

Feasibility of using Solar PV Waste Heat to Regenerate Liquid Desiccant in Solar Liquid Desiccant Air Conditioning System

ABSTRACT

(Hybrid Photovoltaic (PV) units are systems that produce both electrical and thermal energy in a single unit. The purpose of this research is to investigate the feasibility of using PV solar waste heat to regenerate liquid desiccant in the solar air conditioning system. A typical liquid desiccant regenerator requires a temperature range between 50 °C and 60 °C. Thus, the heat recovery system is designed on a 50W solar PV that focuses on recovering, delivering, and transferring of heat from panel PV to heat the circulating water. This paper also discusses the comparison of output power and efficiency between heat recovered and a standard solar photovoltaic panel. The calculated maximum output power for heat recovered and standard solar PV system was 52.20W and 40.15W, with an efficiency of 11.72% and 9.65% respectively. The maximum temperature for the heat recovered system was 55.10 °C at 1.00 pm and the standard system was found at 62.30 °C. The experiment results show that stored water temperature in the reservoir able to reach 55 °C, within the range of a preferred liquid desiccant regenerator. Thus, it is possible to utilise the solar PV waste heat for desiccant solution regeneration and simultaneously benefit from the added benefit of improved efficiency.