Solar Tracking Street Light System

The purpose of this project is to design and construct a solar tracker system that follows the sun direction for producing maximum out for solar powered applications. To get the maximum sunlight in a limited distance, two solar panels were placed in bi-facial manner and reflectors. LDRs are used to detect the sun direction. And the energy from the solar panels is stored in battery. The stored energy is used for street lights. These street lights are automated. This automation process is done by the microcontroller with help of LDR. The street lights switched ON in night and switched OFF in day times.

A solar panel is a large flat rectangle, typically somewhere between the size of a radiator and the size of a door, made up of many individual solar energy collectors called solar cells covered with a protective sheet of glass. The cells, each of which is about the size of an adult's palm, are usually octagonal and colored bluish black. Just like the cells in a battery, the cells in a solar panel are designed to generate electricity; but where a battery's cells make electricity from chemicals, a solar panel's cells generate power by capturing sunlight instead. They are sometimes called photovoltaic cells because they use sunlight ("photo" comes from the Greek word for light) to make electricity (the word "voltaic" is a reference to electricity pioneer Alessandro Volta).

This project consists of few LDR sensors and a motorized mechanism for rotating the panel in the direction of sun. Moving the solar cell panel in the direction of sun can increase the solar energy generated from the solar cell. Microcontroller based control system takes care of sensing sunlight and controlling the motorized mechanism. This system works continuously without any interruption.

Features:

1. Voltage measurement.
2. Automatic controlling solar panel direction.
3. Storage of energy into rechargeable battery.
4. Stored energy is used for streetlights.
5. Street lights automation.

The project provides learning's on the following advancements:

1. Solar panel.
2. Voltage measurement.
3. Interfacing LDRs with micro controller.
4. Conversion of AC supply to DC supply.
5. LCD interfacing.
6. Embedded C programming.
7. PCB design.

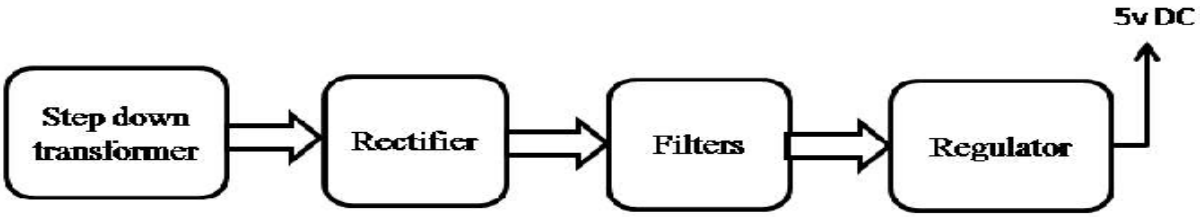
The major building blocks of this project are:

1. Regulated Power supply.
2. Microcontroller.
3. LDR Sensor to sense the sun direction.
4. LCD display.
5. Motorized mechanism to control the position of solar panel.
6. LED Indicators.
7. Rechargeable battery.
8. High power LEDs.
9. Crystal oscillator.
10. LED indicators.

Software's used:

1. PIC-C compiler for Embedded C programming.
2. PIC kit 2 programmer for dumping code into Micro controller.
3. Express SCH for Circuit design.
4. Proteus for hardware simulation.

Regulated Power Supply:



Block Diagram: