Contribution ID: **470** Type: **Oral Presentation**

Construction and evalauation of a PV/T collector under low concentration using the batch method

Thursday, 12 July 2012 12:00 (20 minutes)

Abstract content
   (Max 300 words)

Photovoltaic cells are generally made from doped semiconductors whose conductivity decrease with increase in temperature. It is anticipated that by suppressing the rise in temperature for cells under concentration by using hot water could improve the overall efficiency of the photovoltaic system. Concentrator photovoltaic/thermal (PV/T) hybrid collectors could reduce the cost of solar cells by reducing the solar cell area and employ cheap booster reflectors. The advantage of the water batch method is that transfer fluid in PV/T can easily reach practical values of 50deg;C and above. The thermal energy extracted by the cooling fluid (water) can be used for other purposes. The maximum achieved power output from the PV/T was 23W compared to the rated value of 18W. The thermal efficiency reached a maximum of 71.80% while electrical efficiency increased to a maximum value of 23% from a standard reference value of 14% for mono-crystalline solar cells. We observed that thermal and electrical efficiency decreased exponentially with increase in outlet temperature beyond 42deg;C. Therefore, the stagnant temperature of the prototype was 420deg;C. We also observed that the wind profile is important when designing a PV/T system because high wind profiles favour electrical efficiency than thermal output due to high thermal losses through convection and radiation at high wind speeds.

Apply to be
 consider for a student
   award (Yes / No)?

Yes

Level for award
 (Hons, MSc,
   PhD)?

MSc

Main supervisor (name and email)
and his / her institution

Dr. S. Hatwaambo, University of Zambia
Email: shatwaambo@unza.zm

Would you like to <br> submit a short paper <br> for the Conference
 Proceedings (Yes / No)?

Yes

Primary author: Mr SAMUKONGA, Gilbert (University of Zambia)

Presenter: Mr SAMUKONGA, Gilbert (University of Zambia)

Session Classification: Applied Physics Forum

Track Classification: Track F - Applied Physics