

Exergy, exergoeconomic and enviroeconomic analysis of a building integrated semitransparent photovoltaic/thermal (BISTPV/T) by natural ventilation

ABSTRACT

Different parameters could contribute to the performance of Building Integrated Semi-Transparent Photovoltaic/Thermal (BISTPV/T) systems, for example amount of incident radiation, the location, the degree of semi-transparency of the PV system, orientation of the collector surface, and the mode of ventilation of the air within the double-skin façade (DSF). Nevertheless, the performance of the system could not be solely depended on energy efficiency but has to be analyzed in its entirety. Thus, exergy efficiency must be examined as well. The present work studies the exergy, exergoeconomic and enviroeconomic analysis of BISTPV/T system by natural ventilation. For a given meteorological conditions, the energy and exergy efficiency, net and ratio loss rate, CO₂ emission and enviroeconomic reduction are calculated by solving a set of energy and exergy formulations. The results depicted that the BISTPV/T exhibits greater energy and exergy efficiency than the opaque BIPV/T, thus creating lower loss rate and eventually better impact economy and environment.

Keyword: BIPV/T; Exergy; Exergoeconomic; Enviroeconomic; Natural ventilation; Semitransparent
