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Power Generation by Waste Material

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Abstract: *Thermometric generators (TEGs) are small solid state devices that generate electricity directly from heat. They have the potential to be applied inwaste heat recovery systems and be used as a primary heat engine as a generator. In this study, a direct heat to electricity (DHE) technology using the thermoelectric effect, without the need to change through mechanical energy, was applied to harvest low-enthalpy thermal work. The power generator assembled with TEGmodules had an installed power of 1 KW at atemperature difference of around 120 °C. The power generated by the thermoelectric system is almost directly proportional to the temperature differencebetween the hot and the cold sides. A Cost Analysis of the technology, however suggests that, the material costs are too high for typical thermoelectric power generation applications at mean temperatures below 135°C. Above 275°C, many bulk thermoelectric materials can achieve costs below Rs.72/W. The major barrier to economical thermo electric power generation at these higher temperatures results from system costs for heat exchangers and ceramic plates. For cooling applications, we find that several thermoelectric materials can be cost competitive and commercially promising.*

Keywords: Heating panels, Led Bulbs,zaar box, IN4007, Battery 4.5V, Resistors, capacitors

I. INTRODUCTION

In the present world, electricity is very necessary. So, to generate electricity we use many fuels like coal, gas, diesel, uranium, etc. These all fuels are in limited quantity. Which, we could up to 70 to 80 years. These fuels are used in different power plants to generate electricity. EX. In thermal power plants - coal, nuclear power plants uranium, gas power plants – gas, and in diesel power plants - diesel is used as fuel to generate electricity. In This Project when burning start then heatinggenerate and heating penal start converting heat to electricity and that electricity, we can see on multi meter display, we can see how much voltage generate by waste materials and we Electricity generating perfectly then automatic heating sensor on the output power supply then Big LED Bub start glowing and our idea everyone can seein live working, Our Idea 100% work for generating electricity by waste materials. So, this is our best live working idea.

II. WORKING

When we start burning the waste material in the burning box the heating panels will start collecting the heat energy generated in the burning box by waste material. The heat energy collected by heating panel will be converted into the electrical energy. The generated electrical energy will be seen in circuit box with led glowing. The generated electrical energy will transfer to the batteries through the power boosters. The batteries will not dissipate the energyback because a diode is connected to it. The batteries relate to the heat sensor and LED bulbs. Whenever theheat sensor will start conducting the batteries allow energy to flow will start conducting and LED bulbs will glow.

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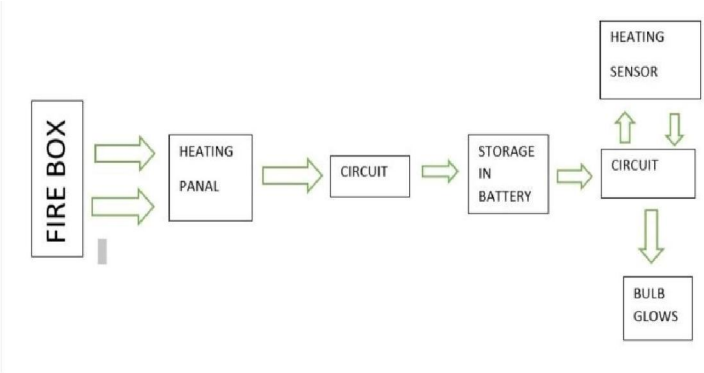
III. BLOCK DAIGRAM



Heating Panel

Heating panels are energy-efficient devices designed to warm indoor spaces. They come in various types, such as infrared or electric radiant panels, providing an alternative to traditional heating methods. Heating panels operate by radiating heat directly to objects and surfaces, creating a comfortable warmth. They can be wall-mounted or ceiling-mounted, offering discreet heating solutions. Electric heating panels are often easy to install and can be controlled individually for better energy management. Infrared panels, specifically, emit heat similar to the sun, warming objects without heating the air. Consider factors like room size and insulation when choosing the right heating panel for your space.

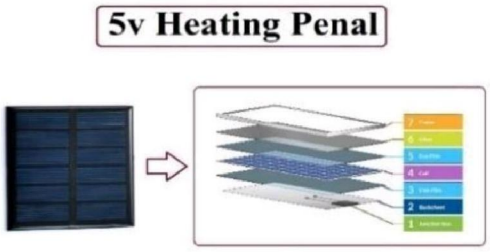


Fig:- Heating Panel

Heating Sensor

Heating sensors, commonly used in HVAC systems, monitor and regulate temperature. Thermostats are a common type of heating sensor, maintaining a set temperature by activating or deactivating the heating system. Modern smart thermostats offer programmable schedules and remote control through apps. Temperature sensors, often integrated into heating systems, provide feedback to ensure accurate temperature control. Additionally, occupancy sensors can optimize energy efficiency by adjusting heating settings based on room occupancy. Regular maintenance and calibration are essential for reliable sensor performance.

