DUAL AXIS SUN TRACKER SOLAR PANEL

[1]SAIFI ANSARI, [2]MOHD SALEEM ALI, [3]SUDHEENDRA KUMAR PANDEY,
[4]AVINISH KUMAR DUBEY, [5]SANCHIT KUMAR KHARE
[1234]UG Student, [5]Assistant Professor, Department of Mechanical Engineering
INSTITUTE OF TECHNOLOGY AND MANAGEMENT, GIDA GORAKHPUR, INDIA

ABSTRACT

The most frequent approach of boosting the efficiency of solar photo modules is to use a solar tracking system. This study compares the efficiency of energy conversion of photo modules with sun tracking systems versus stationary photo modules. In the proposed sun tracking system, four photo resistors are mounted on the sides of the photo module. As a result of the photo resistors, the solar tracking system becomes more sensitive, allowing for a more precise assessment of the sun's location. A comparison was made between fixed and dual-axis tracking systems. The dual-axis solar tracking device produced 31.3 percent more power than a fixed photo module.

Key words: *Photo module Microcontroller, Solar energy Technology Stationary, Sun tracking system.*

INTRODUCTION

Power Stations are used to maintain or monitor the power circuits or parameters associated with solar panels. Voltage, temperature, light intensity, and current are all crucial parameters to keep track of. These characteristics must be monitored in both businesses and households. So, let's talk about how to keep track of solar panel parameters.

Solar energy has a little share of the energy industry at the moment, but this is a passing trend. The average solar cell efficiency ranges from 15 to 22 percent. Because the sun's rays fall at a 90° angle on the panel's surface, increasing PV module production efficiency, the design indicated above has been implemented. In practise, efficiency is defined as the ratio of a maximum power P max to a minimum power P min .which can be subtracted from the unit area photo module the entire solar radiation power W incident perpendicularly on the working unit photo module's surface, given as a percentage:

$W=A*\lambda\cos\theta$
$\eta = Pmax /W*100\% \ P$

PROBLEM STATEMENT

A solar tracker is used in a variety of devices to improve solar radiation capture. The issue at hand is the implementation of a system capable of increasing electricity production by 30-40%.

PROJECT JUSTIFICATION

The goal of the project was to ensure that the sun's rays fell perpendicularly on the solar panel, giving it the maximum amount of solar energy. This is converted into electricity. Between 1200 and 1400 hours, maximum energy is obtained, with a peak around midday. The sun is directly overhead at this time. Simultaneously, the least amount of energy will be required to move the panel, thus increasing the system's efficiency. The goal of the project was to come up with a low-power, accurate, and cost-effective microcontroller-based tracking system that could be built in the time permitted and with the resources available. It's supposed to trace the course of the sun across the sky. It is supposed to sleep by reverting to a horizontal position during the night to save electricity. The motor control problem is solved using an algorithm, which is then turned into a C application for the Arduino.

"Single vs. Dual Axis Solar Tracking," Alternate Energy e-Magazine, April 2011. David Cooke, "Single vs. Dual Axis Solar Tracking," Alternate Energy e-Magazine, April 2011.

LITERATURE REVIEW

In 1962, C Finster used a mechanical mechanism to create the first solar tracker. Despite the fact that finster solar produces negligible energy gains, years of experimentation and development have resulted in an improvement in PV system conversion output, necessitating the use of various tracking methods and applications (eg. concentrator non-concentrator). In summary, better sun cells have been developed, and solar tracking systems have become more popular than standard fixed PV systems.

EXPERIMENTAL SETUP

The proposed tracking system more successfully tracks sunlight by providing a PV panel that rotates along two separate axes. Four LDR sensors, two stepper motors, and a pic microcontroller make up the tracker. A pair of sensors and one motor are used to fill the tracker in the sun east west corner, while the other pair of sensors and the motor are fixed at the tracker's bottom in the sun north south direction. A microcontroller is used to control the sensor input.

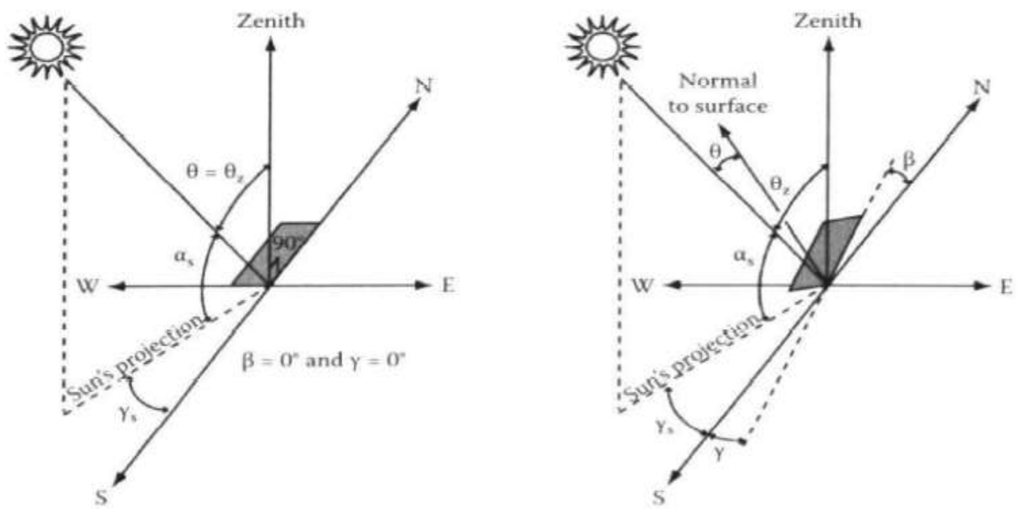

Fig .1 Angle including light in solar tracking system

Efficiency of solar panels

The efficiency of solar cells is determined by the fraction of incident power converted to electricity. It has the following definition: Pmax=VocIscFF n=./.VocIscFF/n Pin

Voc is the open-circuit voltage, and Isc is the short-circuit current. The efficiency is N, while the fill factor is FF.

The input power for efficiency calculations is 1 kW/m2 or 100 mW/cm2. As a result, the input power of a 100*100 mm2 cell is 10W.APPLICATION

- Agriculture field
- Automobile sector
- Residential(home)
- Industrial (used in office)
- Transportation

FUTURE SCOPE

- Dual axis solar tracker system.It improve and improving the mechanical structure of our industry
- This solar tracker is improving load capacity of our industry
- Dual axis solar tracker also reduce the dependence on fossil fuels.

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