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# GENERATION OF ELECTRICITY USING WASTE MATERIALS

***Mohan Babu C[1], Sonika N[2], Likhitha N M[3], Poornima L[4]***

[1]Assistant Professor, Dept of Electronics and Communication SJC Institute of Technology Chickballapur,Karnataka,India mohanbabu015@gmail.com

[2] Dept of Electronics and Communication SJC Institute of Technology Chickballapur,Karnataka, India sonikan86@gmail.com

[3] Dept of Electronics and Communication SJC Institute of Technology Chickballapur,Karnataka,India vimala4963@gmail.com

[4] Dept of Electronics and Communication SJC Institute of Technology Chickballapur, Karnataka, India lpoornima79@gmail.com

ABSTRACT –

The society has been greatly impacted by energy resource constraints, climate change, and international energy disputes this year, which has posed a significant threat to global stability. These issues are linked to the depletion of fossil fuel reserves, the growing world population, global climate change, and the increasing levels of waste (both solid and liquid), ultimately resulting in an electricity crisis. Throughout the current year, the scarcity of energy sources, the changing global climate, and conflicts over energy resources have had detrimental effects on all aspects of society, further exacerbating the threat to global stability. These challenges are directly linked to the diminishing fossil fuel reserves, the rapid growth of the world population, the global climate change, and the escalating levels of waste, ultimately leading to an electricity crisis. In many developing countries, this electricity crisis hinders socio-economic and technological progress, leading to a decrease in job opportunities as industries shut down or relocate to neighboring countries. The objective of this project is to generate power from waste materials such as plastic, rubber, garbage, and other waste materials. The electrical energy produced will be stored in batteries through a circuit and utilized to power the entire system. This project successfully demonstrates how electricity can be generated from waste materials and effectively stored in batteries.

Keywords : Heating panels, LED Bulb, Arduino UNO, Capacitors, LCD, Voltage sensor.

## INTRODUCTION

Electricity is a necessity in modern society, and to produce power, we utilize a range of fuels such as coal, petrol, diesel, uranium, and more. These fuels have a finite supply, allowing us to sustain our energy needs for approximately 70 to 80 years. Various power stations use these fuels to generate energy, with thermal power plants using coal, nuclear power plants using uranium, gas power plants using gas, and diesel power plants using diesel to produce electricity. The technology employed to convert waste materials into electricity is continuously advancing, with new innovations emerging to enhance efficiency and cost-effectiveness. This process presents an exciting opportunity to reduce waste, decrease greenhouse gas emissions, and offer renewable energy sources to communities worldwide.

## WORKING

Burning waste materials produces heat that heating panels convert to electricity, and LED lights that shine with electricity indicate the presence of electricity.

Following that, the circuit uses electricity to charge the batteries and fuel the burning of waste items in the burning box.

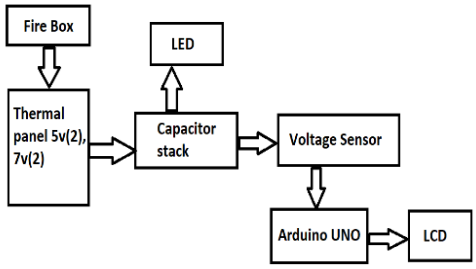
The LED lights and heat sensor are connected to the batteries. The batteries that permit electricity to flow will being conducting as soon as the heat sensor does, causing the LED lights to shine.

## METHODOLOGY

The waste materials are gathered and incinerated in the firebox, causing the heating plates to absorb the heat energy produced. This captured heat energy is then converted into electrical energy, which is indicated by the glowing LEDs on the circuit box. In order to transform the erratic energy

waveform into a linear wave, a circuit containing two diodes in parallel, two resistors in parallel, five LEDs, and six capacitors in parallel is utilized. The generated electrical energy is then directed to the batteries through power boosters for storage. Due to the connection to a semiconductor known as a diode, there is no way for the energy to be lost back to the system. The batteries are used to power heat sensors and LED lights, with the LEDs lighting up when the heat sensors detect heat. The burning of waste materials produces a large amount of hot, hazardous gases that are harmful to both the environment and people. To safeguard against these gases, a water storage tank is employed to cool the hot gases before they are transferred to a cooling tank, where a significant amount of carbon is released. The heating panels convert heat into electricity during the incineration of waste materials, with the LED lights illuminating to demonstrate the power of the electricity being generated. Subsequently, a circuit is employed to charge a battery with the electricity produced while the waste materials are burned in a firebox equipped with a heat sensor that activates the LED lights once a specific temperature is reached. This process clearly showcases the successful conversion of waste materials into electricity.