Fig:- Heating Sensor/Tub Starter

Resistor

Resistors are electronic components that limit the flow of electric current. They have a specific resistance measured in ohms (Ω). Resistors are commonly used in circuits to control voltage, current, and protect components. There are

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various types, including fixed resistors with a constant resistance and variable resistors that allow adjustment of resistance

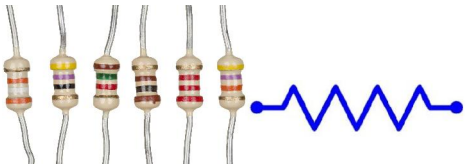

Fig:- Resistors/ Resistors Symbol

Capacitor

The capacitor is a component which has the ability or "capacity" to store 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 the electrical energy and store and end the electrical energy to battery by connection of and series and parallel to increase the voltage double.

Fig:- Capacitor

LED Bulbs

The LED Stands for Light emitting diode and LED BULBS are used glow the bulbs in the project to see the energy generation. 10 watts bulbs are used see the energy generation. LED bulbs are energy-efficient lighting options that use light-emitting diodes. They last longer, consumeless energy, and come in various color temperatures. Consider them for cost savings and environmental benefits.

Fig:- LED Blubs

Battery

A battery converts chemical energy into electrical energy by a chemical reaction. The chemicals are kept inside the battery. It is used in a circuit to power other components. A battery produces direct current (DC) electricity. The battery used store the energy generated.

Batteries store and provide electrical energy. Common typesinclude lithium-ion, alkaline, and lead-acid batteries. They power various devices, from smartphones to cars. Remember to dispose of them properly, as they can be environmentally sensitive.

Fig:- Battery

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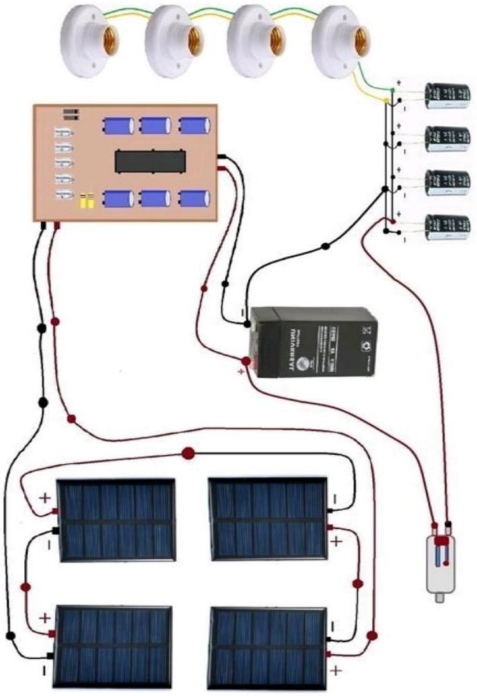
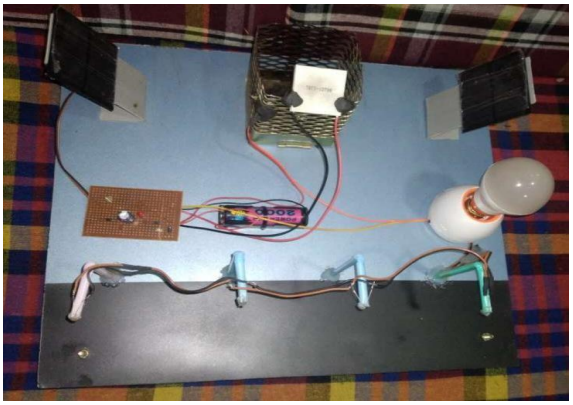
Connection Diagram



IV. WORKING



Electricity generated from waste material typically involves processes like incineration, anaerobic digestion, or gasification. In incineration, waste is burned to produce heat, which is then used to generate steam, turning turbines to produce electricity. Anaerobic digestion involves organic waste breaking down in the absence of oxygen, producing biogas that can be used for power generation. Gasification converts waste into syngas, which is then used to generate electricity. These methods help utilize waste while contributing to sustainable energy production.

The process of generating electricity from waste materialinvolves various methods:

- Incineration:- Waste is burned at high temperatures, releasing heat. This heat is used to produce steam, which turns turbines connected to generators, ultimatelygenerating electricity.
- Anaerobic Digestion:- Organic waste is broken down by microorganisms in the absence of oxygen, producing biogas (mainly methane). This biogas can be burned to generate electricity or used as a fuel source.
- Gasification:- Waste materials are converted intosyngas (a mixture of hydrogen, carbon monoxide, and other gases). Syngas can be utilized to generateelectricity through combustion or other thermal processes.

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- Landfill Gas Recovery:- Methane produced by the decomposition of organic waste in landfills is collected and can be used as a fuel for electricity generation

V. CONCLUSION

In conclusion, generating electricity from waste material is a crucial facet of sustainable energy practices. Technologies such as incineration, anaerobic digestion, gasification, and landfill gas recovery play pivotal roles in harnessing the energy potential of waste. By converting waste into electricity, these methods not only contribute to sustainable power generation but also aid in waste management, reducing environmental impact. Embracing these approaches fosters a more efficient and environmentally friendly energy landscape, aligning with the principles of a circular economy and mitigating the challenges associated with conventional waste disposal.

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