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## A model of clearness index using atmospheric parameter for solar energy applications in Offa environment, Nigeria

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Solar energy is the radiant energy from the sun that is harnessed using a range of ever-evolving technologies such as photovoltaic, solar architecture and solar thermal energy. It is a source of renewable energy and its technologies are broadly characterized as passive or active solar techniques depending on how it is obtained and distributed as solar energy or converted to solar power. Clearness index reflects the meteorological variations and climatic changes depending on the location. This study is based on the formulation of a model for clearness index using ambient temperature for solar energy applications in Offa environment (lat.8.90N, lon4.20E). The atmospheric parameter was obtained from FEDPOFFA meteorological station at, Offa for a period of five months; from 1<sup>ST</sup> June to 30<sup>TH</sup> October, 2016. The performance of this correlated model as global radiation estimator was evaluated by comparing the predicted and measured values. Different statistical analyses were employed to examine the mathematical model. The quadratic equation obtained fits well with the measured data. The quadratic equation obtained was well correlated with the measurement when further comparisons were carried out with the existing equations for tropical environment. The importance of empirical models for obtaining accurate solar radiation is not over emphasized as accurate data base for solar radiation is virtually not available in Nigeria and there is need to develop solar energy systems for rural applications.

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