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Automatic Night Light using Solar and Piezo Power

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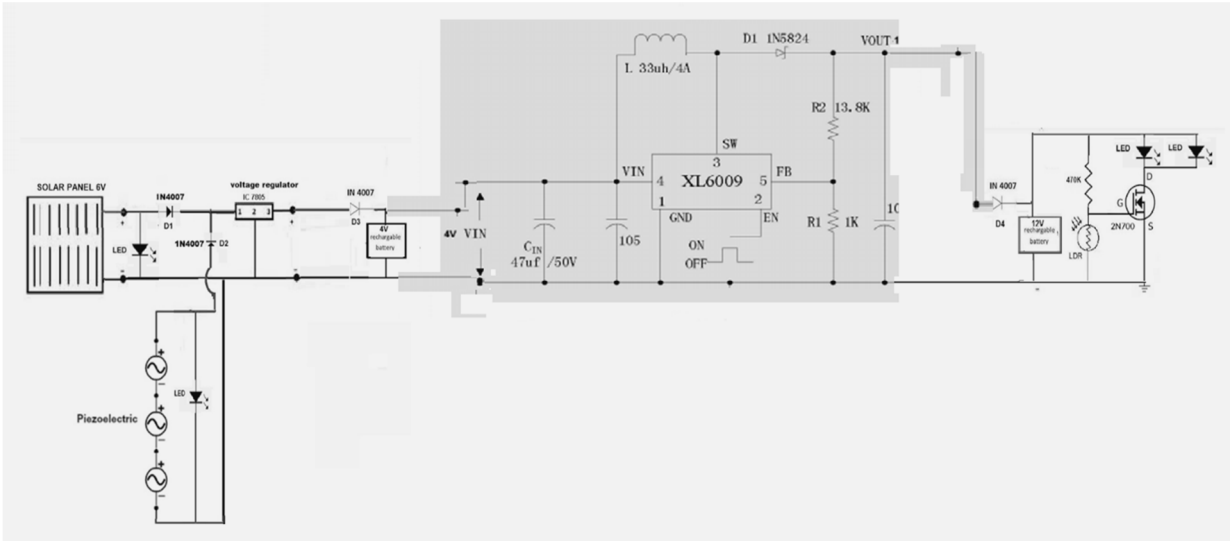
Abstract: ***The objective of this project is to get power continuously from the renewable energy resources. Here the renewable energy resources utilized in this project are solar energy and rain water. Now-a-days using solar power for the generation of electricity has become extremely popular. Particularly within the agricultural fields the usage of solar panels for electricity increasing day by day. The flaw during this concept is whenever there's sun, there'll be solar power production Another project is based on the principle of using hybrid mechanism of mixing solar energy technology with piezo electrical power technology during this project, we'll have hybrid panel i.e., one side it'll have solar array and other side it'll have piezo electric plate.. So whenever the day is sunny, solar array are going to be faced up and whenever there's rainfall, the piezo electric plate are going to be faced up. For sensing the sun, we are using an LDR. solar power may be a very useful renewable source of energy, which can be the solution to the longer term for power, or energy needs, as heating seems to select up rapidly by installing Solar AND piezo electric generator for Street lights, it'll help to spice up the economy of INDIA. during this no need of manual operation like ON time and OFF time setting. By using this technique electricity consumption are often reduced which is one among the most advantage also. within the basic circuit of this technique we are using an LDR, solar array, piezo electric transducer, Battery, voltage booster, Transistor, , Resistor and an LED.***

Keywords: Solar Panel, Piezo Sensor, Ldr, Renewable Energy

I. INTRODUCTION

In today's rapidly increasing and randomly developing technological world, the last word need for sustainment of humanity is Electricity. There are some ways during which the electrical energy are often stored, converted, and amplified for our use. to assist in understanding the energy sources which plays a crucial role within the world's future, it's required to familiarize with a number of the history, theory, economics, and problems of the varied sorts of energy. The energy sources are split into three categories: fossil fuels, renewable sources, and nuclear sources. The fossil fuels here are coal, petroleum, and gas. The renewable energy sources are solar, hydroelectric, ocean energy, and piezo energy. The nuclear-powered sources are fission and fusion.

