P E A R L P V

Data sharing for trans-European PV performance analyses

Report on the online WG1 workshop
of 3 November 2020

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1.Introduction

Because of the continuing Covid pandemic Cost Action PEARL-PV took the initiative to organize monthly online workshops in the period from November 2020 until April 2021, inviting participants from the Action to actively engage in the various research topics that this Action covers. This report summarizes the findings of the first online workshop, organized on 3 November 2020 by working group 1 (WG1), in particular by Nikolina Shutinoska, Cihan Gerçek and Wilfried van Sark, which was entitled "*Data sharing for trans-European PV performance analyses*".

The workshop consisted of three parts:

1) a series of research presentations that presented collaborative work that has been performed within the PEARL PV Action. PV Performance analyses have resulted in and will indicate what the possible next steps could be for further collaboration;
2) an interactive workshop, in small groups (breakout rooms) where participants discussed possible methods and data that could be used for such study amongst them. The aim was to define a common framework for PV performance analyses across Europe and the steps to enable such collaboration and motivate participation.
3) training on how to use the PEARL PV CKAN database, and procedures to upload and download data we explained as well as the database properties. To make this training as effective as possible, participants were invited to prepare some PV monitoring data sets for data uploading during the workshop.

As main result from the workshop, foundations for collaborative papers have been identified.

2.Agenda and participation

Time	Item/title	Presenter/moderator
9:00	Opening of the workshop	Angele Reinders (UT)
9:10	Workshop introduction	Wilfried van Sark (UU)
9:20	Performance Loss Rates & Data requirements	Sascha Lindig (EURAC)
9:40	Data processing and quality verification for improved photovoltaic performance	Andreas Livera (UCY)
10:00	break	
10:15	Introduction break-out sessions	Wilfried van Sark (UU)
10:20	Three parallel break-out sessions	Angele Reinders (UT), Cihan Gerçek (UT), Wilfried van Sark (UU)
10:50	Plenary summary	Angele Reinders (UT), Cihan Gerçek (UT), Wilfried van Sark (UU)
11:00	break	

11:15	Introduction databank training	Wilfried van Sark (UU)
11:25	Three parallel break-out training sessions	Anton Driesse (PVlabs), Cihan Gerçek (UT), Wilfried van Sark (UU)
12:00	Plenary summary and future work	Wilfried van Sark (UU)

In total 60 persons across Europe have attended the workshop, peaking at 51 persons at the same time. Due to privacy regulations, an attendance list cannot be provided in the report, however it has been registered in the e-Cost administration of PEARL PV.

3.Outcomes

3.1. CKAN database

Before the announcement of the workshop, about 60 users had registered as users of the PEARL PV database. As a result of the workshop, now about 100 users have registered as database users.

During the CKAN database data upload and download training, the tools that the database has have been demonstrated, a.o. using a short video tutorial made by Carolin Ulbrich and Judit Süveges (HZB). Some technical issues related to access to the database have been encountered, caused in particular from double registrations, password problems, refreshing times of user list etc.. This prohibited some users to actively up/download data. This has been resolved. During the session, three small datasets have been uploaded, while more data sets have been promised by users to be uploaded in the coming weeks, especially related to common research projects. In fact, as of the date of this report, 25 datasets have been uploaded.

3.2. Research collaborations

In three parallel break-out sessions, after brainstorm and discussions the following research topics have been identified. Also, lead persons have gratefully volunteered to further develop the collaborative research. In the coming months.

- Climate dependent degradation of PV systems, additional information can be found here: https://pvpmc.sandia.gov/download/7879/ (lead: Steve Ransome)
- Uncertainties in determination of degradation, satellite base data and recorded data (lead: Alessandro Virtuani)
- Can you use the databank to see how geographic locations impact stability and understand which are the biggest factors to influence stability across Europe (lead: Jeff Kettle)
- PV data analysis for performance assessments of roof top PV systems in relation to losses due to system failures, soiling and maintenance schemes in order to inform PV system owners about highly necessary insights in their systems' quality of operation and associated financial revenues as well as OPEX. This research would be executed using the theoretical background on simulated PV system failures and their costs will be provided by the recently completed PV Bankability project. Monitoring data of roof top PV systems will be complemented with maintenance information (ticketing information, maintenance logbooks).In the analysis geographic clustering of groups of systems for forecasting of 'good'

performance will be applied as a reference for 'weak' performing PV systems using AI, i.e. neural networks, for large PV data analyses, in first instance on the basis of daily values for yields and irradiation, subsequently for 15- down to 5-minute recording intervals? (This group of researchers will have a follow-up meeting to further detail the execution of the research plan))

- How does floating PV performance vary across Europe (lead; Wilfried van Sark)
- Performance analysis in Agrivoltaics (lead: Tareq Abu Hamed, Cihan Gerçek)
- What is the effect of fast power fluctuation of PV systems on the grid? (lead: Jovan Todorovic). This would require power data with very high (sub-second) time resolutions

4. Evaluation

At the end of the last session, the workshop was evaluated using an online poll by 22 participants. They have been asked to rate 1 (poor/totally disagree) to 5 (very good/totally agree) on ten statements on five thematics: research presentation (quality and usefulness), brainstorming (interactivity and usefulness), CKAN database (training and user-friendliness), taking part in the collaborative paper, and overall quality. Poll results are summarized in Figure 1.

The overall quality (4.6/5) and Research presentations (4.5/5) were the most appreciated. Brainstorming sessions and CKAN database activities were found useful for gathering new ideas for collaboration(4.3/5). Some participants were not able to/willing to participate in the collaborative work, which made it the least valued item, yet most of the participants show their willingness (4.1/5). Overall, the workshop was assessed to have been of good quality and useful for collaboration in all its aspects (4.4/5 on average).
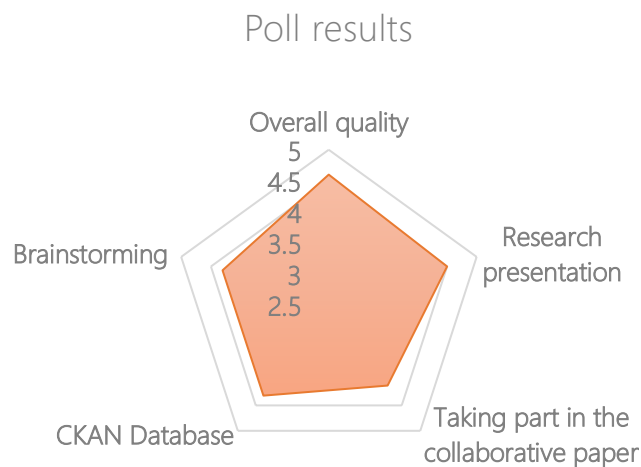

Figure 1: Summary of poll results.