



Digitalization in PV Power Plants - Enhancing O&M through Digital Twinning, Data and Process Integration

Ulrike Jahn, Fraunhofer CSP & Task Manager of IEA PVPS Task 13



- What is IEA PVPS?
- Task activities & deliverables
- Programme outline of this session
- Task 13 - Meet the Experts

What is IEA PVPS?



The IEA Photovoltaic Power Systems Programme (IEA PVPS) is one of the **Technological Collaboration Programmes (TCP)** established within the International Energy Agency (IEA). Since 1993, international participants have collaborated on a diverse range of joint projects, all aimed at **advancing the application of photovoltaic technology** for the conversion of solar energy into electricity.



PVPS

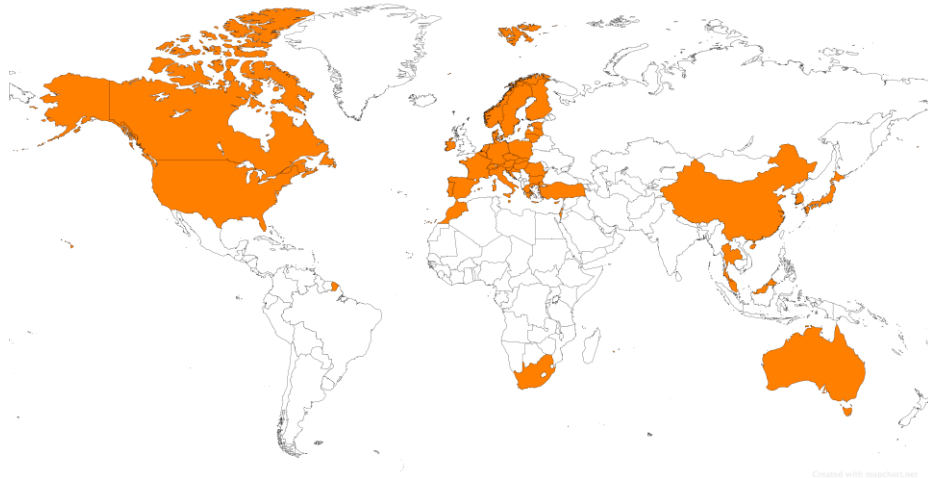
The IEA PVPS Executive Committee and PVPS Task Experts in 2023

9 Research Projects are currently operational

around
340 Individuals from all over the globe are participating in PVPS

over
175 Scientific reports have been published since 1998

Our members



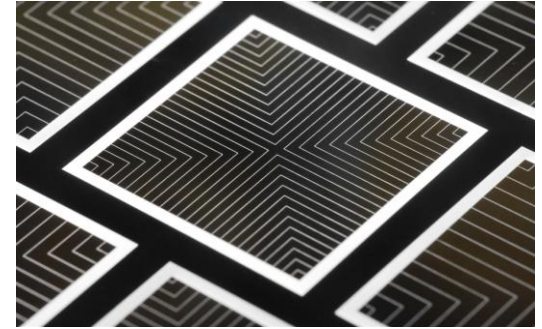
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-  Australia
-  Austria
-  Belgium
-  Canada
-  China
-  Denmark
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-  European Union
-  Finland
-  France
-  Germany
-  Israel
-  Italy
-  Japan
-  Korea
-  Malaysia
-  Morocco
-  the Netherlands
-  Norway
-  Portugal
-  Solar Energy Research Institute of Singapore
-  Solar Power Europe
-  South Africa
-  Spain
-  Sweden
-  Switzerland
-  Thailand
-  Türkiye
-  United States



PV Cells and Modules

- Degradations modes of new backsheet materials
- Degradation modes in new cell and module technology
- Impact of testing strategies under specific load conditions
- Review of PV module repair strategies
- Re-qualification & standardization of 2nd life PV



PV + Storage Systems

- Application-specific performance and degradation
- Estimating lifetime of PV + storage systems
- Guidelines for O&M of PV + storage systems
- Cost estimations for O&M of PV + storage systems



Task 13: Performance and Durability of PV Applications (ST2)



PV Applications

- Floating PV performance (modelling vs. real data)
- Floating PV - Degradation modes and PLR
- Agri PV: Performance of dual land use
- Bifacial PV tracking systems: Performance modelling
- Bifacial PV tracking for optimal performance and cost



PV Integration

- Digital integration of PV systems from design to O&M
- Digital twinning of PV power plants
- Module Level Power Electronics (MLPE) in PV systems
- Performance comparison of MLPE vs. string inverter



Task 13: Techno-Economic Key Performance Indicators (ST3)



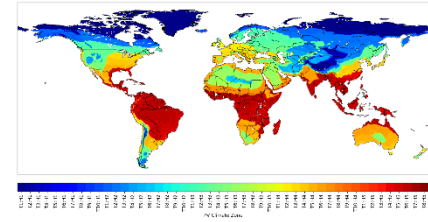
Overview and Assessment of

- Extreme weather events and impact on KPIs
- Diagnostics, repair and mitigation strategies
- Best performing technologies for climatic conditions
- Guidelines for module selection and system design



Mapping of PV economic KPIs

- Decision matrix of KPIs along the value chain
- Develop best practice flowcharts for PV projects
- Analysis of large-scale impact on reliability KPIs
- Visualization of techno-economic KPIs and global mapping



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Ulrike Jahn

Introduction of IEA PVPS Task 13



Jonathan Leloux

Mapping the Relevance of Digitalisation for Photovoltaics



Björn Müller

Use cases for a digital twin within an integrated PV and O&M company



Julián Ascencio Vásquez

Why digitalization is the right choice for your lifetime asset operation



Atse Louwen / Christian Schill

IEA PVPS Task 13 Activity 2.4: Digitalisation in the PV Sector



Panel Discussion & Wrap-up of this Workshop



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PVPS



International Energy Agency
Photovoltaic Power Systems Programme

IEA PVPS TASK 13 EVENT

Meet the Experts

David Moser

Head of PV Energy Systems at EURAC Research, Italy
ETIP PV Vice Chair

Jaione Bengoechea Apezteguia

Head of Photo-Electric and Photovoltaic Innovation and
Technological Development Area, CENER, Spain

Ulrike Jahn

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Intersolar Europe 2024 - Exhibition

20TH JUNE 2024

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2:00 – 3:00 PM

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Thank You

