

Developing Soil Accumulation Effect Correction Factor for Solar Photovoltaic Module

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Abstract : Increasing demand for energy, depletion of non-renewable energy, effects of climate change, the abundance of renewable energy such as solar energy have increased the interest in investing in renewable energies, in particular solar photovoltaic (PV) energy. Solar photovoltaic energy systems as part of clean technology are considered to be environmentally friendly, freely available, offer clean production systems, long term costs benefits as opposed to conventional sources, and are the attractive power source for a wide range of applications in remote areas where there is no easy access to the national grid. To get maximum electrical power, maximum solar power should penetrate the module and be converted accordingly. However, some environmental and other geographical related factors reduce the electrical power. One of them is dust which accumulates on the surface of the module and forming a dust layer and in the process obstructing the solar power from penetrating PV module. This study intends to improve the performance of solar photovoltaic (PV) energy modules by establishing soil accumulation effects correction factor from dust characteristics and properties, and also from dust accumulation and retention pattern on PV module surface. The non-urban dry deposition flux model was adapted to determine monthly and yearly dust accumulation pattern. Consideration was done on prevailing environmental and other geographical conditions. Preliminary results showed that cumulative dust settlement increased during the months of July to October leading to a higher drop in module electrical output power.

Keywords : dust, electrical power output, PV module, soil correction factor

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