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## Experimental analysis of the performance of various photovoltaic panels: A case study of Durban, South Africa

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Photovoltaic (PV) power generation is witnessing a significant growth, as one of the outstanding power generation alternatives, necessitating the investigation and analysis of the performance of various types of PV technologies. A PV test-bed was set up consisting of three different types of commercially available photovoltaic panels (monocrystalline silicon, multi-crystalline silicon, and single junction amorphous silicon), usually connected to the power utility grid, for monitoring and analyzing their operating performances under the weather conditions of Durban Municipality, South Africa. The power output efficiency, the panel efficiency, and the performance ratio were calculated for each module and the results of the comparison are presented here. These values were compared to the manufacturers' values and monitored over time. The results show that mono-crystalline silicon and multi-crystalline silicon PV panel perform better at high irradiance. but poorly at low irradiance condition, whereas the single junction amorphous silicon PV panel performs better in cloudy and diffused sunshine condition. Moreover, the efficiency of monocrystalline silicon and multi-crystalline silicon PV panels has been found to drop when the temperature increases. This was not observed in amorphous silicon PV panel, which shows that for this case study the performance of amorphous silicon PV panel is better in terms of power conversion efficiency and overall performance ratio for the PV panels studied.

### Biography

AA Adebisi is a Ph.D. student from the Durban University of Technology, South Africa. He currently researches performance analysis and optimization of distribution grid-tied photovoltaic system, and his research is funded by South Africa's National Research Foundation (NRF). He graduated with a Master degree from the Durban University of Technology. His Master's dissertation was entitled "Investigating the application of Static Synchronous Compensator (STATCOM) for mitigating power transmission line losses."

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