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A Novel Approach for Modern Power Conservation Using Hybrid Power Supply System

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Abstract: In modern days we are seeing that the usage of electricity is at a peak. We are paying much money for per unit of electricity. For that, we are implementing a project by which we can produce electricity from speed hump, solar energy etc. With the help of this project, we can able to generate electricity from nature. This green energy gradually replaced traditional energy such as fossil energy. Several methods have been used to capture green energy from an environmental source. One of the most popular methods is using solar energy and from speed hump energy. They energy such generated are used for public use.

Index Terms: Speed Hump, Solar panel, Arduino circuit board, Soil moisture sensor

I. INTRODUCTION

To harness efficiently the power from renewable energy such as hump energy and solar energy. A common practice is to combine hump and solar photovoltaic energies.

This paper focuses on the initial results of using renewable resources and focusing on reliability. To provide renewable energy to stand alone applications the generation system should be composed of different types of energy sources to make better use of the natural resources in these applications. The goal of the project was to provide a reliable, continuous, sustainable, and good-quality electricity service to the street light and detecting soil moisture. The combination of two or more source and combining into a maximum output is called as "HYBRID SOURCE".

The aim of this paper is to produce energy from speed hump and photovoltaic system implemented in roads and national highway, where the vehicles cross over speed hump produces the huge amount of pressure and at the same time, acquiring the solar energy from the ambient will also be collected. Both hump power and solar power will be acquired simultaneously for charging the batteries. For the purpose of a maximum uninterrupted power supply, a DC generator and Power supply line is also connected to the system, but these two works in a priority, only when the demand is not met by the hump-solar system.

II. CURRENT TECHNOLOGY IN LITERATURE

This research examines a productive way to develop a hybrid power system design that can be used to generate the electricity using speed hump and solar panel. The generated electricity is mainly used for public use like street lights and detecting the soil moisture to measure the volumetric content then produces the water from pump motor using the generate electricity. For this, a new trend is needed to fulfill the needs of the system. The trends that concerned with our systems are stated below.

III. MAIN MOTIVE OF THE PROPOSED SYSTEM

We come across many technologies which are developed in order to generate electricity from a solar panel and speed hump. When a vehicle cross over the speed breaker then gear start move downwards and rotating. The dc motor is used to generate and electricity from the speed hump and connected the 12V battery. The solar panel works by capturing the sun energy and converted into electricity. Each solar cells are made up of silicon like a semiconductor. They constructed with the positive and negative layer, which creates an electric field. The combination of two or source is called a hybrid source.

IV. EXISTING SYSTEM

In the existing model, the charging is not reliable. The storing of energy in the battery is the main reason for not relying on a renewable resource. The energy produced from the windmill is converted into DC and the charges accumulate in the pores of the battery. These charges accumulate on the pores requires some time, the terminal keeps pushing the charge meanwhile. Hence the energy is wasted in terms of heat and the maximum power is not harnessed in the battery. Mechanical model failure, the wind turbine shaft break problem occurs frequently.

A. Disadvantage

- 1) Removal of shaft from turbine.
- 2) Not suitable for both horizontal and vertical winds
- 3) Inverter section problem is worse.

V. PROPOSED SYSTEM

The system overcomes the drawback of the existing system. The system consists of a solar panel and speed hump setup for energy generation. The energy produced by these two resources is provided to the battery for storage. Once the energy is stored that is used for various public uses. The system uses energy for street light controlling. The system consists of an LDR sensor for detecting whether it is day or night. Only in light, the system starts operating. Even though the night is detected, the light is not turned ON. Only if the person is detected, then only the light is turned ON. This is used to eliminate the wastage of electricity. Also, the system consists of a soil moisture sensor for detecting the soil moisture in parks. Once the soil moisture is dry, then the pump motor is activated.

A. Advantages

- 1) Energy is conserved from multiple source.
- 2) It is easy to generate an electric energy.
- 3) Effective use of power is performed.

