

The Application of Artificial Neural Networks for the Performance Prediction of Evacuated Tube Solar Air Collector with Phase Change Material

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Abstract : This paper describes the modeling of novel solar air collector (NSAC) system by using artificial neural network (ANN) model. The objective of the study is to demonstrate the application of the ANN model to predict the performance of the NSAC with acetamide as a phase change material (PCM) storage. Input data set consist of time, solar intensity and ambient temperature wherever as outlet air temperature of NSAC was considered as output. Experiments were conducted between 9.00 and 24.00 h in June and July 2014 underneath the prevailing atmospheric condition of Kurukshetra (city of the India). After that, experimental results were utilized to train the back propagation neural network (BPNN) to predict the outlet air temperature of NSAC. The results of proposed algorithm show that the BPNN is effective tool for the prediction of responses. The BPNN predicted results are 99% in agreement with the experimental results.

Keywords : Evacuated tube solar air collector, Artificial neural network, Phase change material, solar air collector

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