



Impact of dust on the photovoltaic (PV) modules characteristics after an exposition year in Sahelian environment: The case of Senegal

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Auteur	Ndiaye, Ababacar [1], Kébé, Cheikh M.F. [2], Ndiaye, Papa A [3], Charki, Abderafi [4], Kobi, Abdessamad [5], Sambou, Vincent [6]
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Mots-clés	dust effect. [7], photovoltaic (PV) module performance parameters [8], Photovoltaic module [9]
Résumé en anglais	<p>The objective of this paper is to find the effect of dust on the performance of photovoltaic modules. To this end, the International Center for Research and Training in solar energy at Dakar University and the Lasquo-ISTIA Laboratory of Angers University have put in place a research project in order to investigate the impact of Sahelian climatic conditions on the photovoltaic (PV) modules characteristics. Accordingly, monocrystalline silicon (mc-Si) PV module and a silicon polycrystalline (pc-Si) PV module are installed at Dakar University and monitored during one operation year without cleaning. We evaluate the variation depending on the dust of electrical characteristics such as I-V and P-V curves, open-circuit voltage (V_{oc}), short-circuit current (I_{sc}), maximum output current (I_{max}), maximum output voltage (V_{max}), maximum power output (P_{max}) and fill factor (FF). This work has highlighted the impact of dust on the Current-Voltage (I-V) and Power-Voltage (P-V) characteristics of PV modules (mc-Si and pc-Si) with the advent of the mismatch effect. P_{max}, I_{max}, I_{sc} and FF are the most affected performance characteristics by the dust deposits on the PV modules surface. The maximum power output (P_{max}) loss can be from 18 to 78% respectively for the polycrystalline module (pc-Si) and monocrystalline module (mc-Si). I_{max} loss can vary from 23 to 80% for respectively pc-Si and mc-Si modules. However, the maximum voltage output (V_{max}) and the open-circuit voltage (V_{oc}) are not affected by dust accumulation for both technologies studied. The fill factor (FF) may decrease from 2% for the pc-Si module to 17% for the mc-Si module.</p>

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