

Design and Sensitivity Analysis of Photovoltaic/Thermal Solar Collector

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Abstract : Energy is required in almost every aspect of human activities and development of any nation in this world. Increasing fossil fuel price, energy security and climate change have important bearings on sustainable development of any nation. The renewable energy technology is considered one of the drastic approaches taken over the world to reduce the energy problem. The preservation of vegetables by freezing is one of the most important methods of retaining quality in agricultural products over long-term storage periods. Freezing factories show high demand of energy for both heat and electricity; the hybrid Photovoltaic/Thermal (PV/T) systems could be used in order to meet this requirement. This paper presents PV/T system design for freezing factory. Also, the complete mathematical modeling and Matlab Simulink of PV/T collector is introduced. The sensitivity analysis for the manufacturing parameters of PV/T collector is carried out to study their effect on the thermal and electrical efficiency.

Keywords : renewable energy, hybrid PV/T system, sensitivity analysis, ecological sciences

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