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Design and Development of a Solar Panel Controller for Rural Application.

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Abstract

A solar panel controller for rural application has been designed and tested to evaluate its performance. The electrochemical storage system, especially the widely used lead-acid batteries, are affected by the overcharging and excessive (deep) discharged. To protect these batteries from these dangers, an automatic electronic circuitry was designed to monitor the battery voltage continuously, both during charging and discharging cycles and disconnect it accordingly when certain preset levels are exceeded and thus protect it from undergoing any of those processes. The controller cuts-off the panel (from the battery) when the battery voltage rose to a preset voltage (about 14.5V) and reconnect it when its voltage fell to slightly less than this value. On the other hand, the battery was isolated from the loads when battery voltage dropped to a defined voltage (about 11.0V) and the loads are reconnected when the battery voltage rise to slightly higher than 11.0V when recharging commences. The controller is therefore capable of protecting the battery to its safe operating voltage. Furthermore the cost of the controller was estimated at Ksh 3500 (relatively cheap) and easy to maintain as the circuit is simple.