



Contribution ID: 107

Type: Oral Presentation

Determining optical performance and current generation of a CPV due to intensity distribution

Wednesday, 13 July 2011 11:00 (15 minutes)

High concentration photovoltaic (CPV) systems utilize non-imaging optics to concentrate and distribute the solar flux uniformly onto a solar receiver to achieve maximum performance and power output from a CPV module. However, in many cases due to mechanical misalignment, tracker error and imperfections in the optical material, the optimum performance of the module is compromised. A LabVIEW programme employing visualization was used to determine the main contributing factor for current generation, i.e. position and intensity of the distribution. The topography was determined by multiple raster scans with a spectroradiometer and optical fiber in the plane of the reflective secondary's aperture where the cell would be placed. The results showed different currents been generated at different points on the cell surface. These results were put into a CPV cell current-voltage (I-V) characteristic simulator to extract I-V curve at each point. These were then compared with measured I-V curves obtained from the CPV system. The results showed that there was a non-uniform current densities (J_{sc}) distribution due to non-uniform spectral and intensity distribution across the cell surface.

Level (Hons, MSc, PhD, other)?

Msc

Consider for a student award (Yes / No)?

Yes

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

no

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Session Classification: Applied

Track Classification: Track F - Applied and Industrial Physics