



Contribution ID: 154

Type: Oral Presentation

## The Development of a Meteorological Index to characterise the variation of spectral change on the operational performance of various Photovoltaic Technologies

Wednesday, 5 July 2017 14:20 (20 minutes)

With the rapid deployment of various Photovoltaic (PV) technologies around South Africa, the question has arisen to which technology is best to deploy within certain regions. This paper, discusses the development of a LabVIEW program that employs a meteorological indexing methodology to determine the effect of spectral changes caused by meteorological events on PV module performance. The analysis, using this methodology, was conducted for a subtropical region where the Outdoor Research Facility (ORF) at NMMU is located. The custom-developed LabVIEW program utilises simulated (from Meteonorm) and measured meteorological data to obtain the standard daily irradiance profiles. These profiles are then compared in real time to the measured irradiance obtained from a Silicon CCD spectrometer. With both recorded irradiance and spectral data, 50 W.m<sup>-2</sup> resolution bins were created to determine the overall clear sky index, and how it is distributed for a day, week, month, etc. In addition, the measured spectra combined with the spectral response of popular deployed PV technologies can indicate the sensitivity of the technology within these “power” bins. In doing so, the expansion of the metrological index that can be used to determine and forecast the likely performance for each PV technology at different irradiance levels within specific regions of South Africa.

**Apply to be considered for a student &nbsp; award (Yes / No)?**

No

**Level for award&nbsp;(Hons, MSc, &nbsp; PhD, N/A)?**

n/a

**Main supervisor (name and email)&nbsp;and his / her institution**

EE van Dyk  
Ernest.vanDyk@nmmu.ac.za

Nelson Mandela Metropolitan University

**Would you like to submit a short paper for the Conference Proceedings (Yes / No)?**

No

**Primary author:** Mr SCHULTZ, Ross (NMMU)

**Co-authors:** Prof. VAN DYK, Ernest (NMMU); Dr VORSTER, Frederik (NMMU)

**Presenter:** Mr SCHULTZ, Ross (NMMU)

**Session Classification:** Applied Physics

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