Energy Saving Solar Powered LED Street Lights with Automatic Intensity Control

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Abstract- ***This paper offers solar powered LED lights for energy management by controlling the light intensity of street lights. This article introduces a solar powered LED street light that uses stored energy for energy management. It will be used more effectively in rainy or cloudy seasons. The system is developed and practically implemented using a microcontroller. This ensures that the street light can work all night without turning off in the middle of the night, especially in rainy or cloudy seasons, because there is less energy stored in the battery. LET lambs are the futures of lighting and they are rapidly replacing traditional lambs worldwide due to their low power consumption and long life. Use a light dependent resistor (LDR) light sensing device whose resistance drops dramatically under sunlight for sensing purpose. In the measuring circuit, the light intensity is monitored by an LDR sensor. In this way, the power consumption is efficiently realized and the battery life is long.***

Indexed Terms- ***Solar powered street light, Intensity, Light emitting diode, Light dependent resistor***

I. INTRODUCTION

But during the rainy season, it will ensure that the street light works all night and every day of the year [1-3]. Propose an idea for a streetlight replacement system that can fulfil all five function of a city. Energy saving technology and large scale lighting mechanisms that do not consume large amounts of electricity will significantly reduce the of road lighting. The IJSER of the zone with the best management strategy and the intensity of insolation is uniform and each engineer is in this zone [4]. Inefficient lightning wastage a large part of the main road lighting system to ensure that it cannot have a funding source once a year, while poor lighting consumes less energy and is economical in terms of cash flow and insecurity.

II. EXISTING SYSTEM

The photovoltaic panels charge rechargeable batteries which powered the LED light at night. We use an LDR sensor there, which detects the intensity of the environment. These solar lights stay on all night with the same high intensity. As a result, energy is consumed unnecessarily. The existing system is a manual system.

III. PROPOSED SYSTEM

The power of the solar cell was selected according to the general radiation conditions during the year to obtain the comfortable energy required for night lighting, hence the A/H rating of the cell [5]. The highest power target voltage of the selected solar cell is more or less sufficient to meet the battery charging voltage, so there is very little power wasted during the charging [6], although MPPT is not used. So the load side is amplified, just an ON/OFF load switch, which requires a PWM controlled inverter system, which in turn has its own switching losses, reducing the horrible benefits of MPPT [7-13]and adding complexity. The predetermined rules are in the controller. The intensity of light from the semiconductor diode is controlled by a buck converter based on the PWM input of the controller.

The flow chart describes the operation of this project. First the LDR sensor detects the intensity of the environment. From this we can see that it is day and

night. At night, the intensity of the light varies with respect to time to save the electricity.

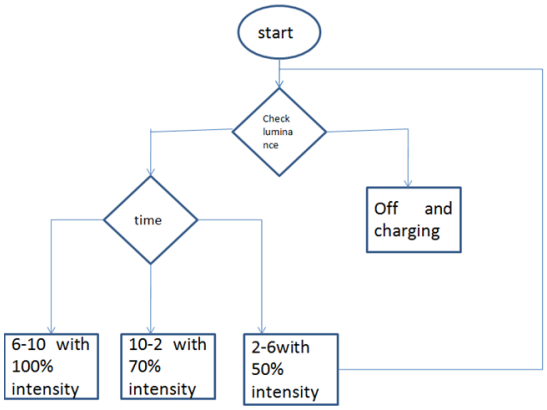

Figure 1. Flow chart

The solution offered by this idea s to increase the life of public lighting circuits. In addition to the traditional lighting circuit and intelligent circuit is also attached. This circuit is designed to recognize mood lighting to automatically turn off at sunrise using an Arduino AT Mega 328p microcontroller. The real time clock (RTC) is used here for real time use. The completion of the programming depends on the duration. The LDR is used to check the luminescence.

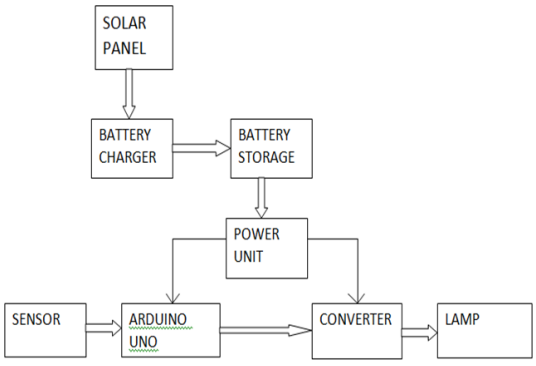

Figure 2. Block diagram

The street light span is divided as
Phase 1: After sunset to nightfall (6pmto 11pm).
Phase 2: At midnight (11pm to 3am).
Phase 3: Before dawn (3am to 6am).

