

Design and development of a low cost solar energy system for the rural area

Abstract

Currently, solar energy has turned into a popular alternative energy source to meet certain demands around the world due to the instability of oil and coal prices with global warming issues. The aim of this paper is to develop of a simple and cost-effective solar system for the rural areas where grid electricity is not available. To fulfill this objective, a 5-Watt PV (photovoltaic) stand-alone solar module was used as solar power source and a common type lead acid battery (12V, 7AH) applied for backup system. The solar panel was connected to the battery via a charge controller which was responsible to pass the correct voltage for charging the battery and also, ensure that the battery was not overcharged. In addition, the system was designed for 22W AC and 12W DC loads. An inverter was designed for the AC loads which could convert the fixed DC voltage from battery to an AC output voltage. Finally, the entire system was tested successfully and cost evaluation also presented in the paper. This developed system will be effective for the poor people in the rural area those are deprived from the electricity as well as the conventional fuels being saved.

Keywords — Inverter, photovoltaic module, solar system, charge controller, loads