II. CIRCUIT DIAGRAM



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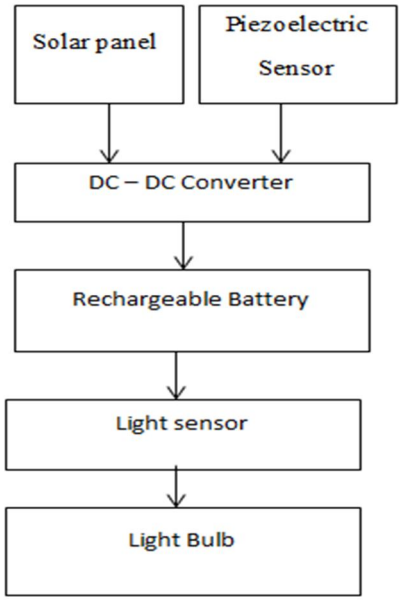
III. BLOCK DIAGRAM



IV. WORKING SYSTEM

The project consists both Solar and piezo electric sensor. The energy produced from solar and Piezo electric sensor are boosed with DC – DC Converter and stored in battery. The light sensor the light sensivity and switch the light, when it senses Darkness. It consists of Solar Panel, Piezo electric sensor, Ldr, DC – Dc converter, Rechargeable Battery

V. HARDWARE COMPONENTS

A. Solar Panel

A solar panel is an device that converts the energy of sunshine directly into electricity by the photovoltaic effect, which may be a physical and natural phenomenon. it's a sort of photoconductive cell , defined as a tool whose electrical characteristics, like current, voltage, or resistance, vary when exposed to light. Solar cells are the building blocks of photovoltaic modules, otherwise referred to as solar panels. Solar cells are described as being photovoltaic, regardless of whether the source is sunlight or a man-made light. they're used as a photodetector (for example infrared detectors), detecting light or other electromagnetic wave near the visible range, or measuring candlepower .

The Working of a solar cell requires three basic attributes:

1) The absorption of sunshine, generating either electron-hole pairs.
2) The charge carriers separation of opposite types.
3) The separate extraction of these carriers to an external circuit.

Fig.1: Solar Panel

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B. Piezo Electric Sensor

Piezo electric sensor works on applying a mechanical stress to a crystal, one can generate a voltage or P.E. difference, and thus a current. Piezoelectric generator principle states that the conversion chain starts from vibration that a energy source is required. The vibrations generated via piezoelectric are converted into electricity. The electricity produced is then later formatted by a converter before supplying the load (electrical device).Piezoelectric generators work due to the piezoelectric effect. This is the ability of particular materials to create electrical potential when responds to mechanical changes. In simply, we can say that when compressed or expanded or while changing shape a piezoelectric material will give output as some voltage.

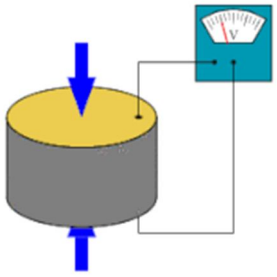

Fig.2: Piezo electric sensor

C. Rechargeable Battery

Rechargeable battery may be a one quite electrical battery and it's electro mechanical reactions to regulate so it's also called as storage cell . Generally, there are two sorts of batteries, namely gel cell deep cycle and lead acid battery. a chargeable battery is employed in solar LED street lights, this battery is employed to store electricity generated from the solar array during the sunrise to afford energy within the sunset. The lifetime and capacity of battery are essential as might be affect the backup power days of the lights.

Fig.3: Rechargeable battery

D. Diode

A diode is two-terminal electronic component that conducts current in just one direction. A diode may be a crystalline piece of semiconductor material connected to 2 electrical terminals. the foremost common function of a diode is to permit an electrical current to pass in one direction while blocking current within the other way. Thus, the diode is often thought of as an electronic version of a check valve. This unidirectional behaviour is named rectification, and is employed to convert AC to DC and to extract modulation from radio signals in radio receivers.

