BIRLA VISHVAKARMA MAHAVIDYALAYA

ENGINEERING COLLEGE

(AN AUTONOMOUS INSTITUTION)

"PROJECT EXPO 2022"

REPORT

Topic: Smart Dual Axis Solar Tracking System

Prepared By: Margav Shah (ID NO: 19EE048)

Abstract

In this project photovoltaic conversion panel is expected to be used in an automatic microcontroller based solar tracker system. Our aim is to design a single axis solar tracker as well dual axis solar tracker system. The sun is tracked by the tracker and its position is changed in such a way that it maximises the power output. The solar panel is moved by two geared DC motors so that sun's light is able to remain aligned with the solar panel. The operation of experimental model of the device is based on a DC motor which is intelligently controlled by a dedicated drive until that moves a mini photovoltaic panel, the presence of the two simple but efficient light sensors receive signals by a microcontroller. The performance and characteristics of the solar tracker device are experimentally analysed.

Introduction

Project Definition

The aim of this project is to ensure the sunlight rays are falling perpendicularly on the solar panel to give the maximum solar energy. Normally a solar panel converts only 30 to 40 per cent of the incident solar radiation in to electrical energy. An automated system is required to get a constant output, which should be capable to constantly rotate the solar panel. The sun tracking system was made as a prototype to solve the problem. It will be automatic and keeps the panel in forward-facing of sun until that is visible. The unique characteristic of this system is that instead of taking the earth as its reference, it takes the sun as a guiding source. The sunlight is monitored by the active sensors and rotates the panel towards the direction where the intensity of sunlight is maximums.

Project Objectives

Our project is based on the following objectives:

- Ability to manually rotate the tracker with the usage of a controller alongside the overall ecliptic.
- The solar panel tracks the sun from east to west mechanically for maximum intensity of light.
- To consume maximum solar energy through solar tacking panel.
- Design and improve a solar panel
- High performance and efficiency of Solar panel.

Project Applications

The main applications for this project are;

- It could be fabricated and increased in dimensions to be used during camping for several purposes.
- It can be modified to make a concentrated solar-hybrid form which can save almost all the cost of running it.
- It can be use domestically and on largest scales.
- It gives better efficiency comparing with general systems.
- It can implement on large PV panels.

Conclusion

The current project is based on tracking solar panels. These panels change their orientation in relation to solar radiation to increase the efficiency and results in maximum production of energy and helps in getting full benefit of optimal angle between solar panels and solar radiations. The execution of solar tracking system was made clear because of our sufficient research and preplanning of our goals and objectives. The main agenda of this project was to make simple machinery on low cost basis. Trial and error method help us in achieving our goal. We made use of our engineering knowledge in this three month project and were successful in developing and designing low cost solar tracking system. Because the issue of global warming must be controlled by making use of alternatives that are environmental friendly.