International Energy Journal, Volume 12, Issue 1, March 2011

Single Basin Solar Still Coupled with Evacuated Tubes - Thermal Modeling and Experimental Validation

K. Sampathkumar, T.V. Arjunan, P. Senthilkumar

Abstract

An attempt made to couple the water-in-glass evacuated tubes with single basin solar still is reported in this paper. Even though many active methods have been developed to increase the productivity of the solar still, the proposed experimental technique has increased the daily average production to 72%. For high temperature distillation, evacuated tubes have better performance when compared to flat plate collector and other solar collectors. Outdoor experiments were conducted to predict the performance of a single basin solar still coupled with evacuated tubes for the climatic condition of Coimbatore (latitude: 11°N; longitude: 77°E and an altitude of 409 m above sea level), Tamilnadu, India. A thermal model was developed using energy balance equations and the results obtained were in good agreement with the experimental results. The payback period of this system was found to be 235 days based on the economic analysis.

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