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The study of photovoltaic systems performance using various azimuth angles and solar array tilt positions

Abstract

The study of photovoltaic energy and load predictions have become essential with the increase of energy demand. The objective of this paper is to present an analytical study on the performance of photovoltaic system with various azimuth angles and solar array tilt positions. The output power of a solar module is mainly dependent on its tilt position, solar irradiation, type of solar cell, and the technical properties of the module. The data used in this work consist of two different locations. The outcome of this work shows that the energy production influenced heavily on the weather conditions, location, azimuth angles and tilt positions. Within this work, parameters such as planes-of-array irradiance, net to inverter output power, net to grid output power and performance ratio have been studied. The developed analytical study is anticipated to provide a better understanding on the energy production and load usage in accordance with suitable tilt angle of solar array in a specific location.

Keywords

Azimuth angle; Energy efficiency; Photovoltaic system; Solar panels tilt positions