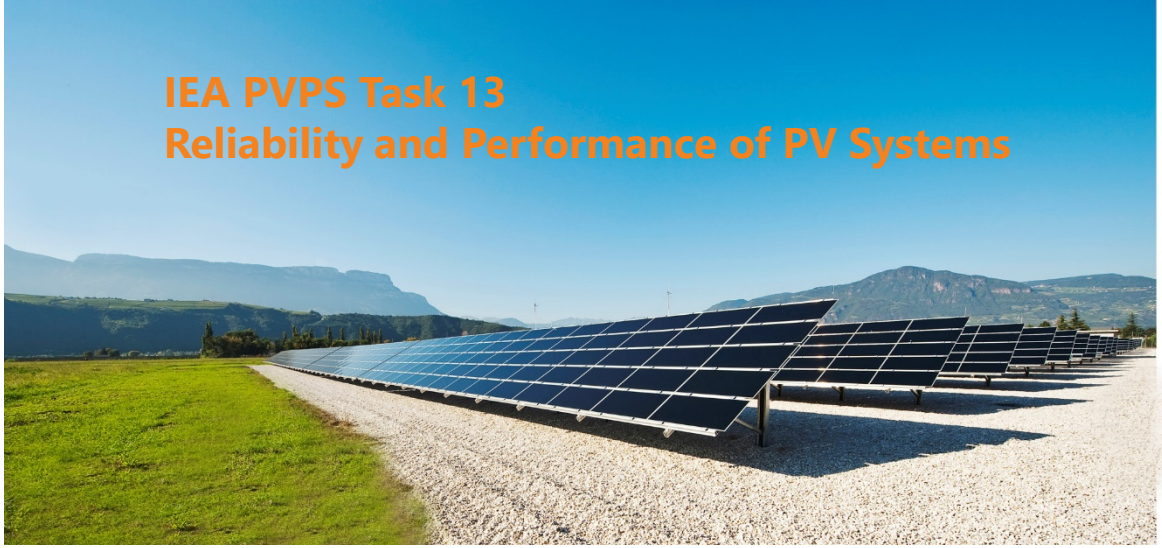


IEA PVPS

Task 13 (2022 – 2025)

Activity Leads from Switzerland: Franz Baumgartner, ZHAW SoE Winterthur
Gabi Friesen, SUPSI Lugano

Contact at BFE: Stefan Oberholzer

IEA Meeting, 25 May, 2022 in Bern organized by BFE

Outline

1. Topics of PVPS task 13
2. Find the joint SWISS team to contribute
3. Why to distinguish between activity leads and contributors?
4. Motivation of contributors
5. Benefit in structure the Swiss T13 contributions
6. Outlook

1. Topics of PVPS task 13

- PV King of electricity
  IEA statement 2020 Oct
  www.reuters.com

- Program https://iea-pvps.org/

International Energy Agency
Photovoltaic Power Systems Programme

REUTERS World Business Markets Breakingviews Video

COMMODITIES NEWS OCTOBER 13, 2020 / 6:04 AM / UPDATED 2 YEARS AGO

Solar the new 'king of electricity' as renewables make up bigger slice of supply: IEA

By Forrest Crellin 3 MIN READ

PARIS (Reuters) - Solar output is expected to lead a surge in renewable power supply in the next decade, the International Energy Agency said, with renewables seen accounting for 80% of growth in global electricity generation under current conditions.

