

SOLAR PANEL EFFICIENCY IMPROVEMENT WITH TRACKING AND FRESNEL LENS CONCENTRATOR

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ABSTRACT

In remote areas the sun is a cheap source of electricity because instead of Thermal and hydraulic generators it uses solar cells to produce electricity. The output of solar cell depends on the intensity of sunlight and the angle of incidence. It means to get maximum efficiency; the solar panels must remain in front of sun during the whole day. But due to rotation of earth these panels can't maintain their position always in front of sun. This problem results in decrease of their efficiency. Thus to get a constant output, an automated system is required which should be capable to constantly rotate the solar panel. This experiment details the design, development, and evaluation of a microcontroller-based solar tracking and control system capable of not only maintaining the peak power position of a photovoltaic (PV) array by changing the position of the array relative to the sun but also it deals with increasing efficiency by increasing the concentration of the solar rays by using the mechanical concentrator - Fresnel Lens. The system is basically developed to evaluate the difference between conventional solar tracking system and newly developed system for the power output from both the systems. This maximum power positioning concept was tested using a small two-axis tracking concentrator array. For the Data analysis here an attempt is made to show graphical as well as tabular form display on Computer. A real-time data analysis will show a deviation in maximum power during the day after accounting for other variations.

KEYWORDS: Solar Panel Efficiency, Tracking, Fresnel Lens Concentrator, Electricity, Thermal, Hydraulic Generators.