



PANAMA

PRESCRIPTIVE SOLAR ANALYTICS & ADVANCED WORKFORCE MANAGEMENT

D5.1

„Laboratory Test Results”

Responsible Partner	AIT
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EXECUTIVE SUMMARY

Within the PANAMA project, the Deliverable 5.1 is the outcome of the Task 5.1 – “Laboratory Tests on AIT and UCY sites”. Both are due at the 22nd project month, which is the end of June 2022.

In the project proposal, the outcome was described as:

The laboratory testing of the algorithms and prescriptive maintenance tool is another objective of this task. The integration each component of the project and the interactions will be tested within Hardware-in-the loop trials in the AIT SmartEST Laboratory. Furthermore, laboratory tests will also be carried out at the FOSS laboratory.

Since the envisaged project partner FOSS/University of Cyprus (UCY) did not receive national funding and therefore were not able to participate in the project execution, related challenges had to be overcome in this task. The initial idea of performing real-live module aging in Cyprus - and then to perform the highly accurate measurement of these modules at AIT - was unreplaceable due to the very special irradiation conditions in Cyprus. To conserve the contextual reason behind the task, namely, to ensure that the algorithms indeed work, alternative evaluations were performed to cross check their validity. This more accurate validation of the failure mechanisms was performed in T2.2 and 2.3, as well as the field validation of T5.2. The results are documented in D5.2 as well as D2.2, hence no detailed text is provided in this document.

Multiple corrective measures were evaluated by the project consortium to compensate for the non funding of the envisioned partner:

Modules from Turkey: To replace the aged PV modules of the partners from Cyprus that were not able to participate in the project, it was evaluated to instead use modules from the Turkish solar systems from the field validation performed in the course of T5.2. This, however, was not useful for multiple reasons: Firstly, the modules of these systems were not measured before the installment using an accredited PV-flasher. Accordingly, no initial, accurate and non-degraded IV-data was available and no reasonable information of the system degradation could be performed. Secondly, in the relevant PV systems, neither replacement nor reference modules were available that could be used, while removed modules were to be shipped to Austria. Hence, the removal of modules would have caused a strong underperformance of the systems and related monetary losses to the plant owners.

Aging of Modules within AIT: The much larger UV- and visible radiation, together with higher ambient temperatures, leads to a unique situation in Cyprus: Modules can be aged faster. Outdoor exposure in Austria can not compensate for that. Accelerated aging using climatic chambers and indoor UV irradiation is known to cause partially different degradation mechanisms as compared to outdoor exposure. Moreover, modules of the Turkish PV systems are likely to have different degradation mechanisms than potentially artificially aged modules. Hence, no measured PV module degradations can be fitted to monitoring data from a system that has comparably degraded modules exposed to a long-term outdoor degradation of at least one year. For shorter durations, seasonal effects are not included in the monitoring, rendering the degradation estimation unreliable.

Due to this reasoning and discussion in the consortium, the workload was shifted towards T2.2 and 2.3, as well as the field validation of T5.2. These endeavors were necessary, and finally ensured that the goal of the project was still fulfilled, while circumventing the challenges of the loss of envisioned partners.