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# Renewable Energy Resource Management

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**ABSTRACT**:The power requirement across the globe is increasing at a higher rate. Since ancient times the fossil fuels i.e., coal, petroleum and natural gas and other conventional resources, are main sources of power generation. The use of fossil fuels at large scale leads to pollution. These reasons lead to develop new and alternative methods of power generation, which could not be adopted so far due to various reasons. Sufficient amount of electricity cannot be generated by using a single source such as bicycle. So we are making use of more than one source to produce a required amount of energy. Either of the sources can act as a backup, if any one of the source fails. We can make use of staircase to generate electrical energy. The rack and pinion mechanism is used in which mechanical energy is converted into electrical energy. Solar power systems can be used to produce power directly from the sun. Combination of all these above sources can be used to generate meaningful amount of power.

**KEYWORDS:**Resource Management,Renewable Energy, Rack and Pinion mechanism, Solar Power System, Cycling Instrument.

## I. INTRODUCTION

The leading edge technology intelligent systems and smart sensor networks are an essential part of our everyday life. Their evolution will help us to better utilize our resources (energy saving initiatives) and enhance our way of living. In order to better utilize electricity, many governments and utilities are interested and encourage the initiatives leading towards the development of intelligent systems.

In this project we are going to receive energy generated from different sources such as

1. Staircase using Rack and Pinion Mechanism. [2]
2.Energy generated from cycling instrument.
3. Solar Panel and charge a 12V battery. [3]

This DC energy is converted to AC 230V using 200W inverter. This inverter is now connected to two lamps to illuminate gymnasium.

## II. THREE SOURCES OF THE SYSTEM

In the fig 1,it shows the staircase following rack and pinion mechanism .When the person walks through the steps ,the step is having springs attached below it and thus due to persons weight they get pressed. A rack and pinion mechanism is attached to those springs which are further connected to the Dynamometer and thus converted into the DC voltage for storage in the Battery. [2]

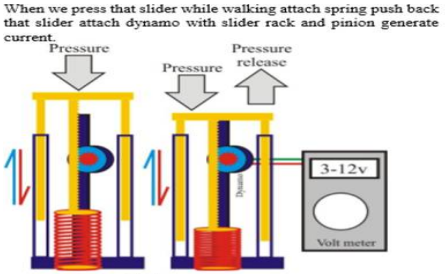


Fig. 1Staircase using Rack and Pinion mechanism

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In the fig 2,it shows the cycling instrument ,when a person cycles in the gymnasium, the dynamo-meter is connected to the cycling equipment which calculates the power produced by the rotating wheel and converts into the DC signal (14V, 1A).This can be stored into the Battery using charge control.

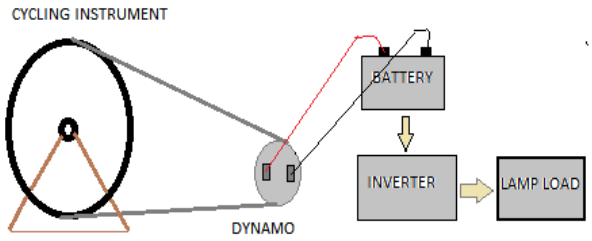


Fig. 2 Cycling instrument

In the fig 3,the Solar panels are the medium to convert solar energy into the electrical energy. Solar panels can convert the energy directly or heat the water with the induced energy. PV (Photo-voltaic) cells are made up from semiconductor structures as in the computer technologies. Sun ray are absorbed with this material and electrons are emitted from the atoms .This release activates a current. [3]

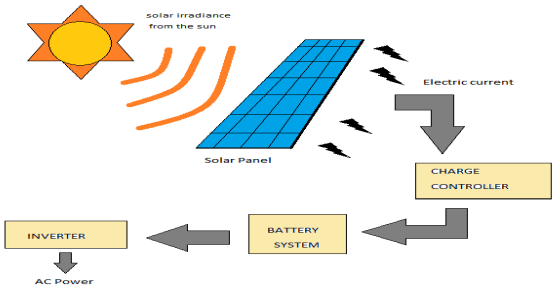


Fig. 3 Solar panel

## III. BLOCK DIAGRAM AND EXPLANATION

In the fig 4,it shows the block diagram of the proposed system .The three sources are connected to three batteries one for each, which are given to a switch .The switching, is done as per the highest charged battery among all three batteries.

