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Effects of grass and concrete reflective surface on the performance of dual axis bifacial solar PV systems

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Abstract:

Consumers are shifting towards renewable energy, particularly solar energy, due to the high cost and demand of conventional electricity. The Council for Scientific and Industrial Research (CSIR) Energy Centre has a vision of creating an Energy Autonomous Campus where the entire energy demand is supplied by renewable energy source. As part of this program, solar PV plants are being installed and commissioned at the Pretoria campus. This paper focuses on comparing two dual axis bifacial PV tracker systems of 11.34 KWp out of the complete installation of 17 tracker systems installed at CSIR. The remaining 15 tracker systems are dual axis of 11.97kWp with mono-C-Si technology. Literature shows that surface underneath the bifacial PV system plays a major role in increasing the amount of incident light reflected to the rear part of the PV trackers, depending on the type of material used such as rough, smooth, hard surfaces and the colour of the surface. The lighter the colour of the surface the better the reflection. This study looked at a grass surface and a grey concrete surface, and it was found that the difference in the power produced is insignificant. It is then concluded that the results are in line with the literature. It is therefore recommended that further studies be carried out to compare these two surfaces to a lighter surface (white).