International Scientific Journal of Engineering and Management (ISJEM) ISSN: 2583-6129
Volume: 05 Issue: 04 | April – 2026 DOI:10.55041/ISJEM06220
An International Scholarly || Multidisciplinary || Open Access || Indexing in all major Database & Metadata

Waste Material to Energy Generation

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Abstract - Plastic waste has become a critical environmental challenge, with traditional disposal methods like burning contributing to air pollution and waste disposal. This project introduces a perfect solution that utilizes heating panels to convert heat from burning plastic &,household waste into electricity, providing a sustainable energy source. A custom-designed carbon filter captures harmful smoke and converts it into usable carbon residue, which is then processed into ink. Additionally, the remaining plastic ash is repurposed to create concrete materials, ensuring complete utilization of waste. This eco-friendly approach not only reduces pollution but also transforms plastic waste into valuable resources, supporting a circular economy and promoting environmental sustainability. The project demonstrates the potential for innovative technology to address global waste and pollution problems while generating renewable energy and new products.

1.INTRODUCTION

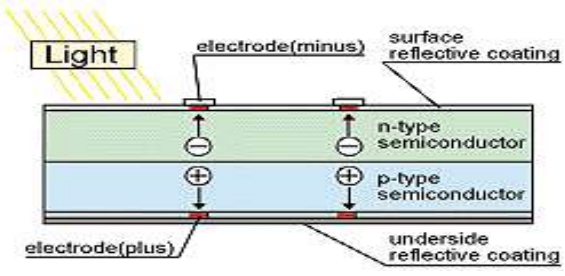
Plastic waste has emerged as one of the most pressing environmental issues of the modern era. With global plastic production reaching unprecedented levels, improper disposal has led to severe consequences, including land and water pollution, harm to wildlife, and increased greenhouse gas emissions. Traditional waste management methods, such as burning and landfilling, are insufficient and often exacerbate the problem by releasing toxic pollutants and occupying valuable land resources.

This project seeks to tackle the plastic waste crisis through an innovative and sustainable approach. By leveraging heating panels, the energy from burning plastic is harnessed and converted into electricity. Unlike conventional solar panels, these heating panels are specifically designed to hefficiently capture and transform heat energy into electrical power. Furthermore, the smoke generated during the burning process is filtered using a carbon filtration system, which not only reduces harmful emissions but also repurposes the captured carbon for practical use, such as ink production

2. . IITERATURE SURVEY

The literature survey examines various studies, technologies, and methodologies that have informed and inspired the development of this project. It includes an analysis of the existing challenges, innovative solutions, and advancements in the field of plastic waste management and energy conversion

3. HEATING PENAL



The p-type, with one less electron, attracts the surplus electron from the n-type to stabilize itself. Thus the electricity is displaced and generates a flow of electrons, otherwise known as electricity

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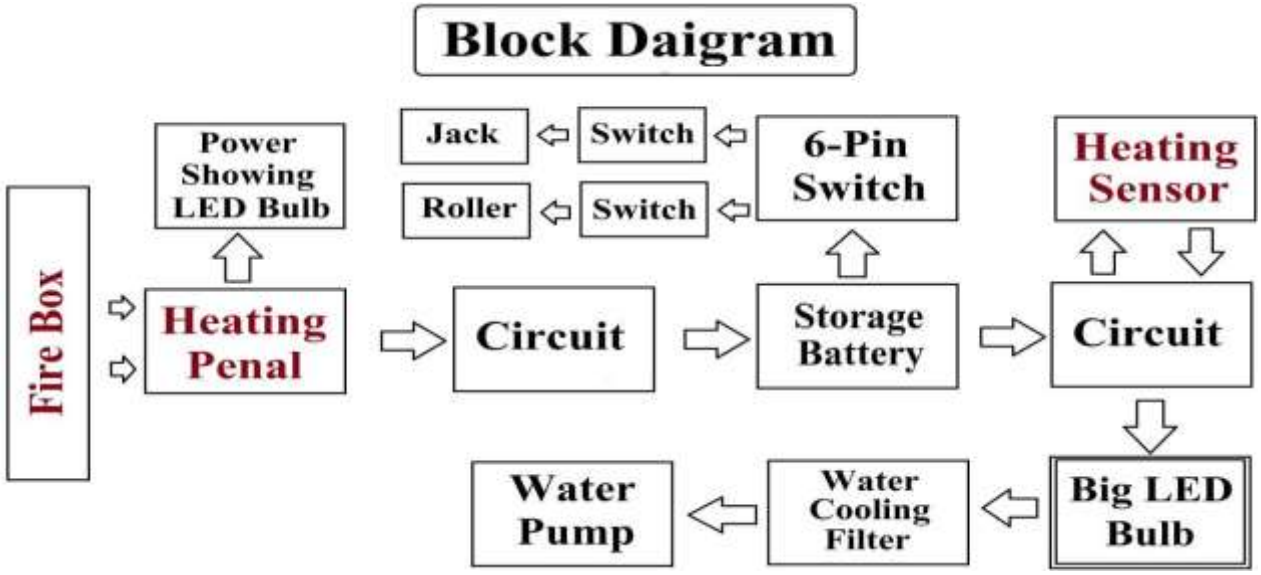

Explanation:

Burning Waste Material → Heat Absorbe by Heating Penal→ Heating Sensor→ Capactor/Switchs to Circuit → Big led Bulb → Water Cooling Filter →Water Pump

2.6 Working Principle of Membrane Filtration

The working principle of this project is based on the conversion of thermal energy generated from burning plastic waste into electrical energy using heating panels, along with a comprehensive system for pollution control and material recycling.

1.Plastic Burning and Heat Generation

Plastic waste is placed inside a protective iron box designed to contain heat and minimize the escape of harmful emissions.

As the plastic burns, significant heat energy is produced. This heat is absorbed by heating panels strategically placed around the jar box.

2.Heat-to-Electricity Conversion

The heating panels capture the thermal energy and convert it into electrical energy using thermoelectric principles.

The generated electricity is stored in a rechargeable 4-volt battery, which powers a DC LED bulb, demonstrating practical usage of the energy.

3.Smoke Filtration System

Smoke produced during the burning process is directed through PVC pipes into a carbon filtration unit.

The carbon filter traps harmful particles and gases, converting the smoke into solid carbon residue.

4.Carbon Repurposing The collected carbon residue is processed to produce high-quality ink. This ink can be used for writing, printing, or artistic purposes, demonstrating the practical value of repurposed waste.

5.PlasticRecycling

The residual ash from burned plastic is analyzed and repurposed into concrete materials, such as blocks or road construction materials, providing a sustainable alternative to traditional building resources.

6.Efficiency of Heating Panels

Unlike conventional solar panels, the heating panels are designed to maximize heat absorption and energy conversion, ensuring efficient utilization of thermal energy.

6. Advantages and Limitations

1.Energy Generation: Converts thermal energy from burning plastic into usable electricity, providing a renewable energy source.

2.Pollution Control: The carbon filtration system effectively captures harmful smoke, reducing air pollution significantly.

1.Initial Setup Cost: Requires investment in heating panels, filtration units, and other components.

2.Energy Loss: Some heat energy may be lost during the conversion process, affecting overall efficiency.

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to my project guide, Mr. P. R. Gulave, for his valuable guidance, continuous support, and encouragement throughout the completion of this research paper. His expert advice and suggestions helped me to understand the subject in a better way and complete this work successfully.

I am also thankful to all the faculty members of my department for providing the necessary facilities and knowledge required for this study. Their support played an important role in the completion of this paper.

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