



TURNING TRASH TO ELECTRICITY

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Abstract : This innovative project is focused on generating electricity using solid waste. The increasing amount of non-biodegradable materials, such as paper and plastics has become a major environmental issue. However, these materials can be used to generate electricity, which provides a useful solution for both waste management and energy production. In this project, non-biodegradable materials used as fuel. By burning these materials in combustion chamber, heat is produced and absorbed by heating panels. After that, inverter circuit converts the heat into electricity using thermo-electric conversion. After generation of electricity, it is stored in batteries for later use. The battery storage system provides a consistent power supply, reliable and eco-friendly energy. This is particularly important in areas where there may be limited access to other source of electricity. The end goal of this project is to proceed towards reducing non-bio-degradable waste, environmental pollution and provides a sustainable source of energy.

I. INTRODUCTION

This project aims to generate electrical energy from commonly discarded waste materials such as plastic, rubber, and paper. With growing urbanization and industrialization, the amount of waste produced every day is increasing at an alarming rate, leading to serious environmental concerns. At the same time, the global demand for electricity is rising, especially in remote or underdeveloped areas. This project provides a dual-purpose solution by utilizing waste as a source of energy, turning an environmental burden into a valuable asset. By burning waste materials in a controlled setup, heat is produced, which can then be converted into electricity using basic thermoelectric or generator-based systems. The generated electricity is stored in a rechargeable battery using an integrated circuit. This stored energy can be used even when waste materials are not available, ensuring continuous access to power. An LED light is connected to the circuit as a visual indicator to demonstrate the presence and usability of the generated electricity. This project, though small in scale, effectively showcases the working principle of a Waste-to-Energy (WTE) system. It can serve as an educational tool and proof of concept for implementing larger-scale solutions. Furthermore, it promotes the reuse of non-biodegradable waste, helping reduce landfill accumulation and environmental pollution.

I. LITERATURE SURVEY

Many researchers and engineers have worked on different methods of producing electricity from waste materials. Waste-to-energy technology is seen as a good solution for two major problems: disposal of waste and shortage of energy. Studies show that solid waste like food remains, agricultural residue, plastics, and industrial by-products can be converted into useful energy. Methods such as biogas production, incineration, pyrolysis, and gasification are commonly used.

Biogas plants use organic waste like kitchen waste and animal dung to produce methane gas, which can be used to generate electricity. Other works highlight that burning of municipal solid waste under controlled conditions can produce heat energy, which is later converted into electricity. Researchers have also found that agricultural wastes such as rice husk, sugarcane bagasse, and crop residue are effective biofuels.

Existing System

In the existing system, waste like paper and plastic is usually collected and dumped without proper utilization. Some of it is recycled, but a large portion is burned in open areas, causing pollution.

When incinerated, paper and plastic release heat energy, but it is rarely captured for electricity. Only a few waste-to-energy plants use controlled burning of such waste to produce power. These systems are often costly and not available in most regions.

Proposed System

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- Some of it is recycled, but a large portion is burned in open areas, causing pollution.
- When incinerated, paper and plastic release heat energy, but it is rarely captured for electricity.
- Only a few waste-to-energy plants use controlled burning of such waste to produce power.
- These systems are often costly and not available in most regions.

