

On the effectiveness of time and date-based sun positioning solar collector in tropical climate: a case study in Northern Peninsular Malaysia

ABSTRACT

This paper provides detailed information on the developed hardware and software for sun tracking mechanism and shows the effectiveness of utilizing time and date-based sun positioning solar collector system in tropical climate. The sun positioning system is based on the calculated azimuth and altitude at location E100°11', N6°26' in Northern Peninsular Malaysia where the climate is categorized as tropical climate. The system has two axes tracking with accuracy of 1° controlled by a programmable logic controller (PLC). The field test has been done during a sunny and clear day, cloudy day and, heavy overcast and rainy day in which the results show that the improvement in the generated power of 91.97%, 122.71% and 90.42%, respectively, as compared with the fixed horizontal system.

Keyword: Photovoltaic system; Solar tracking; Two-axis PV system