthew Norton (University of Cyprus) will present new findings on the metastable behaviour of perovskite mini-modules operating in 3 different locations. By comparing devices exposed to different environmental conditions, the work improves our understanding of how climate influences performance fluctuations and long-term stability, contributing to the development of robust testing and evaluation protocols. Oral Presentation title: "In-depth investigation of metastable behavior of perovskite mini- modules in Cyprus, Germany and Israel".

Dr. Joseph Chakar (IPVF) will present his work on degradation mechanisms in single-junction and tandem perovskite mini-modules using physics-based machine learning. In particular, by analyzing devices across different climates and electrical bias conditions, the study identifies key degradation pathways and demonstrates how advanced data-driven approaches can support the design of more durable and efficient next-generation photovoltaic technologies. Oral Presentation title: "Comparing Degradation Mechanisms in Single-Junction and Tandem Perovskite Mini-Modules Across Climates and Bias Conditions Using Physics-based Machine Learning".

9th World Conference on Photovoltaic Energy Conversion (WCPEC-9), Daejeon, 15-20 November 2026

Mr. Jonathan Parion (imec) will be presenting his work at the WCPEC-9 in Daejeon, Korea, on the use of advanced characterization techniques and simulation tools to investigate how degradation develops across perovskite modules under both laboratory and outdoor operating conditions. The findings provide valuable insights into the relationship between accelerated testing and real-world performance, supporting the development of more reliable perovskite PV technologies. Title: "From Lab to Field: Mapping Degradation in Perovskite Modules via Spatially Resolved Characterization and Simulation".

Stay connected

If you are interested in learning more about the project or for potential collaborations:

- Visit our website: www.testare.eu
- Follow us on social media (LinkedIn, Facebook, and X): @Testareproject
- Or get in touch via email: hadjipanayi.maria@ucy.ac.cy

Acknowledgement

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