

Thesis Title	Design of a Simple PV System to Enhance the Role of Roof Solar Collector
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Abstract

The objective of this thesis was to designing a PV ventilation system to enhance the performance of roof solar collector (RSC) for reducing heat accumulation inside the house. The RSC has 1.5 m² surface area made of CPAC monier roof tiles on the upper part and gypsum board on the lower part. The space between CPAC monier and gypsum board was fixed at 14 cm. The RSC units were tilted at 25°. Base on mathematical model, it was found that the calculated mass flow rate of air inside RSC is around 0.02 kg/s per RSC unit. The corresponding size of DC fan is about 0.1955 W and the required size of module is about 0.0163 unit (0.4401 Wp) of the smallest commercial PV panel.

PV ventilation system consists of a 0.221 m², 27 Wp PV module and two 7.2 W DC fans installed in the gap of each RSC. Experimental result showed that the temperature of the room, CPAC monier, gypsum board and temperature difference between CPAC monier and gypsum board are not too high; around 32, 40, 33 and 7 °C respectively. The average PV powered mass flow rate of air and the corresponding air change per unit RSC are about 0.03-0.06 kg/s and 3-7 ACH respectively. Those performances are much more important than the natural ventilation induced by RSC. Therefore, PV-powered RSC is an interesting option in the sense that it promotes solar energy and conserve energy.

Keywords : Roof Solar Collector / Photovoltaic / Ventilation