

Studying the Effect of Shading by Rooftop PV Panels on Dwellings' Thermal Performance

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Abstract : Thermal performance is considered to be a key measure in building sustainability. One of the technologies used in the current building sustainable design is the rooftop solar PV power generators. The application of this type of technology has expanded vastly during the last five years in many countries. This paper studies the effect of roof shading developed by the solar PV panels on dwellings' thermal performance. The analysis in this work is performed by using two types of packages: "AccuRate Sustainability" for rating the energy efficiency of residential building design, and "PVSYST" for the solar PV power system design. The former package is used to calculate the annual heating and cooling load, and the later package is used to evaluate the power production from the roof top PV system. The analysis correlates the electrical energy generated from the PV panels to the change in the heating and cooling load due to roof shading. Different roof orientation, roof inclination, roof insulation, as well as PV panel area are considered in this study. The analysis shows that the drop in energy efficiency due to the shaded area of the roof by PV panels is negligible compared to the energy generated by these panels.

Keywords : PV panel, thermal performance, roof shading, energy efficiency

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