PVPS

1. Topics of PVPS task 13

- Program https://iea-pvps.org/

International Energy Agency
Photovoltaic Power Systems Programme

Tasks

1 — Strategic PV Analysis & Outreach

12 — PV Sustainability

13 — Performance, Operation and Reliability of Photovoltaic Systems

14 — Solar PV in the 100% RES Power System

15 — Enabling Framework for the Development of BIPV

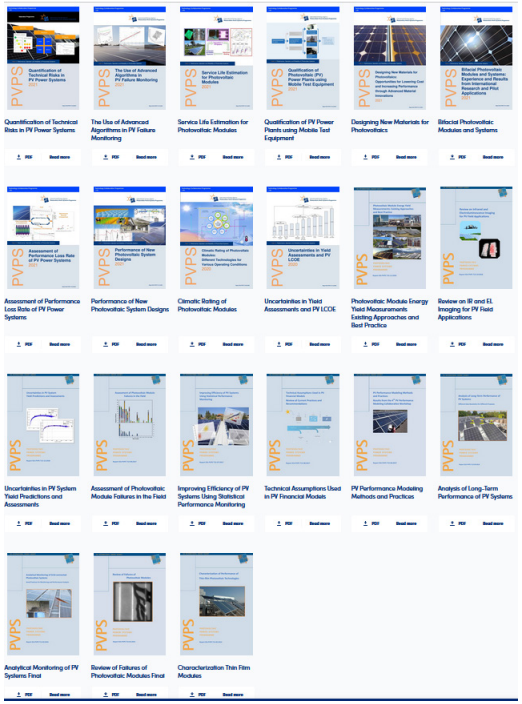
16 — Solar Resource for High Penetration and Large Scale Applications

17 — PV & Transport

18 — Off-Grid and Edge-of-Grid Photovoltaic Systems

Task 13 – a successful document producer

2013

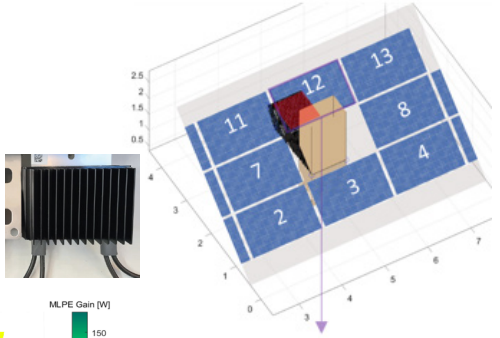


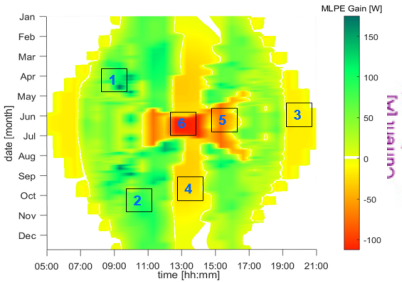
2013

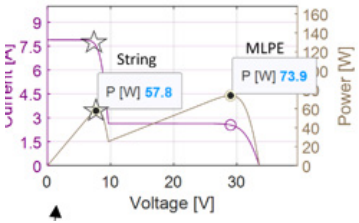
PVPS

1. Topics of PVPS task 13

- My main motivation is to develop and disseminate transparent classification of the **real annual performance** of Photovoltaic (**PV) Optimizers** on PV roofs
- Manufactures marketing increase in performance of **+30%**, our findings typical around +1-3% under **shading conditions** on the roof
- **Manufactures** are **highly valued companies** (see SEDG)
- International exchange about typical shading condition:
- Exchange with the leading experts on the method of combination of indoor lab tests and simulation
- Dissemination results, PV planer, customer via IEA but also to develop an IEC standard
- BFE funded project PVSHADE is the enabler







