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Slope Angle for Seasonal Applications of Solar Collectors in Thailand

S. Bari, T.H. Lim, C.W. Yu

Abstract

Flat plate collectors are usually fixed at a certain slope angle and oriented towards the equator. For year-round operation, many authors have that a collector's slope equal to the latitude angle is the best. However, for seasonal applications where the collectors are used for part of the year, the lope angles need to be different from those for year-round operation in order to get maximum solar radiation. This paper describes a method to determine the slope and orientation angle of flat collectors, for any period of operation. Equations and constants applicable to the average atmospheric conditions and latitude angles of Thailand are given in the paper. The method takes into account the direct and the diffuse components of solar radiation. For simplicity, the reflected component is neglected. It is shown that for seasonal applications, an optimally oriented collector can get as high as 13% more energy than a collector with its slope equal to the latitude collector can get as high as 13 % more energy than a collector with its slope equal to the latitude angle.