NUNCTION

Reliability Department

Reliability assessment of new electronic solutions for module integration in PV systems.



Problem

In order to simplify the installation of

Target

Analysis, evaluation and comparison of reliability and profitability of newly developed module integrated inverters. Development of measures to ensure the lifetime and reliability of the new product.

small PV systems through modular flexibility, as well as to increase their safety and efficiency, the electronic components are integrated directly into the solar module. The resulting heat generation and the associated changes in general conditions, as well as the very high service life requirement of over 20 years, make a detailed analysis from a reliability point of view essential. The critical changes associated with the module integration of the electronics are to be evaluated in terms of reliability. In addition, it must be ensured that the newly developed electronics solutions

Procedure

- 1. System and requirements analysis of PV systems and their electronics
- 2. Identification of critical damage mechanisms (physics of failure) and their physical influencing variables
- 3. Derivation of suitable reliability methods for the evaluation and validation of PV systems using a simulation model based on Petri nets

are competitive with the older variants, even under particularly critical operating conditions directly on the solar module.



- 4. Elaboration of mission profiles and use cases
- 5. Reliability evaluation and verification of critical changes
- 6. Comparison of reliability and profitability of different electronic solutions

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