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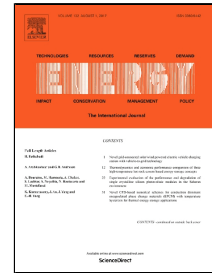
Simulation of Airflow and Particle Deposition Settled over a Tilted Photovoltaic Module

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1 **Simulation of Airflow and Particle Deposition Settled over a Tilted Photovoltaic** 2 **Module**

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10 **Abstract**

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12 Dust deposition over Photovoltaic (PV) module's surface highly influences the PV module
13 performance and decreases the module output power. This paper studied the particle dust
14 deposition over a tilted PV module under different operating conditions. A combined Eulerian-
15 Lagrangian model was used to model the flow and particle phases. The flow was considered
16 turbulent and the v^2 - f turbulent model was used to predict the air flow characteristics. This study
17 first investigated the air flow characteristics and found the imposed forces on the PV module due
18 to the air flow passed over the module when the module was fixed at different tilt angle as well
19 as different wind directions. Then the particle concentration and deposition over the PV module
20 in the above cited conditions were obtained. Results showed that the maximum particle
21 deposition when the module is faced toward the south occurs at 45° tilt angle for particle larger
22 than 10 μ m. This fact does not sustain for smaller particle than 10 μ m as in this size the maximum
23 deposition happened in 90° tilt angle. The results also showed that increasing the wind velocity
24 over the PV module increases the corresponding tilt angle for the maximum deposition.

25
26 **Keywords:** Dust, deposition, Photovoltaic, Particle, Tilt Angle, Lagrangian

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