

AN OVERVIEW ON THE SOLAR TRACKING SYSTEM FOR OPTIMAL POWER GENERATION

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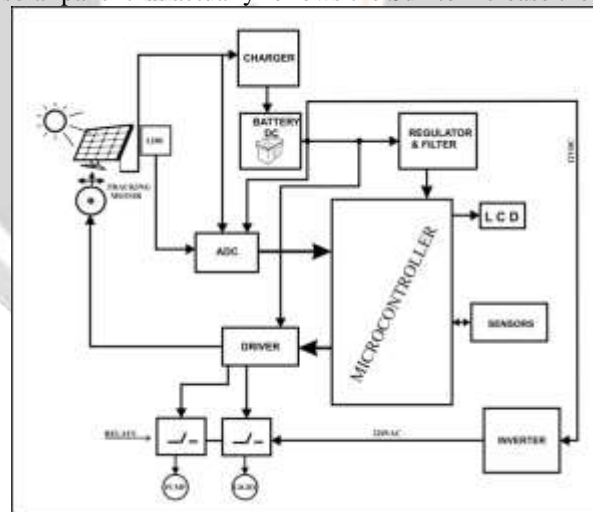
Abstract

Solar power generation had been used as a renewable energy since years ago. Residential that uses solar power as their alternative power supply will bring benefits to them. The main objective of this project is to develop an automatic solar tracking system which will keep the solar panels aligned with the Sun in order to maximize in harvesting solar power. The system tracks the maximum intensity of light.

Keyword Solar Light, Solar Power, Optimization

Introduction

Many of residential around the world used electric solar system as a sub power at their houses. This is because solar energy is an unlimited energy resource, set to become increasingly important in the longer term, for providing electricity and heat energy to the user. Solar energy also has the potential to be the major energy supply in the future. Solar tracker is an automated solar panel that actually follows the Sun to increase the power.



Literature review

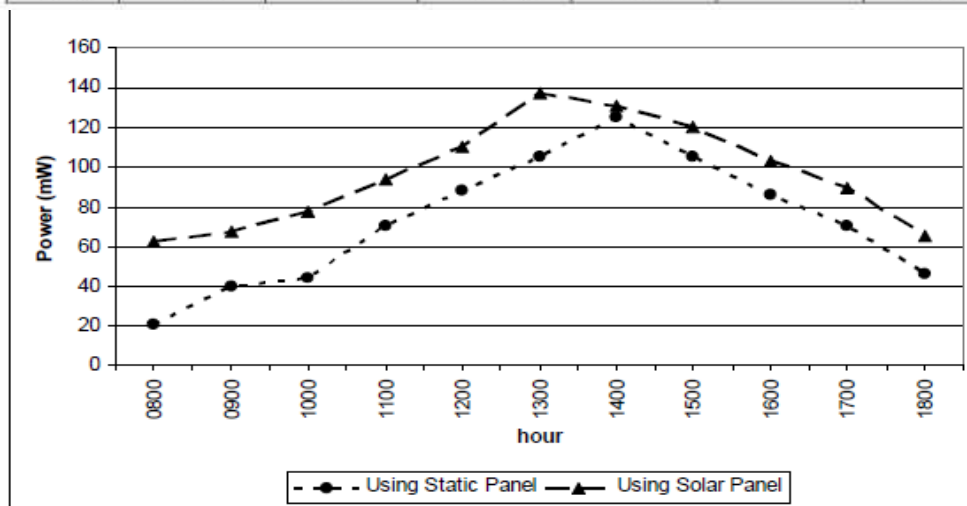
Solar panels are devices that convert light into electricity. They are called solar after the sun or "Sol" because the sun is the most powerful source of the light available for use. They are sometimes called photovoltaic which means "light-electricity". Solar cells or PV cells rely on the photovoltaic effect to absorb the energy of the sun and cause current to flow between two oppositely charge layers. A solar panel is a collection of solar cells. Although each solar cell provides a relatively small amount of power, many solar cells spread over a large area can provide enough power to be useful. To get the most power, solar panels have to be pointed directly at the Sun. The development of solar cell technology begins with 1839 research of French physicist Antoine-Cesar Becquerel. He observed the photovoltaic effect while experimenting with a solid electrode in an electrolyte solution. After that he saw a voltage

developed when light fell upon the electrode. According to Encyclopedia Britannica the first genuine for solar panel was built around 1883 by Charles Fritts. He used junctions formed by coating selenium (a semiconductor) with an extremely thin layer of gold. Crystalline silicon and gallium arsenide are typical choices of materials for solar panels. Gallium arsenide crystals are grown especially for photovoltaic use, but silicon crystals are available in less expensive standard ingots, which are produced mainly for consumption in the microelectronics industry. Norway’s Renewable Energy Corporation (REC) has confirmed that it will build a solar manufacturing plant in Singapore by 2010 -the largest in the world. This plant will be able to produce products that can generate up to 1.5 gigawatts (GW) of energy every year. That is enough to power several million households at any one time. Last year, the world as a whole produced products that could generate just 2 GW in total.it was implemented with a dc motor and a dc motor controller. The solar energy conversion unit consisted of an array of solar panels, a step up chopper, a single phase inverter, an ac mains power source and a microcontroller based control unit.

Methodology

LDR or light dependent resistor has been chosen as the sensor because LDR is commonly used in sun tracking system. This is because LDR is sensitive to the light. The resistance of LDR will decrease with increasing incident light intensity. For the controller, PIC16F866A had been chosen. This PIC programming will give the pulse to the driver to move the motor. For the driver, bidirectional DC motor control using relay has been used. The motor controller had been chosen because it can control the motor to rotate clockwise and counter-clockwise easily. DC geared motor also been chosen because it has a hold torque up to 4 kg.cm and low rpm i.e., 3rpm Last but not least, LM7805 is used to convert the input voltage from the source to 5 V output because integrated circuit only need 5 V to operate

| Hour | Using solar tracker Static solar panel | | | Using solar tracker Static solar panel | | |
|------|---|--------------|------------|---|--------------|------------|
| | Voltage (V) | Current (mA) | Power (mW) | Voltage (V) | Current (mA) | Power (mW) |
| 0800 | 16.8 | 1.23 | 20.664 | 18.3 | 3.41 | 62.403 |
| 0900 | 17.0 | 2.34 | 39.780 | 18.9 | 3.57 | 67.473 |
| 1000 | 17.6 | 2.51 | 44.176 | 19.4 | 3.98 | 77.212 |
| 1100 | 19.4 | 3.64 | 70.616 | 19.7 | 4.76 | 93.772 |
| 1200 | 19.8 | 4.45 | 88.110 | 20.4 | 5.40 | 110.430 |
| 1300 | 20.5 | 5.12 | 104.960 | 21.6 | 6.35 | 137.160 |
| 1400 | 21.1 | 5.94 | 125.334 | 21.4 | 6.11 | 130.754 |
| 1500 | 19.4 | 5.43 | 105.342 | 20.5 | 5.87 | 120.335 |
| 1600 | 17.2 | 5.01 | 86.172 | 19.6 | 5.26 | 103.096 |
| 1700 | 16.5 | 4.28 | 70.620 | 18.5 | 4.86 | 89.910 |
| 1800 | 16.2 | 2.87 | 46.494 | 17.5 | 3.75 | 65.625 |



Conclusion

A solar panel tracking system was designed and implemented. The aim of the solar panel tracking system is to track the position of the sun for better efficiency of the solar panel has shown in the experimental results.

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