This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement Nº 953016

SERENDIPV

COPLASIMON

Collaboration call nº2
Date 10/08/2023

# Collaboration calls

## Floating call for data and feedback on the Serendi-PV models

# 1 FLOATING PV TECHNOLOGY

Several project partners of SERENDI-PV aim to improve their energy simulation model for floating PV modules. Different modelling approaches are being developed and tested.

We will compare the model performance with other software packages and with data from PV systems with floating modules. The work on the improvement of the already existing models, as well as on the validation of the models, will be carried out vs real data.

# 2 WHAT WILL BE OFFERED?

Several tools are currently under development for the simulation and monitoring data analytics of floating PV systems. A beta version of some of these tools will be available from this collaborative platform.

# 3 HOW TO COLLABORATE?

We are actively looking for monitored operational data of floating PV systems of different typologies and installed all over the world, in order to further develop and validate our simulation models. If you possess such data, we will welcome collaboration. If your data are of interest to the research group involved in the floating PV modelling, you will receive in-depth analyses for free that will contribute to a better understanding of the performance of your floating PV assets.

If you are currently modelling floating PV installations, and if you are interested in sharing good simulation practices, and/or simulation codes, we encourage you to use our collaborative tools for development and get involved in floating PV modelling with the rest of the team. Interesting comparisons between different approaches will teach us important lessons. The results of these data analyses, as well as the input data, will not be publicly released in order to preserve the critical commercial character of most of such data that will be provided by their owners, and to prevent their competitors from gaining access to the knowledge of the actual performance of their PV plants.

# 4 CALL DEADLINE

The call will be closed on the **24th of September**.

# 5 PARTNERS' CONTRIBUTIONS

**LuciSun**

Lucisun is developing a simulation tool for innovative PV technologies, including the floating PV systems. The tool is called **Lusim.**

The powerful graphics processing units (GPUs), that have been developed for the video game industry, are applied for complex shading problems applicable to PV systems. An in-depth evaluation of the shading dynamics that affect the direct component of solar irradiance allows for a more reliable PV analysis. This analysis can be conducted at high spatiotemporal resolution for maximum accuracy.

The tool also allows to perform the monitoring of floating installations for analyzing the degradation of the PV plant and a fault detection.

The output of the analysis, given a dataset of production and the environmental conditions, is the degradation rate, which could be compared to the field PV plant to check for the effect of water on the PV production and panels deterioration.

**Solargis**

Within the scope of the SERENDI-PV project, Solargis is developing tools for data analysis – including from floating power plants. The aim of these tools is to identify anomalies in real measured PV production data which indicate issues with the power plants itself. In this way, Solargis is offering a powerful tool to aid Operations and Maintenance (O&M) understand the performance of the plant and take appropriate actions to maximize the production.

The analytical tools rely on the state-of-the-art PV yield simulator developed and operated by Solargis. The simulator uses ray-tracing technology with superior accuracy when compared to traditional view factor modeling. Additionally, a novel floating PV model was developed to account for the cooling properties of the floating environment, and mismatch induced by the moving floats. The Solargis floating PV simulator can thus accurately calculate the estimated yield of any floating PV plant.

Similarly important in the process is the Solargis data quality checking (QC) service. This has been part of the Solargis product portfolio for years, and has been continuously upgraded, including within the scope of the SERENDI-PV project. The QC service investigates the measured data, flags any erroneous values and can also fill gaps. One of our algorithms can also estimate the configuration of the PV plant, if configuration details are not available or are suspected to be incorrect. In the result, only valid, high-quality measurements are used in the analysis, improving its accuracy and the quality of the conclusions.

**CEA-INES**

CEA is developing a simulation tool for floating PV systems. The objective is to develop a thermal model enabling us to consider the impact of the near environment (water) on the module temperature. The model will thus accurately determine the energy production of any floating PV plant according to its characteristics.

# 6 SERVICES OFFERED

**LuciSun**

Lucisun offers the possibility to run a simulation of the PV plant and estimate the energy production the plant should have had and compare it to the actual production.

The required information and data to model a floating PV plant and run a simulation are the following ones:

- Description of the PV plant:
- GPS coordinates,
- PV production
- Ground Horizontal Irradiance (GHI)
- Ambient temperature measurement and other environmental parameters if available

The outcome will be presented in a short report and the QC procedure will be provided on the dataset underlying the presence of incorrect instruments.

**Solargis**

Solargis offers its data analysis service in return for the right to use the data in the development of our models, possibly including the right to include the data in published research (in the form of conference presentations, and scientific articles).

The required inputs are high-quality ground measured data, in the form of time series:

- PV power output (PVOUT),
- Meteorological variables: wind speed, air temperature, module temperature, atmospheric pressure, relative humidity
- Solar resource: plane-of-array irradiation or global irradiation (horizontal, and direct normal or diffuse)
- “Operational” variables: soiling, module degradation – IF AVAILABLE

Furthermore, technical details of the PV plant (location, components, configuration, layout) and instruments (model, configuration, calibration, location) from which the measurements are provided are necessary.

The offered outputs are:

- Quality-controlled time series data with flags identifying erroneous or suspect values
- Solargis simulated PV yield time series, in the same time range as your time series
- Short report explaining and discussing the faults and features identified in the data

**CEA-INES**

CEA offers the possibility to run a simulation with floating PV tool on your PV plant and estimate the energy production over a given period. The required information and data to model a floating PV plant and run a simulation are the following ones:

- Description of the PV plant:
  - electrical architecture,
  - GPS coordinates,
  - geometric dimensions (height, length, pitch between rows …),
  - module layout,
  - Characteristics of floats,
- photos of plant,
- PV module reference (datasheet),
- Global horizontal irradiance GHI, or even better Diffuse horizontal irradiance DHI if available,
- Ambient temperature measurement,
- Water temperature measurement (different depths if available),
- PV plant production;
- When relevant, dataset length of 30 days.

The outcome will be presented in a short report (quality control of data, results of simulation, comparison to measurements).

**COPLASIMON coordinator**

Jonathan Leloux

LUCISUN

contact@coplasimon.eu

lucisun.com

**Project coordinator**

Eduardo Roman

TECNALIA

eduardo.roman@tecnalia.com

tecnalia.com

**Project Partners**