

Development of a retractable tray dryer for drying crops in solar PV farms

ABSTRACT

Temperature plays a significant element in Solar PV technology as well as herbal growth. Significant research laboratories have proven that approximately 0.5% electricity from PV generators are reduced based on 1°C increase of the module temperature which is dispersed as heat energy whereas increasing temperature may degrade the plant growth. Harvesting the dissipated heat from the bottom surface of a Photovoltaic (PV) Array is currently a new research area which is in line with sustainable urban development. This study suggested a new prototype of Retractable Tray Dryer (RtD) be embedded directly under PV arrays as means of harvesting the dissipated heat as well as reducing the bottom temperature within the concept of heat convection. The tray dryer is designed in such a way that it can be suited to any PV structures and can be clustered for a large scale farm. A specified leavy-type herbal crop was used as sample and tested at the Universiti Putra Malaysia PV Pilot site. Field test of the embedded tray as compared to the normal system showed higher drying rate for RtD which produces higher yield and good quality of dried crops.

Keyword: Retractable tray dryer; Dissipated heat; Air convection; Crops drying