

Power loss due to soiling on solar panel: a review

ABSTRACT

The power output delivered from a photovoltaic module highly depends on the amount of irradiance, which reaches the solar cells. Many factors determine the ideal output or optimum yield in a photovoltaic module. However, the environment is one of the contributing parameters which directly affect the photovoltaic performance. The authors review and evaluate key contributions to the understanding, performance effects, and mitigation of power loss due to soiling on a solar panel. Electrical characteristics of PV (Voltage and current) are discussed with respect to shading due to soiling. Shading due to soiling is divided in two categories, namely, soft shading such as air pollution, and hard shading which occurs when a solid such as accumulated dust blocks the sunlight. The result shows that soft shading affects the current provided by the PV module, but the voltage remains the same. In hard shading, the performance of the PV module depends on whether some cells are shaded or all cells of the PV module are shaded. If some cells are shaded, then as long as the unshaded cells receive solar irradiance, there will be some output although there will be a decrease in the voltage output of the PV module. This study also present a few cleaning method to prevent from dust accumulation on the surface of solar arrays.

Keyword: Photovoltaic; Losses; Environment; Power output; Performance loss; Shadow