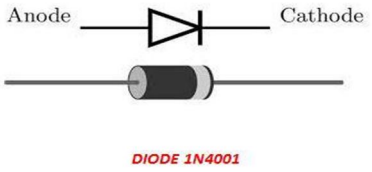

Fig.4: Diode

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E. Resistor

The resistor may be a passive electrical component to make resistance within the flow of electrical current. In most electrical networks and electronic circuits they will be found. The resistance is measured in ohms. An ohm is that the resistance that happens when a current of 1 ampere passes through a resistor with a 1 volt drop across its terminals. the present is proportional to the voltage across the terminal ends. This ratio is represented by Ohm's law

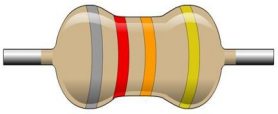

Fig.5: esistor

F. DC-DC converter

DC-DC converter is an electronic circuit that converts DC (DC) from one voltage level to other level. it's a kind of power converter. It boosts the facility levels from very low Voltage to very high (high-voltage power transmission).It is utilized in portable electronic devices like cellular phones and laptop computers, which are furnished with power from batteries primarily. the battery voltage rejects as its stored energy is in low . this converters offer a way to extend voltage from a partially lowered battery voltage thereby saving space rather than using multiple batteries to accomplish an equivalent thing. These converters which are Created to enhance the energy harvest for photovoltaic systems to which double or triple the output voltage.

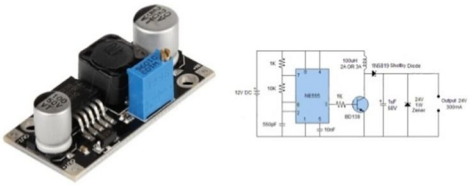

Fig.6: DC – DC Converter

G. LDR

LDR is also as Light dependent resistor, or photo resistor are often utilized in electronic circuit designs where it's necessary to detect the presence or the extent of sunshine .These electronic components are often described by a spread of names from light dependent resistor, LDR, photo resistor, or maybe photo cell, photocell or photoconductor. Although other electronic components like photodiodes or photo-transistor also can be used, LDRs or photo-resistors are a very convenient to use in many electronic circuit designs. they supply large change in resistance for changes in light level.

In view of their low cost, simple manufacture, and their simple use, LDRs are utilized in a spread of various applications. At just one occasion LDRs were utilized in photographic light meters, and even now they're still utilized in a spread of applications where it's necessary to detect light levels.Light dependent resistors are widely available:- they're normally stocked by electronic component distributors, and in sight of the way the industry supply chain operates lately , this is often the traditional thanks to obtain them. Electronic component distributors large and little will typically have an honest selection

Fig.7: LDR

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VI. RESULTS

The Hardware arrangement of the "Automatic Night Light Using Solar And Piezo power" is given below.

Fig.8: Hardware Arrangement

A. Result Analysis

1) The tests have been performed to obtain the power from solar panel and piezo electric sensor. With the help of Dc – DC converter the voltage increases and stored in Battery

2) The Battery contains the generated electricity by using light sensor which consists Ldr sensor to sense the darkness.

3) When there is darkness, the sensor senses and switches the light.

Fig.9: When the Darkness is detected, the Light will ON

Fig.10: When the Darkness is NOT Detected, the Light will OFF

VII.ADVANTAGES

A. Simple Construction.
B. Power generation is simply walking on step and sun light
C. No manual operation
D. Less maintenance.
E. Environmental friendly.

VIII. CONCLUSION

The pre-study report has described that using the power generation i.e., solar power generation combined with power generation from piezo electric effect gave the conclusion that it provides path for obtaining continuous power generation from renewable energy resources We hope that our proposal towards an efficient way to electrify the streets of all the city corporations under the Solar Street Lighting will help to more effectively implement the project within the budget and thereby reducing pressure on conventional power use and current generation.

