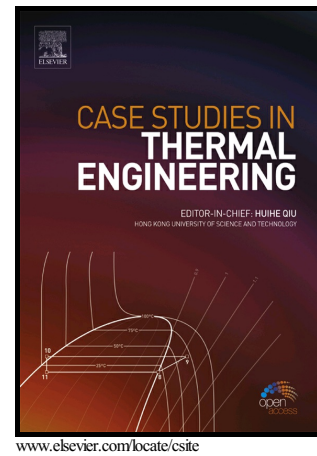


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New design of Solar Chimney (Case study)

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Abstract:

The solar chimney power plant has a promising future in the world. A new design of solar chimney is offered including both PV panels with solar chimney plant for electricity generation. Two experimental models of a hybrid solar chimney were built and designed (systems A&B). System (A) had a collector glass roof cover and a PV panel as an absorber with a chimney of 2 m height while system (B) is similar to system (A) but with PV panel as collector roof cover and plywood as an absorber in the base of the chimney.

Two similar experimental models were built to achieve the performance of these new designs. Practical tests were conducted in Kirkuk ($35^{\circ} 28'$ latitude and $44^{\circ} 24'$ longitude), northern Iraq. The results showed that system (A) had higher thermal gain than system B while the daily average of electrical power in system (B) was (75.6 W) higher than system (A) (79 W). This is because the high thermal gain raised the operating temperature of the PV panel which led to a decrease in its power output. The results also presented that system (A) converted thermal power to kinetic power with daily average (0.008 W) because of the great thermal gain which made air less dense in turn increased its velocity more than system (B) (0.006 W) which had lower kinetic power. The total useful power produced by the system (B) is greater than the useful power produced from the system (A).

Keywords: Solar chimney, New design, Solar cell.

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