

Investigation into Solar Performance of Photo-voltaic Cells

C.S. Lokuhetti¹ and P.A.J. Ratnasiri²

¹ *Department of Physics, University of Colombo, Sri Lanka*

² *Applied Physics and Electronics Section, C.I.S.I.R.*

Solar energy Incident on a horizontal plane was measured over a period of few months and the global insolation per day has been calculated. The total radiation has been observed to be between $18.5 \text{ MJ/m}^2 \text{-d}$ and $7.4 \text{ MJ/m}^2 \text{-d}$. Short circuit current and open circuit voltage measurements have been taken on silicon solar module under direct sunlight radiation over a period of 30 days. Readings were taken between 0800 hrs and 1700 hrs under various cloud conditions. The current recorded was between 0.55 & 2.4 A and the voltage recorded was between 14.0 & 15.6 V. Efficiency values were found to be between 13.28 & 9.55 & while the fill factor ranged between 0.63 & 0.74. Internal resistance is also observed to vary between 4.9 & 31.0 ohms, with radiation level.

Battery characteristics obtained, showed that specific gravity of battery vary more linearly with the state of charge. Batteries were also charged by using Solar moduli M61 and M51. M51 took about 40 hrs to charge the battery form 50% charged state to fully charged state while M51 took about 40 hours depending on the cloud cover. It is very important that there should be a proper impedance matching between the battery and the cell. But even with a proper a matching conditions there will be power losses such as heat dissipation.