VI. BLOCK DIAGRAM OF THE PROPOSED SYSTEM

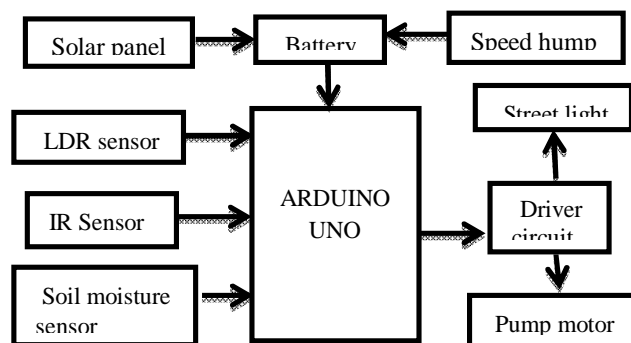


Fig: Block diagram of proposed system

The above block diagram represents the flow of the proposed system in which the Arduino UNO is the microcontroller which is used to process all the input data and produce the output. The generated energy from the solar panel and speed hump energy is stored in the battery and connected to the Arduino. The energy from the two resource is stored in 12volt battery.

The Arduino will operate in the digital method. The diver circuit is used to control the street light and pump motor which the power is received from the battery through Arduino. An LDR sensor detects light on its surface and if the light is detected and it will glow. Soil moisture sensor detects whether the soil is dry or not which is dry the water is flown from the pump motor.

A. Arduino ATmega328p Circuit Board



Fig: Arduino Atmega 328p circuit board

The Arduino UNO is a microcontroller board based on the ATmega328p. It has 14 digital input/output pins (of which 14 can be used as PWM outputs), 6 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

VII. WORKING PRINCIPLE OF THE PROPOSED SYSTEM

The working of the proposed system consists of a solar panel and speed hump in which they are used to generate electricity and stored in the 12-volt battery. In this project, we are using 14*2 dimension of each solar panel cell and a total number of solar panel is twenty-four. The solar panel is worked on the basis of sunlight is received by each cell. The solar panel is allowing the light particle to knock the electrons and free from atoms. a solar panel consists of many smaller units called photovoltaic cells. A photovoltaic cell is used to convert the sunlight into electricity. each photovoltaic cell is sandwiched between two semiconductor and cells are made by the silicon. The solar panel generates electricity up to 5 volts and also depends on how much light energy it acquires then stored into battery. The speed hump consists of two spring, gear and motor are used to generate electric energy. These speed humps are mainly implemented on the speed breakers, toll gate, parking areas in hotels, malls, buildings etc., The speed hump is working on the basis of when vehicles cross over speed breaker then spring of speed hump move downwards and gear starts rotating and dc motor starts generating electric energy. It generates electric energy depends on how much vehicles cross over the speed breaker and generates up to 5volt then stored in the battery.

The Arduino process all the input data and receives energy from the battery. the received energy fetched into pump motor to produce water when the soil moisture is dried for using parks, gardens, road divider plants etc., the street light also used the energy from the battery using IR sensor and LDR sensor. The light dependent resistor works when the amount of light falling on it. It is used as a sensor to detect the light conditions around the atmosphere. This process is controlled by the Arduino uno. The soil moisture sensor is used to measure the soil moisture is dried or not and it is interfaced by the Arduino. The output of soil moisture is detected digitally in the form of soil is normal or abnormal. We have to set the specific range for the soil moisture sensor value. The main motive of the project to generate electric energy and used for public use.

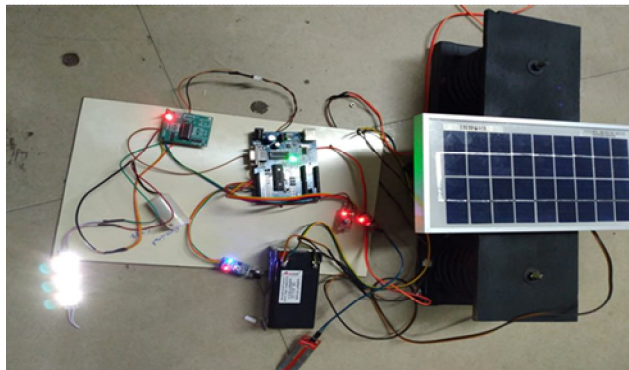


Fig: working module of proposed system

VIII. FUTURE SCOPE

In this paper we study the various data about the speed hump, solar for generating the hybrid at a small level that help the decision makers to study the various factors in construct a Hybrid generation plant with a various minimum cost with the highest generating capacity. The result shows the predict the energy generation through the hybrid system.

For future scope different time period has been used for calculating the power and efficiency. This method motivates the engineers to install small scale solar speed hump hybrid system. The government of India takes a major decision towards hybrid energy sources.

IX. CONCLUSION

The solar panel and speed hump are combined to generate electric energy then it is stored in battery it is also called a hybrid power supply system. In this project, we are generating an electric energy up to 10 volts. The mainly it is used for the street lights, road divider plants and mainly for public use.

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