iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 12 **Issue:** V **Month of publication:** May 2024

DOI: https://doi.org/10.22214/ijraset.2024.59169

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 12 Issue V May 2024- Available at www.ijraset.com

Electricity Generation Using Waste Material

Dr. Manik Deosarkar[1], Naitik Surjuse[2], Prathamesh Hawale[3], Pratik Gargade[4], Rushikesh Ghodke[5], Pranav Jadhav[6]
Department of Chemical Engineering, Vishwakarma Institute of Technology

Abstract: In a world grappling with increasing energy demands and environmental concerns, innovative solutions are essential. This project explores a sustainable approach to electricity production by harnessing the potential within our everyday waste. By employing advanced technologies, we transform discarded materials into valuable resource for power generation. The process involves the efficient conversion of trash into electricity, mitigating both waste management issues and contributing to a cleaner energy landscape. Our study delves into the technical aspects, environmental impact, and economic viability of this unique electricity production method. Through the synergy of waste management and energy generation, we aim to pave the way for a greener and more sustainable future.

I. INTRODUCTION

Modern society cannot function without electricity. As a result, we use a range of fuels to generate electricity, such as uranium, coal, petrol, and diesel. Every one of these fuels has a limited supply. We might live to be seventy or eighty years old. Numerous power plants generate electricity using these fuels. For example, fuel is used in 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 objective of this project is to create electricity from waste materials, such as rubber, plastic, and other trash, and then convert that lower-power electricity into higher-power electricity using an electric coil. We call this method a "boosting process" because, if waste materials in this project yield electricity equal to one LED, then the boosting power will be between thirty and forty LED.

This is essentially an improved procedure that reduces the cost of producing electricity because we don't need to utilize petroleum, coal, or additional expensive raw materials, and it also emits fewer hazardous gases than other methods of generation. By burning it in a regulated manner, the vast volume of garbage can produce a significant amount of heat energy. The initiative's objective is to produce electric energy from waste materials, such as plastic, rubber, trash, and rubbish, and then increase that energy by converting lower-power electric energy into higher-power electric energy using an electric coil. It also includes all of the waste materials that the municipal corporation gathers, including decomposing food and processed biomedical solid waste. Because we didn't need to use coal, petroleum, or other costly raw materials, this is basically an enhanced process that lowers the cost of creating energy while also emitting fewer dangerous gases than previous ways of generation. When burned responsibly, the large amount of waste can generate a substantial amount of thermal energy.

II. PROBLEM STATEMENT

The escalating global demand for energy, coupled with the ever-growing challenge of waste management, presents a critical dilemma. Conventional methods of electricity production contribute to environmental degradation, while the exponential increase in municipal solid waste poses a significant threat to ecosystems. This project addresses the urgent need for an eco-friendly and sustainable solution by investigating the viability of electricity production through the utilization of trash. By tackling both energy and waste crises simultaneously, we aim to mitigate environmental impact and provide a practical and innovative alternative to conventional power generation methods

III. LITERATURE REVIEW

India is facing Waste management issue right now.6 million tons of waste is collet in India. From that approx. 43 million tons we collect from areas and from that 12 MT waste

treated before disposal and reaming rest into the waste yard. Here, waste to energy technical plant is used for the production of energy. In India, the first system which use this system to generate electricity is in BIHAR called as “HUSK POWER SYSTEM” which uses waste material as rice husks and develop the electricity for there, use. For continuous of generation of electricity, we continuously burn something for that other way around effect on voltage. But, now in our project we implement a particular system for storage of electricity also we focus on the implementation of hot gases which form after the burning of waste, because we can’t release them into environment it, effect on humans and animals. This system we basically use in sectors of rural areas. India is a developing country so generation of watse is continuously happening, and we have to focus on the implementation of that. If we do not do that in future, we have to face problem with that.

Waste to energy generation is basically feren-process intergeneration of electricity directly or through heating. First in both processes we get electricity as an output to use for the process. From going through journal the paper there are few proper treatment of waste is given from that one is husk power system which is located in Bihar. In the system Husk of rise is used there only burn husk rise from that generate electricity but the main problem is the have to continuously burn the husk if the process of burning of rise husk is not continuous it will affect the voltage of electricity. Although in India 0.3-0.4 million metric ton of waste per day from rural area across all over India. From that if we consider only half or by one third amount waste is required for this project so we displaced the garbage from area and also produce energy to focus on that energy. The potential production by waste from urban areas is also high.

