

Location of the infrastructure : Le Bourget du Lac, France

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Objectives :

- Outdoor I-V curves measurement, for peak power and most other parameters characterization

Main features :

1. Outdoor IV test benches

- Three IV test benches are located in Le Bourget du Lac and one is at Cadarache, Southern France. They all allow the characterization of PV modules in outdoor conditions.



- Each test bench is able to monitor 24 modules. IV-curves are scanned every 5 minutes and contain about 100 points. At the same time, temperature of the backside, ambient temperature, irradiance in the plane of the modules measured by pyranometer and reference cell, and some other weather data are measured. The measurement software is adapted to perform Variable Illumination Measurements (VIM) which allow a straight forward determination of module equivalent circuit parameters. I-V curves are treated and main parameters (Isc, Voc, Pmax, FF, slopes at Voc or Isc) extracted. Values are stored in a database for further analysis.

2. Indoor Flash-test

A Pasan Sun Simulator IIIa is also available for the determination of the IV-curve under nominal operating conditions. Module sizes up to 1,5 x 1,5m, class A, several filters.

Limitations or constraints :

The access will be allowed with technical and scientific assistance from INES.

Typical services or results :

These test benches can be used for three applications:

- Peak power measurement under real outdoor operation conditions,
- In-situ monitoring of equivalent circuit parameters during module aging
- Or data acquisition for modelling the energy output of PV modules. The use of the MotherPV method, also developed at INES, gives access to the energy yield of the modules.

Support can be provided to define the experiment and to analyse the resulting raw data. Users can then analyse the measurements with their own favorite tools.

Examples of research projects :

- Pre-conditioning procedures before peak power measurement
- Harmonisation of IV tracing methods and relevant data format
- Data management procedures to sort out relevant parameters
- Comparison between indoor and outdoor measurements, Round-Robin tests performed all over Europe for Peak Power measurements and Prediction of the energy yield of PV modules.