Performance analysis of photovoltaic-thermal liquid collector by CFD simulation
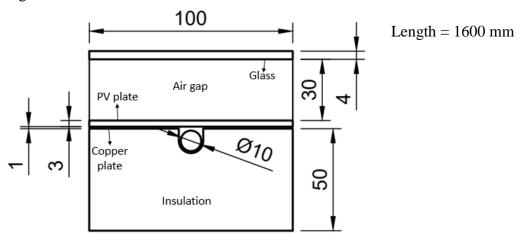
Harsh Manani

Department of Mechanical Engineering

Indian Institute of Technology Bombay

Abstract

Aim of this case study is to calculate thermal and electrical efficiency of solar photovoltaic-thermal collector with water used as a fluid. Efficiency of solar PV system decreases as temperature of silicon cell increases. In solar PVT system water is used as a fluid to decrease temperature of the silicon cell and increase efficiency of electricity generation. Hot water can be used for heating application. In this case study steady state and transient of solar PVT system is done for different values of water mass flow rate and different solar radiation using chtMultiRegionFoam.

References

1. Chow, T. (2003). Performance analysis of photovoltaic-thermal collector by explicit dynamic model. *Solar Energy*, *75*(2), 143-152. https://doi.org/10.1016/j.solener.2003.07.00
2. Misha, S., Abdullah, A., Tamaldin, N., Rosli, M., & Sachit, F. (2020). Simulation CFD and experimental investigation of PVT water system under natural Malaysian weather conditions. *Energy Reports*, *6*, 28-44. https://doi.org/10.1016/j.egyr.2019.11.162