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Degradation of poly-crystalline photovoltaic module after a few operating years outdoor exposure in hot and hymide climate of casamance in Senegal

Abstract

PV modules are often considered to be the most reliable component of a photovoltaic system. The alleged reliability has led to the long warranty period for modules up to 25 years. Currently, failures resulting in module degradation are generally not considered because of the difficulty of measuring the power of a single module in a PV system and the lack of feedback on the various degradation modes of PV modules. In the present study, degradation analysis of 9 poly-crystalline silicon PV modules of solar pump are study after four years exposition in outdoor in a subguineen climate. A comprehensive analysis has been carried out through visual inspection, I-V characteristic After few operation years under subguineen climate environment, the global degradation and the degradation rate of electrical. characteristics such as I-V and P-V curves, open-circuit voltage (V_{oc}), short-circuit current (I_{sc}), maximum ouput current (I_{max}), maximum output voltage (V_{max}), maximum power output (P_{max}) and fill factor (FF) are evaluate at standard test conditions (STC). The study has shown that P_{max} , I_{max} , I_{sc} and FF are the most degraded performance characteristics for all PV modules. The global degradation of power output (P_{max}) presents the highest loss that cand be from 8,75%/year to 22,45%/.

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