IV. MATERIALS AND METHODS:

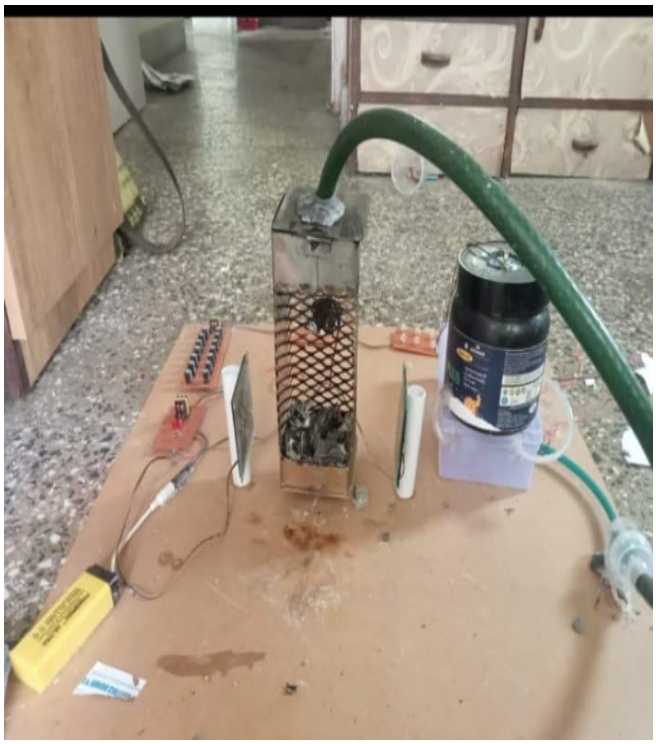
A. Compounds List

1) Capacitor
2) LED Bulb
3) Resistor
4) DC motor 3000 RPM
5) Battery 4.5V
6) PCB
7) IN4007
8) Heating panel
9) Heating sensor

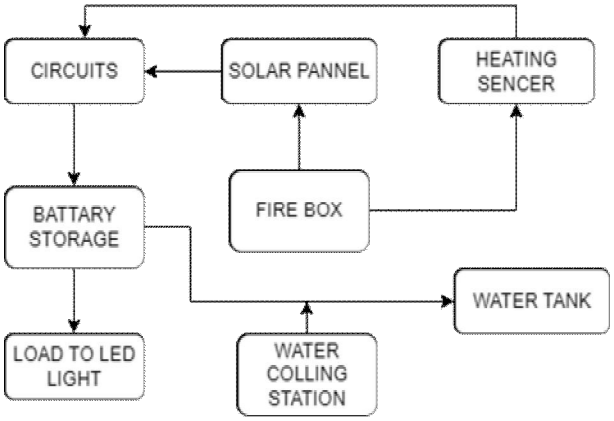
V. METHOD

It involves a multi-step methodology that transforms municipal solid waste (MSW) into a valuable energy source. The process typically begins with the collection and sorting of waste to remove recyclable materials. The remaining combustible fraction, often composed of organic and non-recyclable materials, is then subjected to thermal treatment methods such as incineration or gasification. In incineration, the waste is burned at high temperatures, with this heating sensor senses the heat and the solar plates then converts the heat energy into electrical energy which is then stored in a battery and with that the entire circuit runs which lights the bulbs. Gasification, on the other hand, involves converting the waste into syngas, a mixture of carbon monoxide and hydrogen, which is then used to generate electricity through combustion or other thermal processes. The utilization of advanced technologies in these processes helps minimize environmental impacts, such as the release of pollutants, while maximizing energy recovery from the waste stream. Overall, electricity generation from trash not only addresses the issue of waste management but also contributes to sustainable energy production, offering a promising solution at the intersection of waste disposal and renewable energy generation. After burning waste materials hot gases are produced which we can't release into environment directly because it impact on humans and animal. For that here implement a very unique method for the treatment of these hot gases. the heat fumes are passed through the air filter which collects all the essential elements and purifier air this air is then mix with water. Due to which temperature of water rises the same water is then transported to a water-cooler by pumping motor which cools the temperature of water.

Fig 1.1



VI. BLOCK DIAGRAM



VII. RESULT

1) Energy Production

Waste-to-energy facilities can generate electricity by utilizing the heat released during the combustion of municipal solid waste. The electricity produced can be used to power homes, businesses, and even contribute to the grid.

2) Waste Reduction

One of the main benefits is the reduction of the volume of waste going to landfills. This can help alleviate pressure on landfill capacity and extend the lifespan of existing landfills

3) Resource Recovery

Some waste-to-energy facilities incorporate technologies to recover metals from the ash generated during combustion, contributing to recycling efforts. Reduction of Greenhouse.

4) Gas Emissions

While the combustion of waste releases carbon dioxide, a greenhouse gas, it is argued that waste-to-energy can be more environmentally friendly than traditional landfilling, as the methane emissions from landfills (a potent greenhouse gas) are avoided.

5) Air Emissions and Environmental Concerns

The combustion of waste can release pollutants into the air, including particulate matter, nitrogen oxides, and sulfur dioxide. Advanced pollution control technologies are often used to minimize these emissions.

6) Public Perception and Opposition

Waste-to-energy projects sometimes face opposition from communities due to concerns about air pollution, noise, and the potential impact on health.

