



Contribution ID: 340

Type: Oral Presentation

## Direct-couple PVWPS sizing using borehole hydraulic parameters

*Tuesday, 5 July 2022 12:45 (15 minutes)*

Photovoltaic water pumping systems (PVWPS) are a promising solution to improve water access in isolated rural areas in developing countries. Each system must be carefully sized to satisfy local demand while being as affordable as possible. In order to design a successful and sustainable system, the knowledge of solar radiation and groundwater resources availability is crucial. There are several steps that are followed to size and model a PVWPS. The current study used the borehole and solar radiation characteristics at the Vuwani Science Resource Centre to determine the suitable pump and the size PV power for a sustainable battery-less pumping of groundwater without depletion. The hydraulic characteristics, optimal flow-rate of 69.12 m<sup>3</sup>/day and total dynamic head of 53 m were used as inputs for the sizing of the pump. Then based on the results of the steps,

Grundof online software was used to validate the sizing of a proper submersible water pump that can supply the water needs. With having the electrical load of the system, the excel was used to design a complete and optimized model of PV system. The proposed system consists of a PV, a submersible pump and storage tank. A system controller was also designed and analyzed successfully

### Apply to be considered for a student ; award (Yes / No)?

No

### Level for award;(Hons, MSc, PhD, N/A)?

N/A

**Primary author:** MASEVHE, Livhuwani (UNIVEN)

**Co-author:** MALUTA, Nnditshedzeni Eric (University of Venda)

**Presenter:** MASEVHE, Livhuwani (UNIVEN)

**Session Classification:** Applied Physics

**Track Classification:** Track F - Applied Physics