Short Introduction of IEA PVPS of Task 13

Ulrike Jahn, IEA PVPS Task 13 Manager

System Design of Partial Shaded PV Generators, 21 September 2023

Overview

- What is IEA PVPS?
- Task activities & deliverables
- Programme outline of today

IEA PVPS TCP in a nutshell

- 31 members - 26 countries covering 5 continents, European Commission, 4 associations
- A truly global and unbiased network of PV expertise
- Representing main stakeholders in R&D, industry, implementation and policy
- Covering a large majority of worldwide production, applications and markets
- *Mission: "To enhance the international collaborative efforts which facilitate the role of photovoltaic solar energy as a cornerstone in the transition to sustainable energy systems"*

European Copper Institute · SEIA · SEPA · SolarPower Europe

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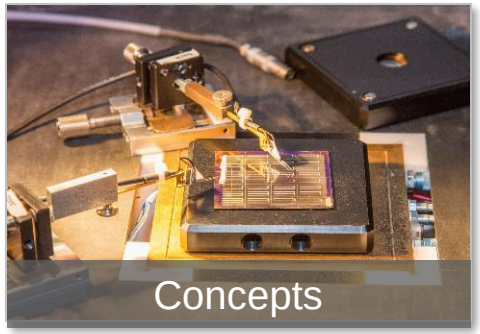
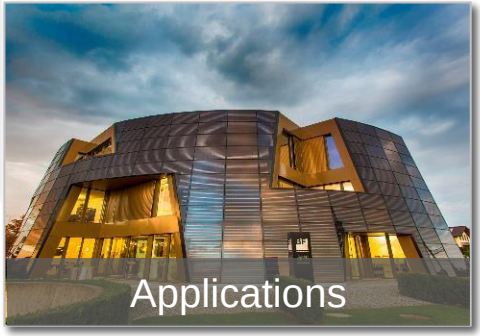
Working along the value chain





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Research | Components | Systems | Integration | Market

PVPS expertise and outreach

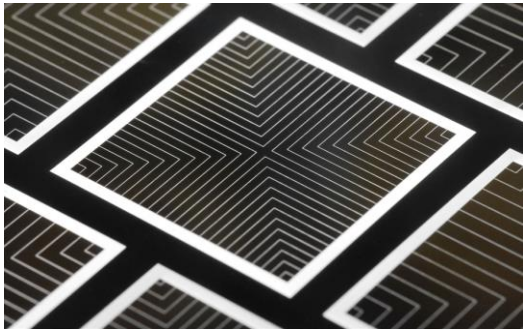
8 Active PVPS Tasks…

- Task 01 – Strategic PV Analysis & Outreach
- Task 12 – PV Sustainability
- Task 13 – Reliability and Performance of PV Systems
- Task 14 – High Penetration of PV Systems in Electricity Grids
- Task 15 – Enabling Framework for the Development of BIPV
- Task 16 – Solar Resource for High Penetration and Large-Scale Applications
- Task 17 – PV for Transport
- Task 18 – Off-Grid and Edge-of-Grid Photovoltaic Systems

Task 13: Reliability of novel PV materials, components and modules

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

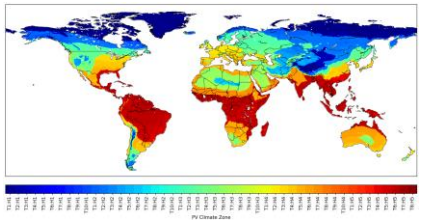
Task 13: Techno-Economic Key Performance Indicators (ST3)

