Contribution ID: **376** Type: **Oral Presentation**

An Investigation into the operational modes used in a charge controller in a grid integrated photovoltaic system with battery storage

Thursday, 12 July 2012 08:20 (20 minutes)

Abstract content
   (Max 300 words)

The integration of kW-scale grid-tied photovoltaic (PV) systems into the energy mix of local municipalities is expected to become a reality in South Africa with the proposed "rooftop programme" of the Department of Energy. These systems may be straight grid-tied, without storage, or may include battery storage. In the current study, a 1.6 kW grid-integrated PV system with battery storage was characterized with respect to performance and efficiency of the PV and the Balance-of-System (BOS) components. Key to the performance of a PV system with battery storage is the performance of the charge controller, which serves to maximize the output power of a PV array by utilizing algorithms to track the maximum power point (MPP) of the PV array or to select the appropriate operational voltage. The charge controller under investigation has two, user selectable, modes of operation, viz. maximum power point tracking (MPPT) perturb and observe (P&O) and fixed voltage operation. This paper discusses the performance and efficiency of the charge controller, with specific reference to the operational modes employed. Preliminary results show, as expected, that the perturb and observe mode is more efficient when irradiance is highly variable or under low irradiance conditions. The energy losses due to the different operational modes are quantified in order to identify which mode of operation is optimal for the PV system under investigation.

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

Prof. Ernest van Dyk, Ernest.vanDyk@nmmu.ac.za, +27415042259, Nelson Mandela Metropolitan University

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

Yes

Primary author: Mr ALISTOUN, Warren (NMMU)

Co-authors: Prof. VAN DYK, Ernest (NMMU); Dr VORSTER, Frederik (NMMU); Dr OKULLO, Willy (Makarere University, Uganda)

Presenter: Mr ALISTOUN, Warren (NMMU)

Session Classification: Applied Physics Forum

Track Classification: Track F - Applied Physics