The power will be cut down as of the present ratios and during phase 1 it will be 100% also Phase 2 it will be 75% & during Phase 3 it will be 50 %. By using the LDR the outer natural lighting is found and based on the LDR response the lights will switch off or on.

Case 1:
During summers, the day is longer hence lights can be switched on even at 7pm and switched off at 5am also.

Case 2:
During winters, the day is longer hence lights can be switched on even at 5pm and switched off at 7am also. Thus, it is an intelligent luminescence controller circuit.

IV. RESULTS AND DISCUSSION

4.1 Conventional method

By considering the practical power consumption scenario, mathematically under the conventional conditions,
Phase 1: After sunset to nightfall (6pm to 11pm).
Power consumed = 8 units
Phase 2: At midnight (11pm to 3am).
Power consumed = 3 units
Phase 3: Before dawn (3am to 6am)
Power consumed = 1 units
Total power consumption (conventional method) = 12 units

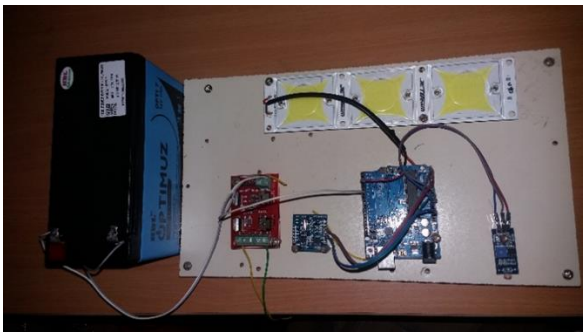

Figure 3. Prototype of the proposed model

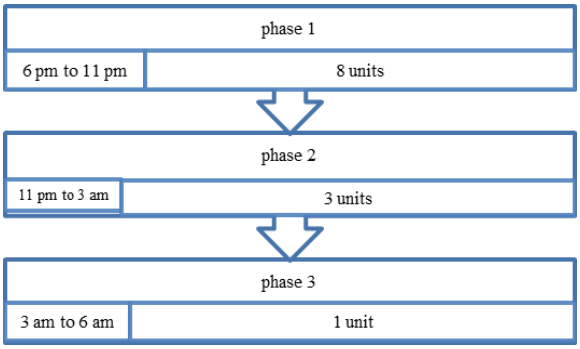

Figure 4 Schematic representation of the conventional circuit

4.2 Ideation method

Mathematically under the smart energy conditions,
Phase 1: After sunset to nightfall (6pm to 11pm).
Power consumed = 6 units
Phase 2: At midnight (11pm to 3am).
Power consumed = 2 units
Phase 3: Before dawn (3am to 6am)
Power consumed = 1 units
Total power consumption (conventional method) = 9 units

By using this method, the excessive energy consumpt ion of street lamps due to continuous lighting and and manual switching is reduced.

SCHEMATIC REPRESENTATION OF IDEATION CIRCUIT

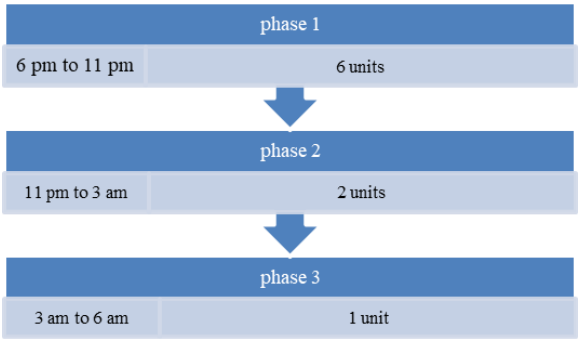

Figure 5. Schematic representation of the ideation circuit

CONCLUSION

The proposed will is control the light from the street based on the atmospheric conditions change and also increase the shelf of the lamp. This system allows easy control of the electrical lamp based on the solar PV panel. From this proposed system, it provides remote control to the street light. Addition circuit is supports the board and help the circuit to work properly based on needs.

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