



Prescriptive Analytics and Advanced Workforce Management for Optimized O&M of Solar Power Plants

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Project acronym: PANAMA

Project title: Prescriptive analytics and advanced workforce management for optimized O&M of solar power plants

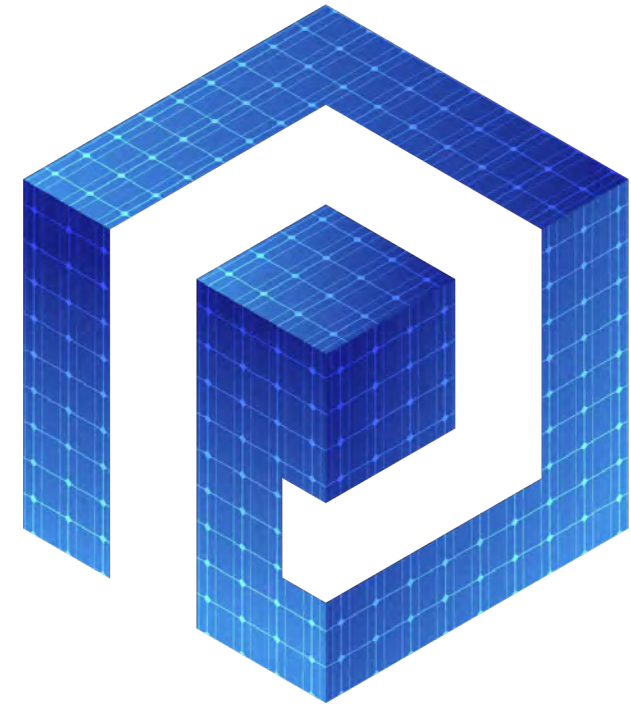
Total project costs (EUR): 341.640,42

Start date of the project: 01.07.2020

End date of the project: 30.12.2022

CONTENTS

- Information about Project
- The Goal of the Project
- Work Packages
- Project Outcomes



