

SINGLE AXIS SOLAR TRACKER

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SYED MOHD HARUSSANI BIN SYED OMAR
FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA (UiTM)
SHAH ALAM
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ABSTRACT

The Single Axis Solar Tracker is created to track the maximum sun. This project is invented especially to prevent wasting energy during sunrise to sunset. This project can increase the output voltage and produce maximum power daily using photo-voltaic. Now days they are many trackers available in market but most of them cost a lot, wasting so much energy such as wasting energy on motor since the power require to rotate the photo-voltaic module is high and very complicated design. To completely specify the position of the sun it is necessary to specify three coordinates. However, if one assumes the distance from the sun to the Earth to be constant, the position of the sun can be specified using two coordinates. Two common choices are the solar altitude and the azimuth. The purpose of this project is to compare the power output produce by using tracker and fixed angle. This project use Programmable Interface Controller (PIC) for controlled the tracker. Photo-voltaic, or PV for short, is a technology in which light is converted into electrical power. One of the applications of PV is in solar tracker. A solar tracker is a equipment for operating a solar photo-voltaic panel or concentrating solar reflector or lens forward sun-concentrates, especially in solar cell application, require high degree of accuracy to ensure that the concentrated sunlight is dedicated precisely to the power device. Solar tracker is invented because solar panel disables to move toward the sunlight when the sun moves from east to west. In order to produce maximum power output, solar tracker is design with motor so that the solar panel will move toward the position of sun. To control the solar panel so that it will always face the sun, the circuit has timer that consistent to the sun movement. The timer indicates the time to move solar panel in 12 hours. It moves the solar panel every one hour. It gives signal to the motor to move the solar panel. When the solar panel face directly to the sun and has maximum concentrated sunlight to the solar panel, the maximum power output will produce. The solar tracker is design as active tracker. It moves according to the sun movement and controlled by microcontroller.

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CHAPTER 1

INTRODUCTION

1.1 OVERVIEW ON SOLAR TRACKING

Electricity has become the most important things in human life not just for living things, but commonly all equipment need electricity. This is because much equipment needs an electricity to operate. Commonly in the world there are many ways to produce electricity but most of it are not green environment such as fossil fuel (coal, oil, natural gas), water power and nuclear power. Now days, many pollution happen either water or air pollution. To reduce it several actions can be taken by produced the project that applying the concept of green environment. Solar cells operate by converting sunlight directly into electricity using the electronic properties of a class of material as known as semiconductors. This project focuses on sunny day only. This project is one alternatively best solution among others because it use solar to generate electricity. The cost for initial set up is a little bit expensive because the costs include acquisition costs, maintenance costs and replacement costs. [1]

Extracting useable electricity from the sun was made possible by the discovery of the photoelectric mechanism and subsequent development of the solar cell – a semi conductive material that converts visible light into a direct current. By using solar arrays, a series of solar cells electrically connected, a DC voltage is generated which can be physically used on a load. Solar arrays or panels are being used increasingly as efficiencies reach higher levels, and are especially popular in remote areas where placement of electricity lines is not economically viable. This alternative power source is continuously achieving greater popularity especially since the realisation of fossil