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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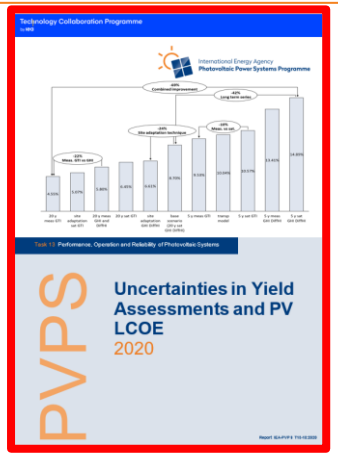
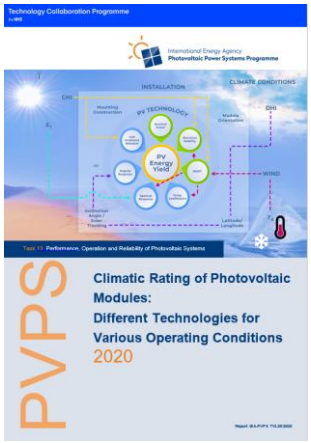
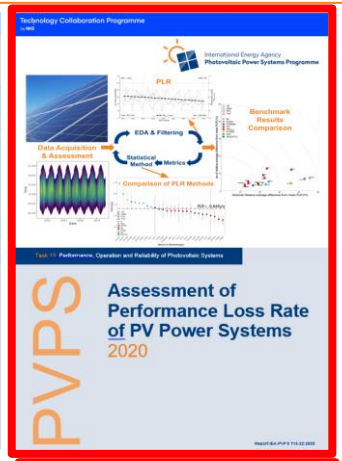
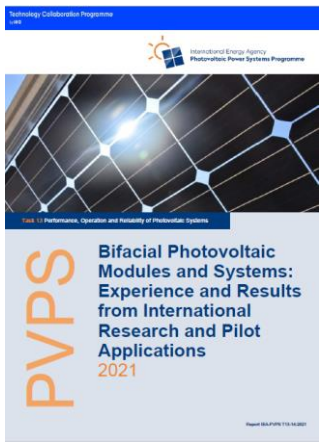
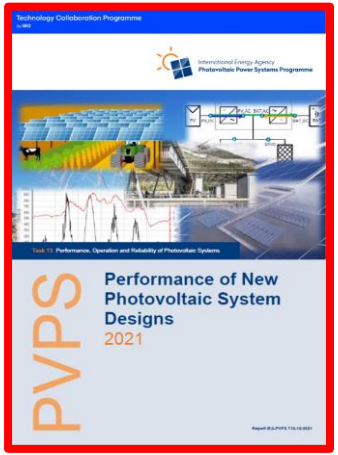
Technical Reports (https://iea-pvps.org/research-tasks/performance-operation-and-reliability-of-photovoltaic)

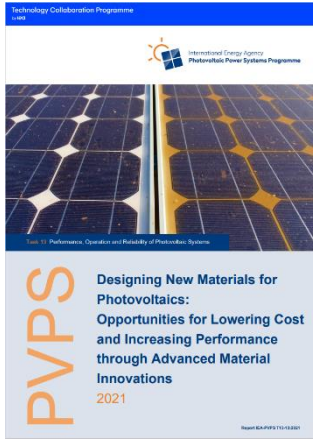


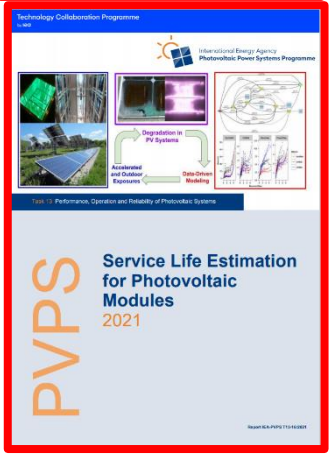


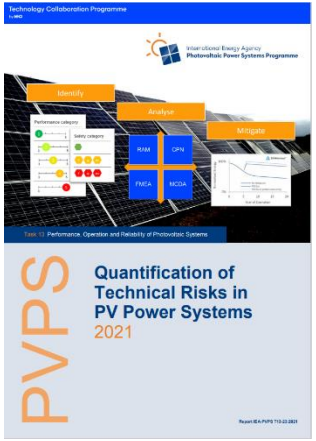


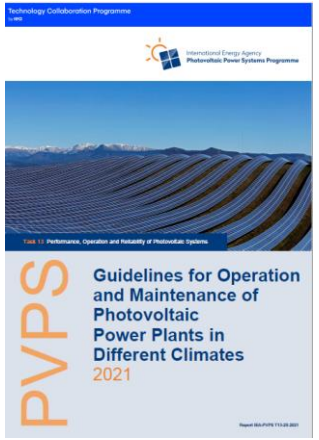










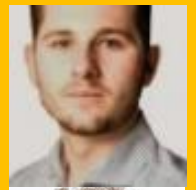


System Design of Partial Shaded PV Generators

Your speakers of today

Ulrike Jahn
Introduction of IEA PVPS Task 13

Cyril Allenspach
PV system performance of different power conditioner and shading index



Mauro Caccivio
Definition of PV shading classes and criticalities in PV applications

Bernhard Kubicek
Precise irradiance modeling as source of partial shading analysis

Sara Golroodbari
Shading tolerant PV module measurements and simulation

Franz Baumgartner
Design recommendations of PV system affected by shading – Webtool

Final Discussion & Wrap-Up

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https://iea-pvps.org/research-tasks/performance-operation-and-reliability-of-photovoltaic

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