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# Annual performance of partially covered photovoltaic thermal flat plate collectors connected in series

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The performance of series connected tube in plate flat plate water collectors partially covered by the photovoltaic module has been evaluated on annual basis. The system consists of 5 partially covered photovoltaic thermal (PVT) water collectors having 2 $m^2$ areas. The annual energy has been estimated by considering all types of weather conditions for New Delhi India. The solar radiation data provided by Indian meteorological department (IMD, Pune) has been used for computing the annual energy. The overall thermal energy and exergy saved by the system are estimated as 10 MWh and 0.887 MWh respectively. The carbon credit earned by the system in a year on overall thermal energy basis is found to be USD 296.1 and on exergy basis it is USD 26.2. The energy payback time on overall thermal basis and exergy basis was found to be 1.6 years and 17.8 years respectively.

## Biography

G N Tiwari is a Professor in Centre for Energy Studies, Indian Institute of Technology, Delhi, India. He has received his Postgraduate and Doctoral degrees in 1972 and 1976 respectively, from Banaras Hindu University. Since 1977, he has been actively involved in the teaching program at Centre for Energy Studies, IIT Delhi. His research interest includes solar distillation, water/air heating system, greenhouse technology for agriculture as well as for aquaculture, Earth to air heat exchanger, passive building design and hybrid photovoltaic thermal (HPVT) systems, climate change, energy security, etc. He has guided about 80 PhD students and published over 600 research papers in journals of repute. He is recipient of National Hari Om Ashram Prerit S S Bhatnagar Award in 1982 for his seminal contribution in the field of solar distillation. He had been to the University of Papua, New Guinea in 1987-1989 as Energy and Environment Expert. He is responsible for development of "Solar Energy Park" at IIT Delhi and Energy Laboratory at University of Papua, New Guinea, Port Moresby. He has successfully co-coordinated various research projects on solar distillation, solar water heating system, Greenhouse technology; hybrid photovoltaic thermal (HPVT) and Building integrated photovoltaic thermal (BiPVT) system etc.

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