F. Baumgartner, Electrosuisse Bulletin, May 2021

PVPS

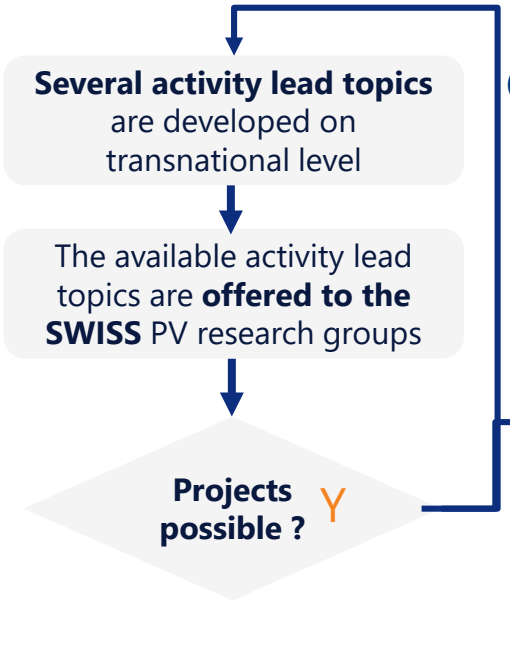
2. Find the joint SWISS team to contribute

- Follow up of the last IEA period T13 project with nearly the same partners
- IEA PVPS T13 needs are found by online meetings with longtime international professional colleagues first

1) international exchange supervised by task manag.

2) national contributions are sought

3) Are R&D projects ready or expected to producing results to be evaluated



Gabi Friesen, SUPSI
Franz Baumgartner, ZHAW

PVPS

2. Find the joint SWISS team to contribute in Subtasks ST2.5

Lead: **Franz Baumgartner**, ZHAW; **Roland Bründlinger**, AIT

Contributors: DNK (SDU), DEU (sunsniff, TUV), NDL (Uni Utrecht), SWE (RISE), CHE (BFH, SUPSI), USA (NREL, APEC)

Activity focus:

- Concepts of system performance comparison of Module Level Power Electronics MLPE
- Selection and simulation of typical shading PV systems
- Indoor laboratory measurement concepts and results of MLPE components and standard string inverter systems
- Comparison of PRO and CONS others than performance of MLPE in the field
- Discussion and dissemination of the results and the extrapolation to annual performance comparison of MLPE and standard string inverter

- **Workshop at EUPVSEC 2023:** *Concepts of system performance comparison of DC/DC MLPE, DC/AC MLPE and string inverter" (M03)*
- **Report:** *Annual PV performance comparison of MLPE versus string inverter for typical shading conditions of roof top systems on typical single-family houses (M30)*

3. Why to distinguish - activity leads and contributors ?

- The manpower resources a completely different
- .Swiss contributions to IEA PVPS workplan

  Contributions can add or change due to the acceptance of new projects or definition of the detailed technical reports. Changes should be communicated in time!

		SUPSI	ZHAW	BFH	SPF	CSEM
Subtask Leader	**Subtask / Activity**					
ISFH	**Subtask 1: Reliability of novel PV materials, components and modules**					
ISFH/PV Guider	1.1 Degradation modes in new PV cell and module technology	major		minor		major
PCCL/CEA-INES	1.2 Repair and 2nd life of PV modules					
ISE/ISFH	1.3 Impact of load factors; the future of accelerated testing	minor			minor	minor
IFE/CASE	1.4 Reliability of PV+Storage		minor	minor	major	
ISE	**Subtask 2: Performance and Durability of PV Applications**					
IFE/UU	2.1 Floating PV					
ISE/CEA-INES	2.2 Agrivoltaics		minor	minor	minor	minor
SANDIA/RSE	2.3 Bifacial Tracking Systems		major			
ISE/EURAC	2.4 Digital Integration and Digital Twinning	minor	major	?		
ZHAW/AIT	2.5 Module Power Electronics Efficiency and Shading	minor	AL	minor		
EURAC	**Subtask 3: Techno-Economic Key Performance Indicators**					
SANDIA/AIST	3.1 Extreme weather and impact on PV performance KPIs		minor	minor		
SUPSI/PCCL	3.2 Guideline for the optimisation of KPIs for specific climatic or environmental conditions	AL		minor		
VDE/EURAC	3.3 Impact of decisions in PV projects economic KPIs					
EURAC/3E	3.3 Mapping economic and reliability KPIs	major				

Estimation of effort:

