

## Modelling the Photovoltaic Pump Output Using Empirical Data from Local Conditions in the Vhembe District

**Authors :** C. Matasane, C. Dwarika, R. Naidoo

**Abstract :** The mathematical analysis on radiation obtained and the development of the solar photovoltaic (PV) array groundwater pumping is needed in the rural areas of Thohoyandou, Limpopo Province for sizing and power performance subject to the climate conditions within the area. A simple methodology approach is developed for the directed coupled solar, controller and submersible ground water pump system. The system consists of a PV array, pump controller and submerged pump, battery backup and charger controller. For this reason, the theoretical solar radiation obtained for optimal predictions and system performance in order to achieve different design and operating parameters. Here the examination of the PV schematic module in a Direct Current (DC) application is used for obtainable maximum solar power energy for water pumping. In this paper, a simple efficient photovoltaic water pumping system is presented with its theoretical studies and mathematical modeling of photovoltaics (PV) system.

**Keywords :** renewable energy sources, solar groundwater pumping, theoretical and mathematical analysis of photovoltaic (PV) system, theoretical solar radiation

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