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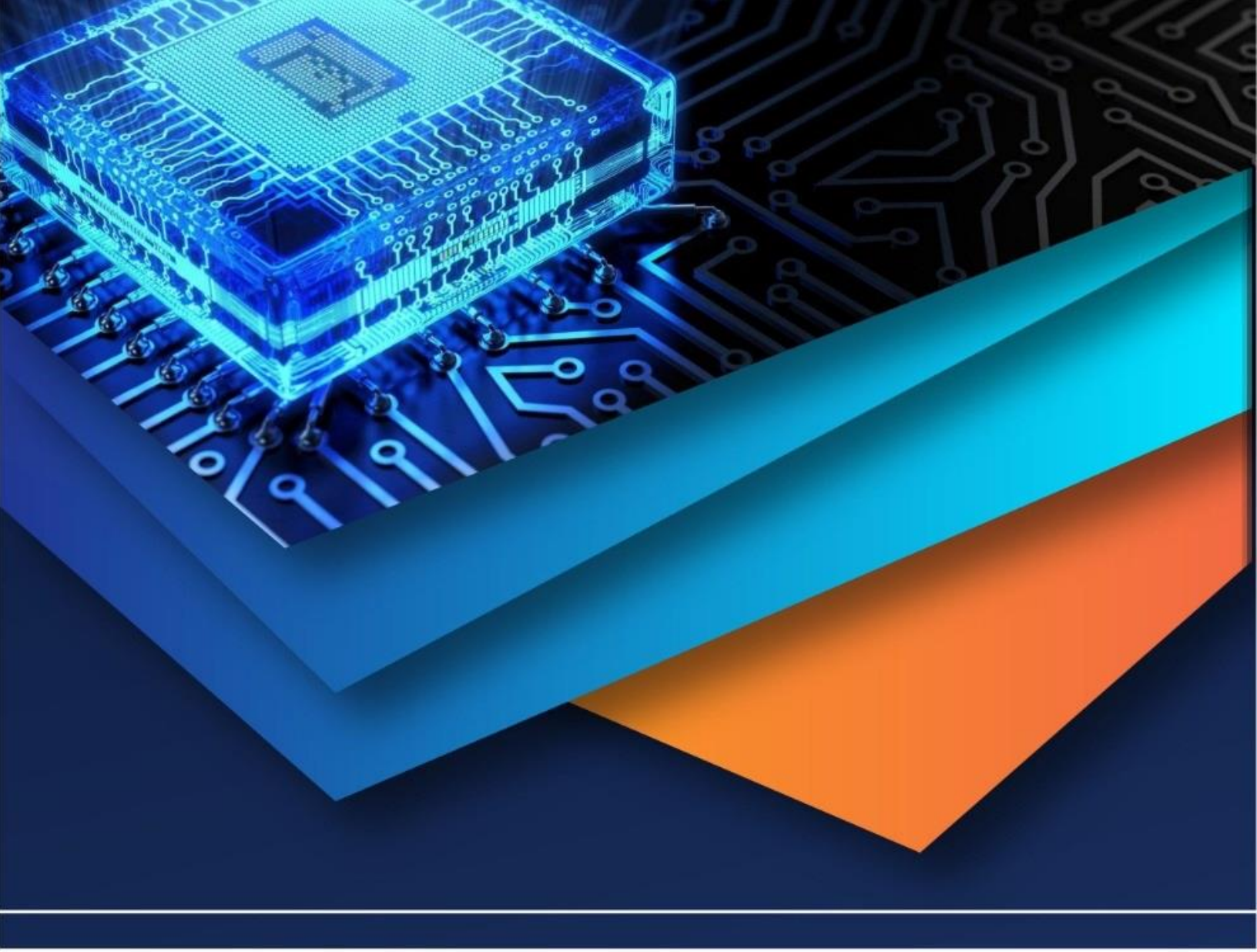

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