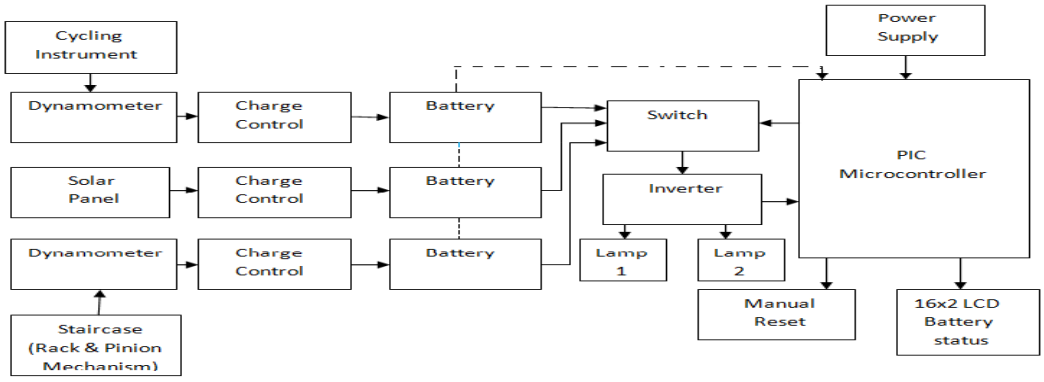


Fig. 4 Block diagram

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**DYNAMOMETER:**It is an apparatus for measuring the mechanical power generated, or absorbed by a rotating machine. It acts as a transducer which converts one form of energy to another such as rotational to electrical or linear to electrical.

**CHARGE CONTROL:** It simply consists of a rectifier to convert sine wave into pulsating dc. In case of rack and pinion mechanism, the negative energy produced due to reverse movement of dynamometer is converted into positive energy by this block.

**BATTERY:** We use three batteries of 12 V each to store the charges generated by the three sources. If one source goes down, we can make use of other two batteries .

**POWER SUPPLY:** The main aim of this power supply is to convert the 230V AC into 5V DC in order to give supply for the microcontroller. In this process we are using a step down transformer, a bridge rectifier & a filter capacitor. Step down transformer reduces the 230V to smaller volt value at its secondary terminals. This reduced voltage is applied to bridge rectifier to convert the 230V AC signal to DC.Further it is given to filter and then to regulator. At the output of regulator we get a 5V pure DC.

**MICROCONTROLLER:**This PIC Micro controller shows the energy stored in the Battery on a 16x2 LCD Display. The micro controller Output is given through the Inverter to the Lamps. Pic controller is used to switch between the batteries.

**SWITCH:** Relay is used as a switch in this project to switch between the different batteries depending upon the amount of charge stored in them.

**INVERTER:**The inverter is used here to convert the dc voltage into ac voltage. At the output there is step up transformer in the inverter design which gives 230 v ac.

**LAMP LOAD:** The output of the inverter is connected to the appliances such as Lamp.

**LCD DISPLAY:** In this project we used 16x2 Alpha numeric LCD display to display the health of the battery and also used it into 4 bit mode.

## IV. INVERTER DESIGN

In the fig 5,it shows the circuit diagram of simple 100 Watt inverter, which uses two MOSFET switch and IC CD4047.

