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Evaluation of an empirical model for a flat plate solar collector

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Abstract content
   (Max 300 words)
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A simple empirical model for a flat plate solar collector is presented. The model describes the hot water temperature at the collector outlet for the system installed in Alice, South Africa. The empirical model takes a top-down approach in which collected data is used to predict collector outlet temperature. The fluid outlet sensor of the two collector plate system was positioned to measure combined water temperature of both collectors. A data acquisition system was designed and built to measure weather data, temperatures and flow data and these variables used as predictors to the model. The regression results indicate an adjusted R squared value of 0.946 which is an acceptable value. Model validation was done by evaluating the root mean square error (RMSE), mean bias error (MBE) and the correlation coefficient (CC). The results comparing measured and calculated temperature show that the model is reliable in predicting the collector out let temperature. The average maximum error was found to be 4.83 which is in the range of the acceptable error margin.

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