

A) General Information



Acronym

ModVal

Title of the User-Project

Validation of PV models and PV simulator

TA Call

September 30, 2010

Host Research Infrastructure

Austrian Institute of Technology, Vienna

Starting Date

April 13, 2011

End Date

April 28, 2011

Lead User (Name-Institution-Country)

Dr.-Ing. Tatakis Emmanuel, University of Patras,
Greece Department of Electrical and Computer
Engineering (not accessing)

Additional Users (Name-Institution-Country)

Nanakos Anastasios, Ph.D. Candidate, University of
Patras, Greece (accessing the facility)
Perpinias Ioannis, Ph.D. Candidate, University of
Patras, Greece (accessing the facility)

B) Summary of the User-Project

The first set of experimental procedures aims to validate the behaviour of the implemented PV model and PV Simulator under various external conditions and load variations (static and dynamic behaviour).

The second research field is about the Distributed Generation PV on a high penetration level. The goal is to analyze the behaviour of DG-PV under critical conditions of the grid, such as voltage drop, short circuit and frequency deviation.

A microgrid in the lab of AIT with two inverters operating on different PCC on the laboratory network was set up, and anti-islanding detection and active power control function tests were conducted.

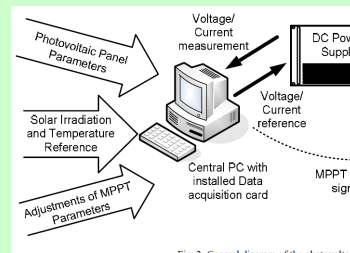
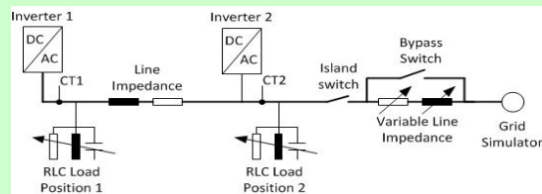
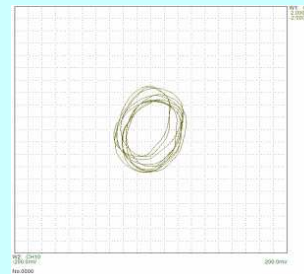


Fig. 2. General diagram of the photovoltaic



C) Main Achievements

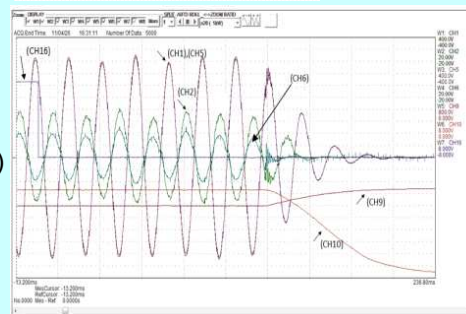
The analyzed PV simulator presents a slow dynamic response due to the huge capacitor in the output of the DC switching supply. This is obvious in the figure, where it is observed an important phase difference of the voltage in relation to the current.



Output voltage (CH9) as a function of the output current (CH10) for our PV simulator

The loss of mains of the two different inverters, operating on different PCC, interconnected by a line impedance was detected (figure)

If the power matching between the DG output power (active and reactive) and the power consumption (active and reactive) of the local load is very good, an island occurs.



Anti-islanding protection with two inverters

D) Dissemination of the Results

The goal is to infer important conclusions from this project and publish this work in international scientific journals or/and international conferences. About the interpolation model, investigations to the model improvement based on the deviation between the measurements and the model have to be done. Furthermore, exploiting the measurements from shaded cells in the PV modules and incorporate the function of shaded cells in the existing model is a further task.

E) Use of the Resources

Nr. of Users involved: 2
Access Days/Units: 9
Stay Days: 32