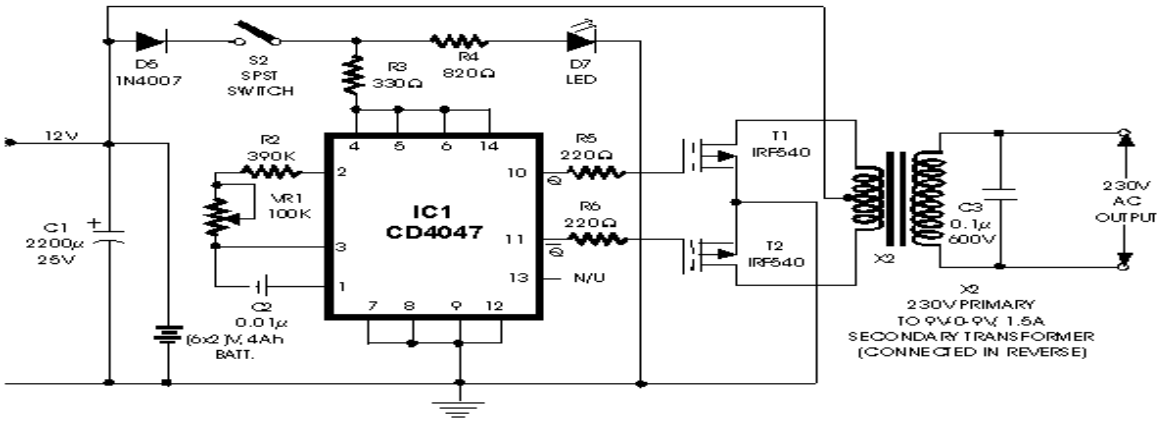


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Fig. 5 Circuit diagram of Inverter

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An astable multivibrator IC CD4047 produces pulse trains which are 180 degree i.e. out of phase. The time period of pulse is 0.01 seconds at the pin 10 and 11. The gate of the MOSFET1 is connected at Pin 10 and the gate of MOSFET 2 is connected at pin 11 through a resistor. Resistor prevents the loading of the IC. The first transistor conducts when the output from the pin 10 is HIGH, and current flows through the upper primary side of the transformer which results the positive half cycle of the output AC current. The second transistor is responsible for the negative half cycle of the output AC current .This current flows through the negative half cycle in the lower half region of the primary side of the transformer which is tapped centrally. The step-up transformer used to increase the output voltage. The zener diode protects the circuit from reverse current. Due to switching between the two MOSFETs dissipation of heat occurs, which can be reduced by using heat sinks.

## V. IMPLEMENTATION AND RESULT OF INVERTER CIRCUIT

We can get output of 100Watts with 230 V from the 12V battery supply by this circuit. This circuit can be used to light bulbs or charge mobile phones, laptop at home.

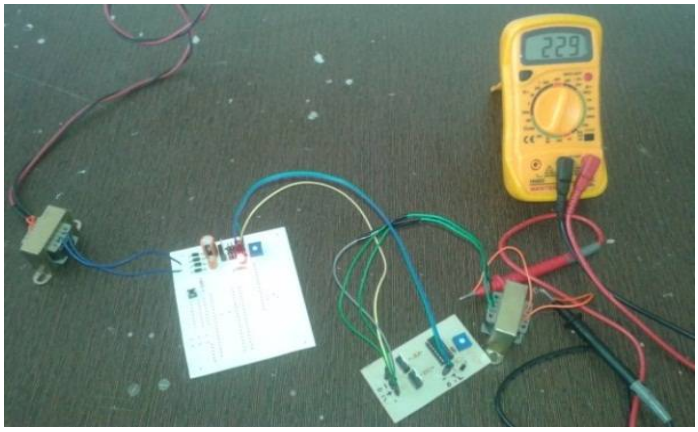


Fig. 5 Implementation of Inverter circuit

## VI.CONCLUSION

This Integration of renewal Energy source will be highly effective in places, where need of electricity is more as It causes no effect on nature i.e. pollution free, at the same time there are less chances of any kind of accident due to lightning. It is also useful to minimize power supply load i.e. cut short power charge. By using this system, we can save electricity charge because very less maintenance charge to this equipment is required. The designing of this equipment is done in such a way that it is very compact and acts as user friendly. When it is manufactured in a large scale, cost of this integrated natural resources power generation system is affordable. It is the most renewable power or electricityresources with less expenditure because of no power failure or load shedding at any situation.

## REFERENCES

[1] Bill Williams, “Solar and Other Renewable Energy Technologies”,2002.
[2] Tom Jose V, Binoy Boban, Sijo M T,“Electricity Generation from footsteps; A Regenerative Energy Resource”, International Journal of Scientific and Resource Publication(ijsrp),Volume 3, Issue 3, March 2013.
[3] N.Sivaramakrishn,Ch.Kasi Ramakrishna Reddy, “Hybrid power generation through combined solar wind power and modified solar panel,” International Journal of Engineering Trends and Technology(IJETT), Volume 4, Issue No. 5,pp. 1414-1416, May 2013.