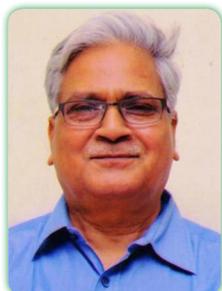


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G N Tiwari

Indian Institute of Technology Delhi, India

Photovoltaic thermal systems: A review

In this review, photovoltaic thermal (PVT) system and its applications will be discussed to meet the energy need of human being on planet earth to sustain global environment and climate change. There is strong need to preserve the fossil fuel based power generation which is not friendly either environment or climate. It should be used for most important applications e.g. industries and commercial sectors for high gross domestic production (GDP) for a particular countries. The photovoltaic thermal (PVT) systems namely PVT water/air heaters, PVT greenhouse crop/vegetables/fruits dryer, building integrated PVT (BiPVT) etc. can be used in agriculture, passive heating/cooling, domestic use, solar distillation to meet water demand in domestic and industrial applications and PVT active heating of biogas plant etc. In these applications, a semitransparent PV module which has higher electrical efficiency in comparison with opaque PV module is mostly used. An overall characteristic analysis of each system based on thermal energy and exergy will be discussed in brief. An environmental effect in terms of CO₂ mitigation will be also discussed with life cycle cost analysis.

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.

gntiwari@ces.iitd.ac.in