Block Diagram

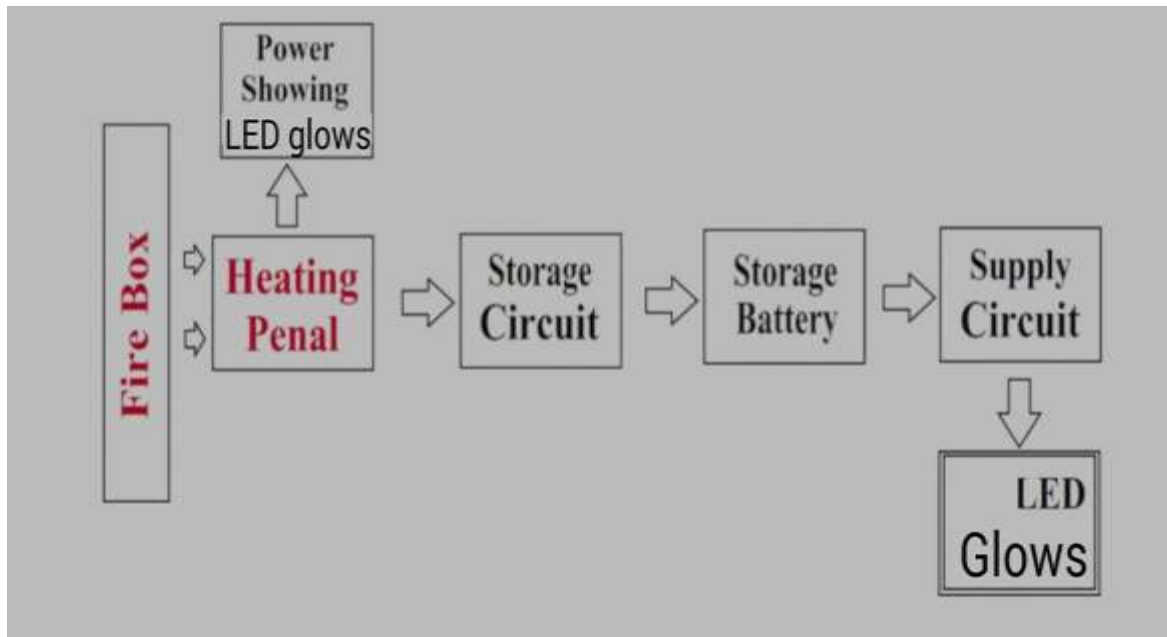


fig-1:Block Diagram

II. METHODOLOGY AND COMPONENTS

In this project, electricity is generated from the heat of waste materials. First, waste like paper and plastic is collected and burned in a combustion chamber. The burning process produces a large amount of heat inside the chamber. Instead of using sunlight, solar panels are placed near the chamber to capture this heat. These panels act as heat collectors and convert the thermal energy directly into electrical energy. The electricity generated is then stored in batteries or supplied for use. This method avoids water or steam and works only with heat from waste. By combining waste combustion with solar panels, useful electricity is produced in a simple way.

The main components used in this project are simple and effective. A waste collection bin is used to gather paper and plastic waste. A combustion chamber is provided to burn the waste and produce heat. Near the chamber, specially designed solar panels are placed to absorb the heat energy. These panels directly convert the collected heat into electricity. A battery unit is used to store the generated power, and an inverter helps to supply it for practical use. A control system is also included to monitor and regulate the process safely. All these components together make the system work smoothly for generating electricity from waste materials

Working Principle

The working principle of this project is based on the conversion of waste heat into useful electrical energy. The process begins with the collection of waste materials such as paper, plastics, and other combustible items. These collected wastes are then fed into a specially designed combustion chamber. Inside the chamber, the waste is burned in a controlled manner to produce a high amount of heat energy. Normally, this heat would escape into the atmosphere and remain unused, but in this project the heat is carefully captured and converted into electricity. To achieve this, solar panels are placed close to the combustion chamber.

Unlike their regular use where they absorb sunlight, here these panels are used to absorb the thermal energy produced during combustion. When the panels absorb this heat, they directly convert it into electrical energy through thermoelectric principles. The generated electricity is then transferred through proper wiring into a storage unit. A battery is connected to store this power safely for later use. To make the stored electricity suitable for practical applications, an inverter is used to convert the direct current (DC) into alternating current (AC). This ensures that the produced electricity can be used to run small electrical appliances

or lighting systems. The system avoids the need for water, steam, or turbines, which makes it simple, cost-effective, and easy to maintain. The combustion chamber plays an important role as it ensures efficient burning of waste and consistent heat generation.



fig-2: Conversion from waste to Electricity

Conclusion

In conclusion, this project shows a useful way of generating electricity from waste materials. By burning waste like paper and plastic, heat energy is produced in the combustion chamber. Instead of letting this heat go to waste, it is collected by solar panels placed near the chamber. These panels directly convert the heat into electrical energy. The generated electricity can be stored in batteries and used for small applications. This method avoids the use of water or steam, making the system simple and cost-effective.

It also helps in reducing waste materials that harm the environment. At the same time, it provides a renewable source of energy. Such projects can be applied in small communities, villages, and remote areas. Overall, this work supports both waste management and clean energy production for a better future.

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