7) Economic Considerations

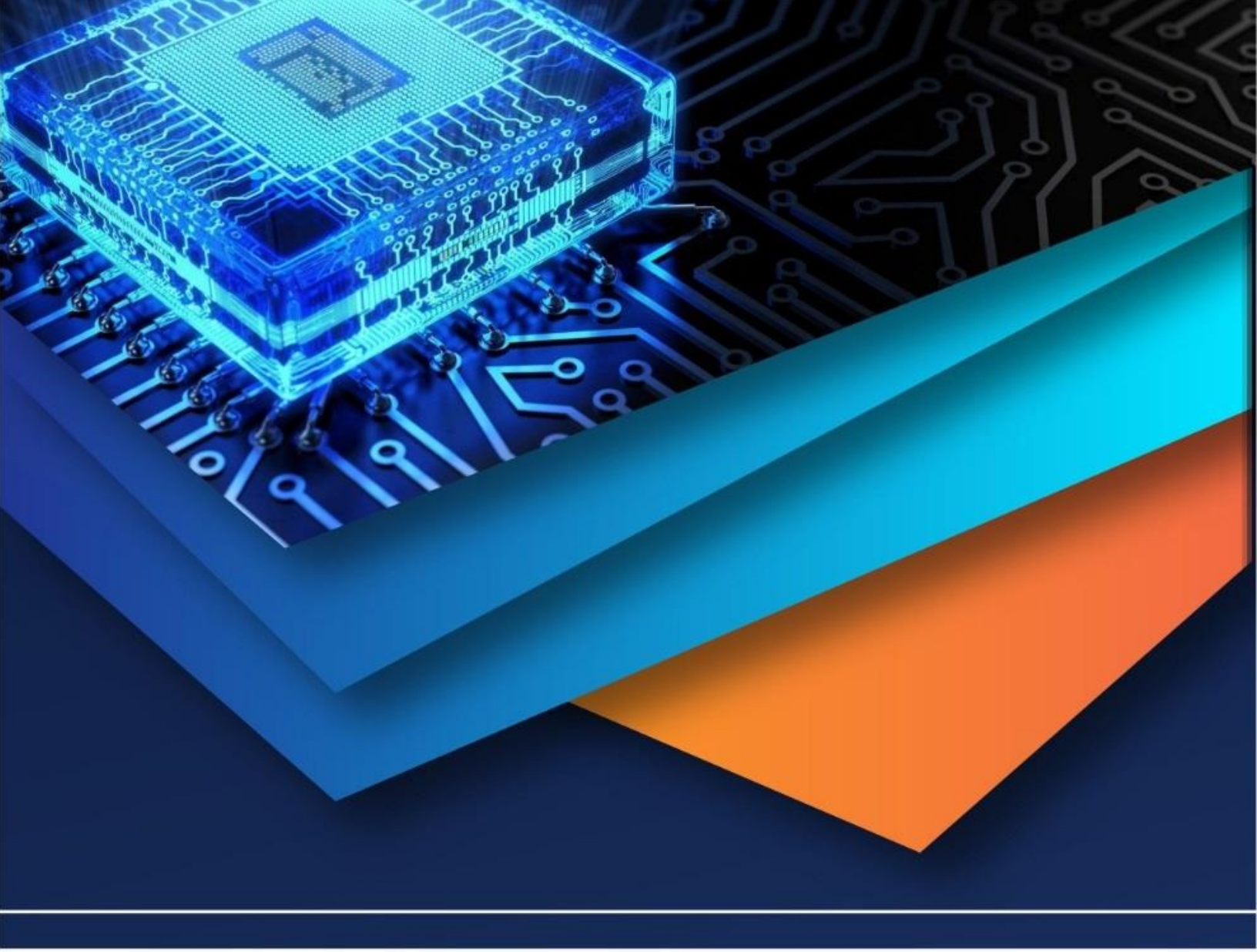
The economic viability of waste-to-energy projects depends on factors such as the cost of building and operating facilities, the price of electricity, and government incentives or regulations.

VIII. CONCLUSION

In summary, waste-to-energy is a promising and innovative way to solve two global problems of waste management and energy production. This approach is based on circular economy principles, where waste is treated as a valuable resource rather than a waste product. Although there are challenges such as technological advancement, economic sustainability and public acceptance, the results clearly show that investing in and expanding the use of waste-to-energy technology can play an important role in our transition to a more sustainable and efficient environment

REFERANCES

[1] Mohmmad Miyan, M.K Shukla (2020) waste to energy: a review on generating electricty in india
[2] Snheal Shahare, shital rahangdale (2023) generation of electricity from waste materials.
[3] Edinger R.,Kaul s. (2000). Renewable resources for electric power: prospects and challenges.
[4] Mr.Swapnil B patondet (2015) experimental analysis of solar operated thermos-electric heating and cooling system
[5] Vinay Gharatet, designed construction of solar operated thermo- electric heating and cooling system



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY