

TRANSNATIONAL ACCESS USER PROJECT FACT SHEET

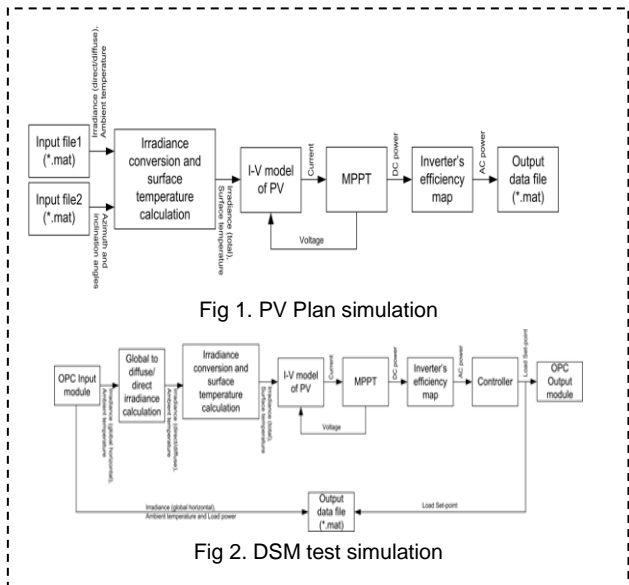
USER PROJECT	
Acronym	DUSCP
Title	Dicle Univerity Smart Campus Project
ERIGrid Reference	01.007-2016
TA Call No.	1

HOST RESEARCH INFRASTRUCTURE			
Name	Centre for Renewable Energy Sources and Saving (CRES)		
Country	Greece		
Start date	10.07.2017	N° of Access days	17
End date	04.08.2017	N° of Stay days	25

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1. USER PROJECT SUMMARY (objectives, set-up, methodology, approach, motivation)

This project deals with the operation analysis and evaluation of a 250kWp Photovoltaic System installed at Dicle University in Diyarbakir, South-eastern Turkey. The system, already in operation since November 2014, has been the test bed for knowledge gaining in the field of renewables and smart grid technologies. In this context, the specific TA project aims at evaluating the performance of the specific power plant under various operating scenarios. Overall, the objective of the analysis is to assess the efficiency of the existing system as well as to investigate methods to increase its efficiency and reduce the impact on the local distribution grid, especially during peak-production intervals. To realize the tests required in the project firstly a PV plant simulation model is prepared in Matlab/Simulink in a pure simulation approach in which all the components are Simulink blocks. This setup is illustrated in fig.1. As for the real-time Demand Side Management(DSM) test physical equipment of the CRES' experimental microgrid are used. This equipment includes the microgrid SCADA, irradiance and temperature sensors as well as a resistive load bank. The physical components are combined with a simulated PV. The objective of this test is to control the actual loads in order to match the simulated PV power. The specific setup is illustrated in fig. 2.



2. MAIN ACHIEVEMENTS (results, conclusions, lessons learned)

By comparing the results of the stationary PV system to the two-axes tracker we realise that both models behave as expected yielding reasonable results in terms of solar irradiance calculation and produced power/energy. More analytically, the two-axes tracker shows a significant increase in the total energy yield, which varies from 20% (for December) to 35% (for July). These results are generally in accordance with the performance of commercial solar trackers. Also, the DSM simulation shows that the loads follow the PV production with a satisfactory accuracy (see fig. 3). Specifically, during the operation the power accuracy in the load profiles is always kept under 25%, which is the success test criterion for the experiment. Furthermore, in terms of energy, the difference between the PV yield and the load consumption is calculated to -4.867% while the maximum allowable deviation was assumed equal to 5%. Consequently, the project shows that such a 2-axis tracker and DSM control strategy can be used in order to exploit the renewable energy of the existing PV plant more effectively. It is obvious, however that between the two technical improvements investigated during the project the DSM control strategy is the most favourable one due to its feasibility of implementation on the existing PV plant at DICLE.

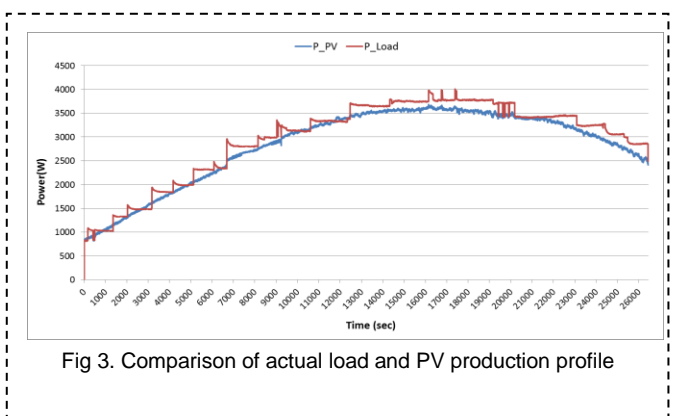


Fig 3. Comparison of actual load and PV production profile

3. PLANNED DISSEMINATION OF RESULTS (journals, conferences, others)

The dissemination plan of the DUSCP project includes submission of two conference papers. One paper will regard pure simulation and it will be submitted to the “International Engineering Conference (IEC 2017, Antalya, Turkey)”. The other paper that regards real-time simulation will be submitted to the “2018 IEEE PES Innovative Smart Grid Technologies Conference Europe (ISGT-Europe)”.

In addition, the paper that regards real-time simulation will be submitted to the “Simulation Modelling Practice and Theory” journal.