

# Dual Axis Solar Tracking System

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**Abstract:** With the alarming rate of depletion of the major energy resources worldwide, it has become an urgent necessity to seek for renewable energy resources that will power the future. According to the worldwide market economy, the increasing demand for energy had forced to put a huge price tag on natural combustible sources of energies [1]. In fact, it has been predicted that in the near future the demand of energy will grow in such a rate that it will be completely impossible to find out or meet the demand with the resources that we had been using for so long, such as – oil, gas, coal, etc. This issue throws a positive challenge to the scientific community as more and more funds are being allocated for the research and development of new alternatives.

**Keywords:** solar tracker, solar home system

## 1. Introduction

In this context we have concentrated our focus on the research of renewable energy. Among these renewable energy resources solar energy is one of a kind. In today's world there is a growing demand to find greener ways to power the world and minimize greenhouse gas emission. The sun is a natural power source that will keep on shining for an estimated 4 billion years. Solar power (photovoltaic) systems are a sustainable way to convert the energy of the sun into electricity. The expected lifetime of a system is 25-30 years. The energy potential of the sun is immense, and it is one of the emerging energy sources, which is subsidized in order to secure the distribution of the technology worldwide. By tracking the sun the efficiency can be increased by 30-40%. The photovoltaic technology allows the conversion of sunlight directly to electricity with a conversion ratio of about 15%.

## 2. Solar tracker

### A. What is solar tracker?

A solar tracker is a device for orienting solar photovoltaic panel towards the sun. The sun's position in the sky varies both with season and time of day as the sun moves across the sky. Solar powered equipment works best when pointed at or near the sun, so the solar tracker can increase the effectiveness of such equipment over any fixed position, at the cost of additional system complexity.

### B. Motivation

All the solar arrays that are currently being installed in our countries are fixed on the rooftop or any favorable open space at approximately 23o inclination with the surface. We went to

BRAC Solar project and get to know that all the BRAC Solar Home System (SHS) are arranged in such a way that the battery will be charged within 5 hours in a day and at night, the people can use the battery to run home appliances accordingly. This seemed a lot inefficient since the sun in our country is high up in the sky for around 10 hours every day. So with this system, 50% of the sun energy are not being utilized and also this SHS does not allow the consumers to use electricity during day time. In many developed countries, solar trackers are already being used commercially. Importing and maintaining those in our country would be very expensive, especially for the people Design and Development of Dual Axis Solar Tracking System Deptt. of MECH, DES's COET, Dhamangaon (Rly.) Page 4 in the rural areas who are the main consumers of solar energy. So we thought of adopting the sun tracking mechanism to see how much more energy we can utilize

## 3. Types of tracker

There are various types of solar tracker; some of them are as mentioned below:

- Horizontal axle solar tracker
- Vertical axle solar tracker
- Altitude azimuth solar tracker
- Two axis mount solar tracker
- Multi-mirror reflective unit
- Active trackers
- Passive trackers
- Chronological tracker

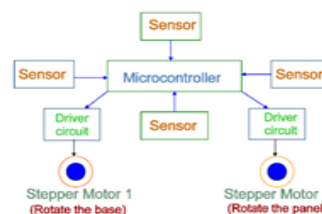


Fig. 1. Tracker

### A. Architecture of the model

Since our project is of solar tracking in 2 axis system, we had to develop a very effective model which can move the panel in dual axis. For that, in the very beginning, we did a rough sketch of what the probable model would look like. After that, we constructed a prototype of the model using cardboard since

that would give a better visualization of what the model will look like. Finally we constructed the model using plywood.

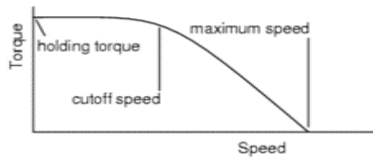


Fig. 2. Speed vs. Torque

#### 4. Conclusion

This paper presented the implementation of dual axis solar tracking system.

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