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Research Article

Performance of Dual-Axis Solar Tracker versus Static Solar System by Segmented Clearness Index in Malaysia

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Abstract

The performance of Dual-Axis Solar Tracker (DAST) and Static Solar System (SSS) with respect to clearness index in Malaysia is presented. An attempt to investigate the correlation between clearness index with energy gain and efficiency of DAST over SSS is being done experimentally. A good correlation could not be found out from the daily clearness index. It is due to the more profound advantage of DAST in the morning and evening compared to midday as it is able to follow the sun's position. Hence, the daily clearness index is divided into three segments which are morning, midday, and evening to interpret the energy gain and efficiency better. A clearer correlation with low standard deviation can be observed on the segmented clearness index analysis. The energy gain and efficiency of seven cities in Malaysia is being estimated with the segmented clearness index and compared to the result generated from anisotropic radiation model. A similar trend is obtained and it has shown that the segmented clearness index could be utilized as a graphical method for estimation of energy gain and efficiency of DAST over SSS.