PANAMA

The Goal of the Project

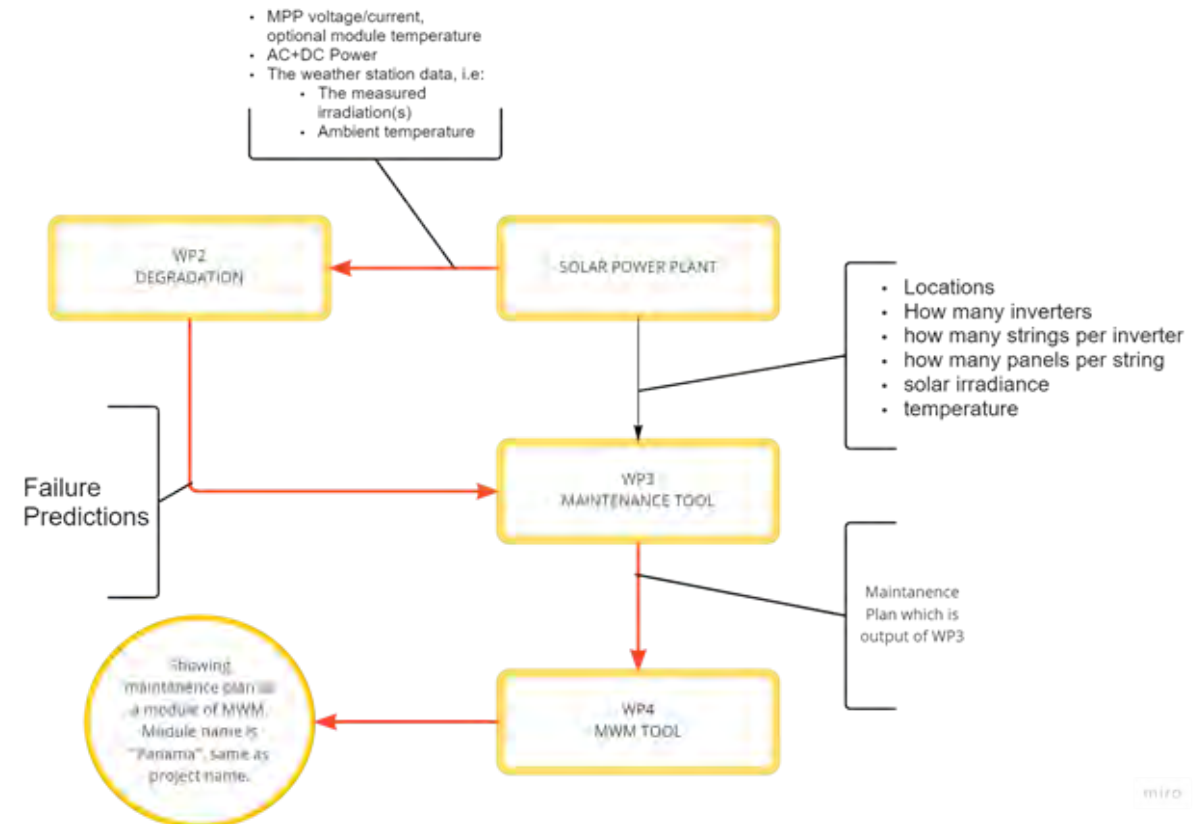
In this project, an O&M suite

- ✓ utilizes prescriptive analytics,
 - ✓ advanced performance monitoring
 - ✓ mobile workforce management tools
- for solar power plants has been developed, validated, and demonstrated.

The prescriptive maintenance tool

- ✓ predicts faults using machine learning and AI.
- ✓ detects the faults, locate them
- ✓ provides necessary recommendations to the technical teams on site helping them to solve the problem in the most proper way and short time.

If necessary, it assigns the works in an automated way. This workforce management tool guides the technical teams at site to solve the problem with advance visualization capabilities as well as online guidance from all the teams even at different locations.



« Exchange of Experiences » - Webinar

Insights, outcomes and results – 28 September 2023



WP-1 Project management and dissemination

Project coordination

Coordination of steering committee

Dissemination

Exploitation

Exploitation Plan

WP-2 Failure detection/degradation algorithms

Development of loss rate algorithms

Development of PV power plant Digital Twin

PV system health state monitor

WP-3 Prescriptive maintenance tool

Short-term forecasting models

Maintenance selection model

PV generation profiling algorithms

Techno-economic assessment

WP-4 Mobile work force management tool

Developing Web and mobile Uis for O&M application

WP-5 Integration and field validation

Preparation of Integration

Integration Plan

Prototype Integration

Redevelopment and/or adjustments

WP-6 Evaluation and recommendations

Cost-Benefit Analysis Report

Roadmap preparation for the commercialization

Roadmap for the commercialization

Work Packages

Project Outcomes

- As planned in the project proposal, 5 different power plants in KONYA/TURKEY, were installed for field verification tests. However, as a result of the evaluations made with all partners, only 3 power plants' data were suitable, and the relevant data and information about the power plants were used for the studies of both AIT and the University of North Macedonia.

JUPITER
PLANT



RTU

- Photographs of the installations carried out at the Jupiter power plant (one of the pilot sides) , are shown side.
- Thanks to the meteorological data station seen in the provided images as well, it has been possible to collect data on sunlight (radiation), wind speed, temperature, etc., from the power plant for 24 hours.
- The data has been collected by the RTU and modem installed in the field.

Project Outcomes

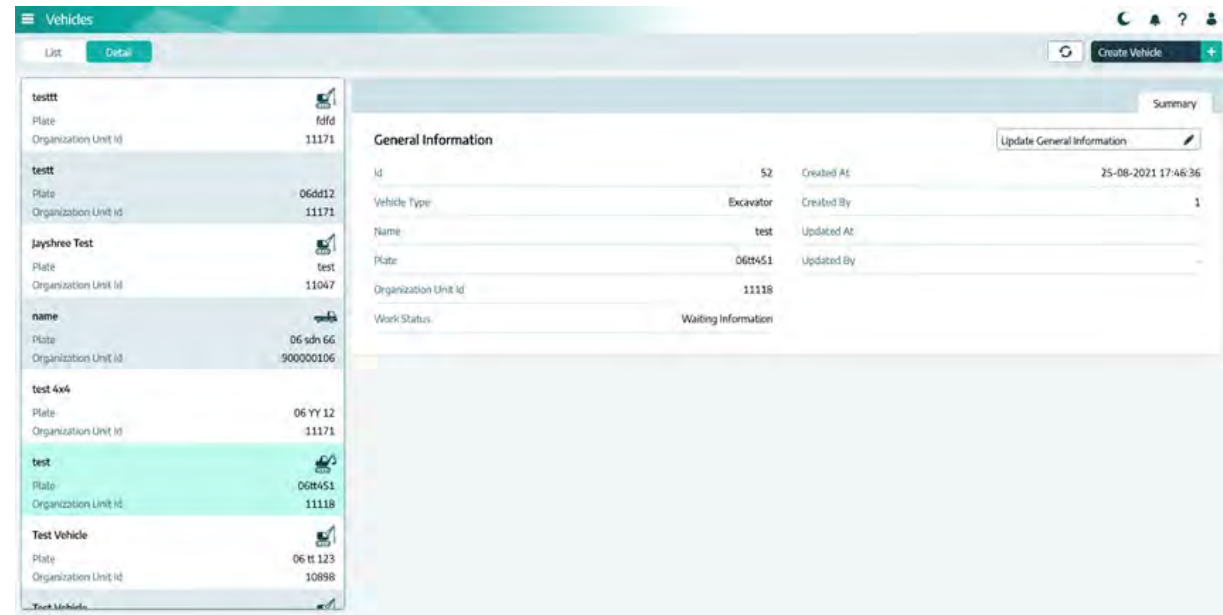
The outcomes are given below in the list:

