PVgnosis
DiaGNOSIS, maintenance and operation of PV plants

Project duration: from 12.2020 to 07.2023
Report submitted: 09.2022

Publishable Summary

PVgnosis aims to create an ICT Platform integrating all the necessary tools for delivering advanced diagnosis, predictive maintenance and intelligent visual inspection on installed PV plants. To this end, an advanced sensors' network is developed and deployed that collects data from unmanned aerial vehicles and thermal cameras as well as real-time, inverter-based information in order to provide to the Plant Operator a complete view with regards to individual panel operation, shading and thermal strain from sensory equipment on-site. Through historical and real-time data analysis using image processing & machine learning-based pattern recognition techniques, a decision-making mechanism is developed for recommendations of plant operation optimization. Thus, early signs of problems will be revealed, such as solar cell Potential Induced Degradation (PID). Specifically for reliability of PV inverter(s), a Fault Detection and Accommodation scheme is realized to detect and isolate faults and will be embedded into an actual inverter-controller for providing relevant information to the central platform. The goal is to enrich inverter functionalities with new control modes and capabilities for enabling the actual ancillary services' delivery from the PV plant infrastructure.

In the first year of PVgnosis, effort has been put on the definition of the platform's specifications and architecture. To this end, user requirements has been systematically collected via interaction with relevant end-users and stakeholders and subsequently transformed into system requirements. After the requirement elicitation phase, the specifications of the ICT platform have been defined and the PVgnosis architecture report has been prepared. Based on the user requirements all users worked towards the implementation of the PVgnosis components in the relevant WPs. Among the technological achievements until now has been the development of a methodology for the performance evaluation of PV plants with the implemented software currently running live on 4500 PV systems in Sweden, the computational framework for the detection of faults in PV panels using aerial images and deep learning techniques as well as the work towards an advanced, smart, multi-functional PV inverter. Dissemination activities have been also pursued with the project website being available at https://pvgnosis.eu/ and significant scientific papers being published.

Project consortium

Coordinator and all contact details:

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Participating countries and financing:

Country	**Number of organisations involved**	**Project costs in EUR**	**Public funding in EUR**
Greece	2	268 238	249 755
Cyprus	1	182 200	175 000
Sweden	1	305 000	137 250
Total	*4*	*755 438*	*562 005*

Funding agencies involved and contracts

Funding Agency	**Contract N° and Title**
General Secretariat for Research and Innovation (GSRT)	PVgnosis/5075007
Cyprus Research and Innovation Foundation (RIF)	P2P/SOLAR/0818/0007
Swedish Energy Agency	2019-004730 PVgnosis – DiaGNOSIS: drift och underhåll för solcellsanläggningar