

Coordination of Photovoltaic systems in large plants

General Outlook

Photovoltaic (PV) systems operating in a single plant will inevitably interfere with other PV systems when placed very close to each other, which is usually the case due to space limitations. This interference depends on several factors but mostly on the architecture of the PV systems and on their relative positions and, may have implications of the efficiency on the whole plant. A study of these interferences would clarify the implications on the efficiency of the plant and lead to the definition of coordination strategies between the PV systems that optimise the overall plant efficiency.

The work will be performed in collaboration with the private company WS Energia Lda and it will be an important contribution to a larger R&D project financed by the QREN.

Objectives

The project will address theoretically and numerically issues related to the interference between PV systems placed very close to each other and the influence on the systems' efficiency. A numerical tool that allows the study of these interferences could lead to the definition of the optimal relative positions between PV systems and strategies that maximize the systems' efficiency. Tests in a field of DoubleSun® solar multipliers (winner of the prize BES Inovação) should be performed to validate the numerical models and the expected theoretical results.

It is foreseen that the thesis will lead to the publication of both theoretical and experimental results obtained during the field tests.

Task: general overview

The work will be divided in the following tasks: - Development of a numerical tool to analyse the interactions between PV systems and its influence on their efficiency – Field tests to validate the numerical models – Analysis of the existing cooperation and coordination strategies – Implementation of the analysed strategies and validation of the results through field tests – publication of the results.