Performance improvement of the finned passive PVT system using reflectors like removable insulation covers

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ABSTRACT

A passive photovoltaic–thermal system (PVT) is the combination of a photovoltaic (PV) panel and a compact solar water heater for co-generation of heat and electricity. This system bears considerable heat losses to ambient, particularly at noncollection times. One simple way to overcome this problem is to use a removable insulation cover on the collector's outer glazing. In this paper, the effects of the reflectors on day and night performance of a finned passive PVT system were numerically studied. At nonenergy collection time, the reflectors can turn and cover the collector cover glass as a nonconductor material. Simulation results showed that the reflectors reduce the night heat losses and increase the solar radiation rate on the absorber plate. The use of removable insulation reflectors resulted to saving extra sensibly thermal energy. Also, the solar cells power generation (Psc), in the case of reflectors installed, was reinforced.