

LOW COST SOLAR POWER SYSTEM FOR DOMESTIC POWER REQUIREMENTS

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Hydroelectric energy has been the major electric energy source in Sri Lanka for the past few decades. Today, as the demand for electricity been considerably high and due to the long dry seasons, it alone has been unable to meet the increased demand. So, the objective of this study is to build up a solar power system, which will meet the domestic needs of a typical middle class dwelling unit.

The target is to develop a solar power system, which can meet the demand of ten 5W CFL bulbs, two 30W fans, a television and a refrigerator. The system uses Lead-Acid battery having 170 Amp hrs. capacity as the main energy storage device.

The solar panel should be oriented in order to capture the maximum intensity of the sunlight. Few tests were carried out using two BP solar 275 modules, one kept horizontal to the east west line and the other solar panel was kept rotating tracking the sunlight.

Comparison between two figures shows that the rotating system provides a considerably high gain over the horizontal system during morning and afternoon. But, the effective gain will depend on the power consumption of the rotating system. So, one of the main targets of the study will be to develop a cost effective, low power solar tracking system.

The practical importance of this system would lie on the possible cost effectiveness. A 75W; BP solar, BP275 PV module is available at \$ 430(with 20 yrs warranty) and Trojan 195AH/12V deep cycle battery at \$189 (10 yrs warranty). The other components of the system can be developed in the Faculty and the research will continue up to that point. Since a solar power system will function more than 25 years with very low maintenance cost, it can be expected to recover the installation cost at least within 15 years. The final target of the research is to develop and implement a solar power system with those features.