



Design and Construction of Automatic Solar Led Street Light System

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ABSTRACT: In this paper, we concentrate a simple solar power streetlight is automatically operated. With the increased use of solar power, the solar street light system plays a major role. Solar system has a generous form of renewable energy which has potential to fulfill billions of watt of electricity. Here, solar energy is collected with the aid of a solar array and thus the battery is charged during day time with the help of a simple charging circuit. During night time, this stored energy is used to light. It is the solar array that produced a D.C voltage due to the energy received from the sun during the day, thereby making battery to charge, as a outcome, keeping the streetlight into operation when it get dark. The basic circuitry on solar powered streetlight is the solar charge controller which essentially consists of an automatic battery charger, automated for dusk to dawn operation. This streetlight just designed to operate or trigger automatically at night. IN this we given the best solution for electrical power wastage.

KEYWORDS: street light, LED(light emitting diode), solar array, photovoltaic effect

I. INTRODUCTION

The street lights are the major demand in today's life for safety purposes and avoiding accidents during night. Providing this technic is one of the most important and expensive responsibilities of a city. The solar led street lighting system uses the solar radiation energy to charge the battery with the solar array during day time, and offer energy to the LED light equipment at night. This system has a double advantage in both usages of new energy and energy-saving. Solar streetlight are beneficial in that the day to day running and maintenance costs are reduced, save energy, environment friendly and convenient to install. The street lights are switched on at the dusk and then switched off at the dawn automatically by using a sensing device LED light future of lighting, because of their low energy consumption and long life there are fast replacing conventional lights world over. This paper gives solution to controlling the intensity of the lights considering the movement in the road. LED is a semiconductor device which is in the solid state that can convert electrical energy into visible light. It is characterized with small size, low power consumption, long service life, environmental production and durance. This paper briefly describes to solar LED street lighting system. In the existing system, power consumption takes place due to continuous lighting throughout the night by streetlights. Hence an idea is implemented in such a way that the lights will be switch ON only in the presence of traffic on the roads at night times. Therefore, maximum power will be save and the saved power can be used for some other useful purposes like agriculture, industries, and domestic purposes.

II. OBJECTIVE

- To start up a street lighting system by use of solar energy
- To protect the solar battery from quick fall as a result of continuous day and night working.
- To control a streetlight automatic solar power is used.
- To utilize the naturally furnish resource.

III. PROJECT SCOPE

This paper design is centered on solar energy as fast growing technology for street lighting with the use of a solar module. The automatic control process of the light can be achieved by a photocell.



IV.BASIC COMPONENTS

The system consist

Solar panel

Charge controller

Battery

High efficiency

SOLAR PANEL:

The solar panel has its major task to convert the sun's energy onto electricity, precisely D.C voltage. These are two types: mono crystalline and poly crystalline.



POWER OF SOLAR PANELS:

Output power of the solar panel is made, it means output power is different at different time and places for the same piece of the solar panel.

PV MODULES:

Semiconductors that exhibit the photovoltaic effect, Photovoltaic is a method of producing electrical power by convert solar radiation into direct current electricity.

LED:

LED'S are used in modern street lights to provide brighter light with low energy consumption. The energy consumption of the high pressure sodium fixture is higher the LED fixture, which is commonly used in traditional street lights.

CONTROLLER:

A controller is a very significant device in solar street light, used to decide the status of the charging and lighting by battery. The battery can be charged by the power received from the solar panels in the sunrise and while in the sunset it charges the battery.



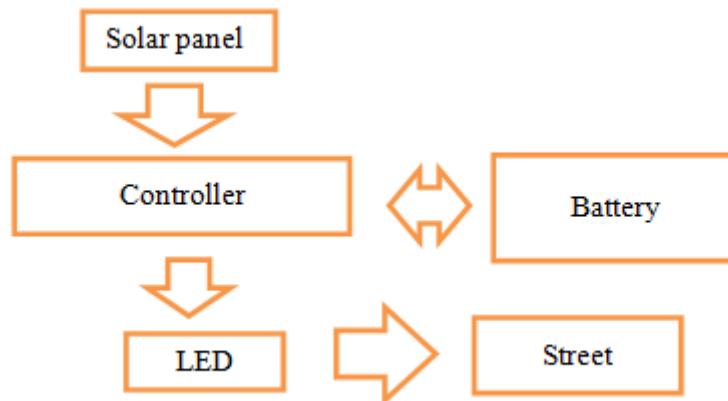
BATTERY:

A battery is an electric cell or a device that can convert the chemical energy into an electric energy. It consists of two or more cells connected in series or parallel, but the term is also used for single cells.

V. OPERATION PRINCIPLE

The solar panels receive solar radiation during the day time and then convert it into electrical energy through the charge and discharge controller, which is finally stored in the battery. When the light intensity reduced during night and open circuit voltage of the solar panels reaches at a certain value, the controller has detected voltage value and then act, the battery offer the energy to the LED light to drive the LED emits visible light at a certain direction. Battery discharged after certain time passes, the charge and discharge controller will act again to end the discharging of the battery in order to prepare next charging or discharging again.

System workflow:



VI. WORKING PRINCIPLE

The photovoltaic cell is composed of at least two layers of the semiconductors which have been “doped” with different impurities. When the photovoltaic cells are irradiated with sunlight, some photons are reflected and the others are absorbed by the solar cell. When photovoltaic cells keep enough photons, the negative electrons are released from the semiconductor material. Due to the manufacturing process of the positive layer, these free electrons naturally migrate to the positive layer which creates voltages differential. When the solar cell is connected with the external load, there will be current circulation in the circuit. Solar cells are connected in series or parallel with others, which is called solar energy



VII. LIMITATIONS

In this project, we use sunlight as the basic need produce electricity it will not be available at winter time so to overcome this we need to be a larger battery in order to provide atleast three days of stand by operation during cloudy weather without discharging the battery below its safe operating limit.

VIII. CONCLUSION

This paper elaborates the design and construction of automatic solar street light control system is a cost effective, practical, safety way and also provided a efficient way in saving the solar energy of the streetlights. This circuit works properly to go street sunlit ON/OFF. The system was also built to conserve energy with the use of a light emitting diode lamp to replace other lamps such as the fluorescent lamps which might reduce the efficiency of the battery. The project has scope in various other applications like for providing lighting industries, campuses and parking lots of huge shopping malls.it will be mainly used in save electric power.

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