- Activity lead 300 hrs/ST
- Major contribution 50 hrs/ST
- Minor contribution 20 hrs/ST

Task experts are listed on the PVPS website under contacts

PVPS

3. Activity leads and contributors of all T13 subtasks?

Task 13: Reliability and Performance	ITA					JPN	NLD		NOR	ESP		SWE			CHE					TAIWAN	THA	USA					
	ENEA	EURAC	GSE	RSE	SUR	AIST	TNO	UU	IFE	CENER	UJAEN	MDU	RISE	CheckWatt	SUPSI	ZHAW	BFH	SPF	CSEM	PV Guider	CSSC	CWRU	Envision	NREL	SNL	ACEP	VDEA
Subtask / Activity																											
Subtask 1: Reliability of novel PV materials, components and modules																											
1.1 Degradation modes in new PV cell and module technology									C						C		C		C	AL		C		C	C		
1.2 Performance and Reliability of Second Life PV		C		C		C		C					C								C	C			C	C	
1.3 Impact of Testing Strategies including application specific load conditions		C				C		C	C						C		C	C	C			AL		C	C	C	
1.4 Reliability of PV+Storage									AL				C	C		C		C				AL					
Subtask 2: Performance and Durability of PV Applications																											
2.1 Floating PV					C	C	C	AL	AL		C										C				C		
2.2 Agrivoltaics	C		C						C	C	C	C				C		C	C			C			C		
2.3 Bifacial Tracking Systems				AL					C	C	C					C								C	AL		
2.4 Digital Integration and Digital Twinning		AL		C					C					C	C	C						C					
2.5 Module Power Electronics Efficiency and Shading								C					C		C	AL	C							C		C	
Subtask 3: Techno-Economic Key Performance Indicators																											
3.1 Extreme weather and impact on PV performance KPIs					C	AL							C			C	C					C	C		AL		C
3.2 Optimisation of KPIs for specific climatic or environmental conditions					C							C	C		AL	C	C					C	C		C	C	
3.3 Impact of decisions in PV projects economic KPIs		AL	C									C										C	C		C		
3.4 Mapping economic and reliability KPIs		AL	C		C			C	C			C		C	C							C	C		C		
Subtask 4: Dissemination & Outreach																											###

4. Motivation of contributors

- Science is always exchanging your findings with international experts of excellence experience in the applied research of Photovoltaics
- Higher success rate in national fundings applications if the topic fits into the international collaboration or topics of for example IEA
- This compensates for insufficient funding for smaller contributions

5. Benefit in structure the Swiss T13 contributions

- National funding decisions are balanced by the input of international experts of IEA in the field of PV
- Swiss contributors exchange their findings and results with international collaborators and not only with national PV experts or by delivering a national public research report with not so much feedback at all.

6. Outlook

- The following Swiss PVPS T13 collaborators are looking forward to learn within the large PV team of over 100 international experts and dismiss the results within Switzerland

(1) Scuola Universitaria Professionale della Svizzera Italiana
Istituto sostenibilità applicata all'ambiente costruito
Via Flora Ruchat-Roncati 15
CH-6850 Mendrisio

(2) ZHAW School of Engineering (ZHAW IEFE)
Fachgruppe Photovoltaik
Technikumstrasse 9
CH-8400 Winterthur

(3) Berner Fachhochschule (BFH-TI IEM PV-Lab)
Labor für Photovoltaiksysteme
Jlcoweg 1
CH-3400 Burgdorf

(4) CSEM PV-Center (CSEM PV-Center)
Rue Jaquet-Droz 1
CH-2002 Neuchâtel

(5) SPF Institute for Solar Technology (SPF-OST)
University of Applied Sciences of Eastern Switzerland
Oberseestrasse 10
CH-8640 Rapperswil-Jona

Thank You for Your Attention!

Franz Baumgartner, Gabi Friesen

contact points of PVPS T13 Team
bauf@zhaw.ch; gabi.friesen@supsi.ch