## BLOCK DIAGRAM




### *4.1 Fire Box*

Fire Box is the component where all the waste materials like rubber garbage are collected.

### *4.2 Heating panel*

Heat panels are designed to convert heat energy into electricity by harnessing the movement of electrons when photons are released from atoms. This electron flow is what generates the electric current.

### *Heating sensor*

The sensor's tip features a spring connected to a rod that extends to the gauge needle. The spring is located within the end of the stem that senses temperature. When heat is introduced to the coil, it generates movement within the coil, resulting in the movement of the gauge needle and the display of temperature. This sensor is designed to detect the generation of heat energy.

### *Capacitor*

The capacitor is a component which has the ability or “capacity” to store the energy in the form of an electrical charge producing a potential difference (static voltage) across its plates much like a small rechargeable battery. In this process the capacitor work to collect electrical energy and store and will send that electrical energy to battery by connection of and series and parallel to increase in the voltage double.

### *4.5 LCD*

1. Liquid crystal displays are flat panel displays or other electronically modulated optical devices that utilize the light modulating characteristics of liquid crystals in conjunction with polarizers. Liquid crystals do not emit light themselves, but rely on a backlight or reflector to generate images in color or monochrome.

***Battery***

1. A battery transforms chemical energy into electrical energy through a chemical reaction, with the chemicals contained within the battery. It is utilized to supply power to various components within a circuit. The battery generates direct current (DC) electricity and is responsible for storing the energy produced.

***LED Bulb***

LED, standing for Light Emitting Diode, and LED bulbs are employed to light up the bulbs in the project for the purpose of visualizing the energy generation. 10-watt bulbs are utilized to monitor the energy production.

***Arduino UNO***

The Arduino UNO is a microcontroller board that is open-source, based on the ATmega328P microcontroller chip, and was developed by Arduino.cc before its initial release.

## Result

In this prototype, when we initiate the heating process of waste material inside the Zaar box, the heat generated will be captured by the heating panels. These panels will then convert the heat energy into electrical energy, which will be transferred to the circuit board. The circuit board is designed with the IN4007 Diode and capacitor connected in both series and parallel configurations. This arrangement is implemented to enhance the generated energy and facilitate its storage in the battery.

Subsequently, the heat sensor will detect the heat and establish a connection with the circuit, enabling the output of LED bulbs. These bulbs will continue to emit light as long as the energy is being stored and the heat sensor detects the ongoing energy generation. The bulbs will remain illuminated without interruption throughout the energy generation and battery storage process. This stored energy can be utilized whenever it is required. In the current scenario of waste material accumulation, it is evident that a systematic approach can be implemented to collect and utilize everything efficiently. The prototype plays a crucial role in generating additional energy from waste materials.

It is apparent that energy generation through this method is simplified, and with proper precautions, the prototype aids in understanding waste utilization effectively.
Through this project, there is a potential to enhance energy production for industrial purposes and cater to various requirements.

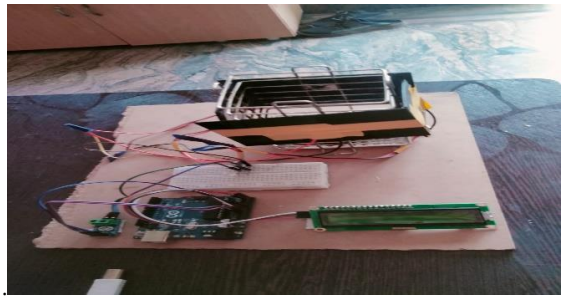


Fig.1: Result of generated electricity

## Conclusion

This project demonstrates the utilization of pollution control filters to minimize pollution and effectively generate electricity from waste materials. We ensure the complete functionality of our project upon completion. It proved to be an excellent project for practical application and demonstration at that time as it operated smoothly. The process of converting garbage into electricity is showcased.

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