

Energy Matrices of Partially Covered Photovoltaic Thermal Flat Plate Water Collectors

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Abstract : Energy matrices of flat plate water collectors partially covered by PV module have been estimated in the present study. Photovoltaic thermal (PVT) water collector assembly is consisting of 5 water collectors having 2 m² area which are partially covered by photovoltaic module at its lower portion (inlet) and connected in series. The annual overall thermal energy and exergy are computed by using climatic data of New Delhi provided by Indian Meteorological Department (IMD) Pune, India. The Energy payback time on overall thermal and exergy basis are found to be 1.6 years and 17.8 years respectively. For 25 years of life time of system the energy production factor and life cycle conversion efficiency are estimated to be 15.8 and 0.04 respectively on overall thermal energy basis whereas for the same life time the energy production factor and life cycle conversion efficiency on exergy basis are obtained as 1.4 and 0.001.

Keywords : overall thermal energy, exergy, energy payback time, PVT water collectors

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