➤ **Prescriptive Maintenance Tool Development**

Measurement data from various sensors - such as electrical and environmental sensors - and digital models of power plants with fault detection and degradation algorithms use in conjunction with artificial intelligence and machine learning tools by employing the necessary research and development methodologies.

➤ **Advanced Work Force Management Tool Development**

A mobile platform used to connect consumers to an online platform, enabling a team member from different locations to assist any technician.



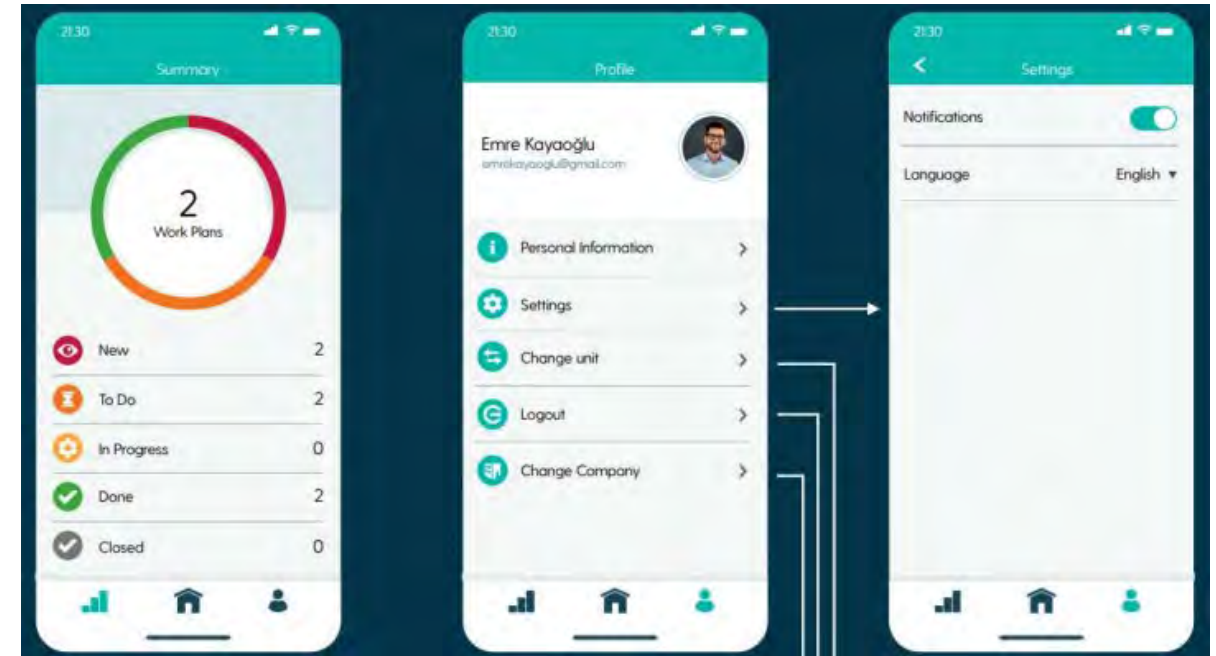
Project Outcomes

➤ Operational Cost Reduction

It provides a set of services to make O&M companies run the operations in an optimum way in both technical and financial manner by giving the necessary information and guidance on time. Location detection of the faults or the malfunctioning equipment reduce the operational costs of the O&M companies.

➤ Reliability of PV Increase

The number of unexpected breakdowns and total production losses reduce by the proposed solution. Besides automated workflow with accurate suggestions on repair actions reduce the power plant downtime even if there is an unexpected breakdown. KPI assessment for these objectives is increasing the overall system performance by at least 10%.



Project Outcomes

5 peer-reviewed
articles

3 Citations to
publications

5 conferences

1 PhD thesis.

18 Project
internal meetings
(teleconference,
videoconference)



PANAMA
PRESCRIPTIVE SOLAR ANALYTICS &
ADVANCED WORKFORCE MANAGEMENT