

## **Solar Radiation Calculations Using the Territorial Climatological Measurements in Vhembe District, Limpopo Province for Solar Energy Potential**

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**Abstract :** Determining the solar radiation for the use of energy generation involves number of procedures and calculations using the climatological weather data measurements. The study was conducted within the Vhembe District area through 9 installed Weather Stations (WS) by the South African Weather Bureau Stations (SAWS). The paper contributes to the overall main project on renewable (i.e. solar, wind, biomass/biogas and hydro) energy assessment for their potentials in electricity generating at small micro scale in the district. The weather data was obtained from January to December 2015. The report determines the minimum and maximum solar radiation equations associated with the local temperature range in accommodating the theoretical bases and its time period changes. These equations are the most important parameters in calculating the solar energy radiation to the area in determining its direct extraterrestrial solar radiation per day/ weekly/ monthly and annual periods. The solar radiations measurements are demonstrated with the use of web-based RETScreen and SOLPOS software analysis in specified area. This provided calculations in which territorial solar energy were determined through climatic conditions and analysis found to be usable.

**Keywords :** solar energy radiation, climatological weather data measurement, extraterrestrial radiation, territorial solar energy and sunshine duration

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