



MODELING TEMPERATURE VARIATION IN A CPV SYSTEM

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Abstract

One of the most sustainable ways to reduce the use of fossil fuels and mitigate the greenhouse gases is represented by the photovoltaic conversion. To increase the efficiency of a photovoltaic system (PV), concentrators can be used. The performance of a PV or Concentrated PV (CPV) system is directly related to the semiconductor activity which, for crystalline silicon, strongly decreases with temperature. This paper objective is to evaluate the temperature on the surface of a PV module, correlated with the outdoor temperature, when using a low CPV, compared to a non-concentrating PV system, both fix tilted at 45° in the Brasov-Romania location. The simulations were done considering the data from the meteorological station and the 10 kWp acquisition system, installed at Transilvania University. The results show an increase with about 30-40°C in the PV system when using plane mirrors as radiation concentrators while the daily energy lost as heat from the low CPV system is about 6 times higher than the energy from a similar system without concentrators.

Key words: low CPV system, PV system, PV temperature, solar radiation

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