International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 04 | April - 2024 SJIF Rating: 8.448 ISSN: 2582-3930

Design, Fabrication & Analysis of "Generation of Electricity from Waste"

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Abstract - Generally, day by day the generation of waste is increasing every day and everywhere. The landfill sites are increasing. The generation of waste is increasing along with the increasing of the population. Hence, pollution also increases along with the increase of waste generation. We need to ingest academic approaches for safe garbage arrangement due to the enormous expansion in the quantity and variety of waste items produced in India, as well as their possible harmful effects on human health and the environment, which have resulted in the development of numerous diseases in human bodies. India produces a significant amount of waste each day due to its vast population, therefore consider this. We, therefore, believed that it was worthwhile to work on this initiative and that it was time to introduce the concept of waste being converted to energy production in India.

1.INTRODUCTION

In India metro cities individually produces an average of 0.8 kg/ waste/ person daily. India has generated municipal solid waste (MSW) estimated at 68.8 million tons per year. The average efficiency of MSW collection is 22% - 60%. Waste to generate energy is essentially a method for producing electricity either directly or by heating the fuel first. With either method, electricity is produced as an output that may be used in the process. This method takes three phases to complete, and then we obtain the result. First, waste materials that have been utilized for a long time are collected door-to-door from all locations. Next, the waste materials are purified based on their calorific values. Finally, in the third step, the purified waste is thrown into a tank where heat is produced, and as a result, electricity is produced. Due to its low cost, little pollution, and simplicity, this technique of electricity generation is the most appealing when compared to other forms of technology.

2. Body of Paper

Generating electricity from waste material is an innovative way to utilize resources and promote sustainability. This project demonstrates how waste material can be used to create a simple and efficient electricity generation system. When waste materials are burned, heating panels sense the thermal heat from the firebox and transform this thermal heat into electricity, this electricity charges the battery. Additionally, circuitry uses electricity to charge batteries while waste materials are burned in a burning box. This system also includes a heating sensor, which operates as an on/off switch when the sensor gets heated by the burning process. After that, you can see that waste materials are entirely successful in producing electricity.

2.1 Working

1. The collected Waste should be separated manually under the categories based on size, weight, dry, wet, etc.

2. The separation should be taken very carefully and avoid any toxic materials like medicines, injections, glass, etc which will be a problem for the further process i. e. heating process.

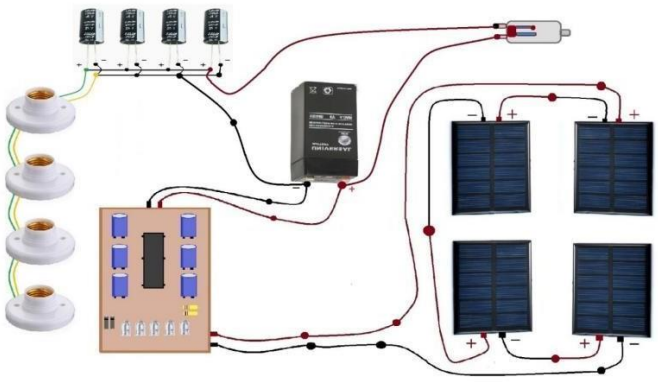
3. When we start burning the waste material the heating panels will start collecting the heat energy generated by waste material.

4. The heat energy collected by the heating panel will be converted into electrical energy.

5. The electrical energy will be stored in a rechargeable battery.

6. The energy which is stored in the battery is used as the output load.

7. The remaining residue which is left in the process in the form of ash is disposed outside.



2.2 Objective

This is an innovative idea of generating electricity Using solid waste Which lead to decrease pollution by stopping to produce almost all dangerous gasses like CO2, CO, SO2, NO2 and Heavy metals such as mercury to a huge number. The main objective of Waste management is to reduce the environmental and health hazards that arise from indiscriminate dumping of waste and pollution of natural resources like the land, sea, and air.

2.3 Scope of Project

To generate electricity from municipal waste in order to reduce the wastes by heating process and by reducing the pollution by using the pollution control filter. To convert the heat energy into mechanical energy by using the heating sensor and heating panel. The key obstacles and difficulties to minimizing plastic waste in residual and merged waste streams, hence promoting waste prevention and recycling.

2.4 Need of the Project

Generating energy from waste material solves the problem of waste disposal. Generating energy from waste material makes cities self-reliant in their demand for power. Reducing waste will not only protect the environment but will also save on costs or reduce expenses for disposal. The purpose model can also help people cut their life expenses by reducing their high electricity bills.

2.5 Future Scope

1. We can create the best storage system to turn waste materials into electricity.

2. We can make high quality heating panel for generating high electricity.

3. Pollution reduction: recycling reduces the need for energy, the consumption of virgin raw materials, and the pollution of the air and water.

4. Reduction of energy consumed by processing virgin raw materials partially counterbalanced by energy consumed for recycling.

2.6 EXPECTED RESULTS

MATERIAL	TIMING	TEMPERATURE	MAXIMUM ELECTRICITY GENERATING VOLTAGE	ELECTRICITY GENERATING TIME	ELECTRICITY GENERATING MINIMUM TEMPERATURE
1000 gm wood	30 - 40 min	300 degrees	16V	30 min	120 degrees
1300 gm wood + plastic	40 – 50 min	300 – 600 degrees	18V	40 min	120 degrees
1500 gm Wood + plastic + rubber	50-60 min	300 – 600 degrees	24V	30 min	120 degrees

3. CONCLUSIONS

This paper highlights future sustainability. A steady supply of affordable, clean, and renewable energy sources with little harm to society or the environment is a major concern. With the help of well guidance of our project guide and the efforts of our project team we have successfully made it possible. It was interesting to see our idea working and most of them working properly. The project done by the team can be mostly used in rural sides where waste is not a problem and electricity is scarce.

4. ACKNOWLEDGEMENT

We wish to express our sincere thanks with gratitude to our project guide Professor Mr. Rajesh R. Shekapure from the Institute Datta Meghe college of Engineering, airoli for their valuable guidance and constant encouragement without which it could been impossible for us to present and complete our Major project i.e. “Design, Analysis and Fabrication of Generation of Electricity from Waste “We would like to extend our thanks to our HOD Dr. Usha Pawar and our Principal Dr. D.J. Pete for facilities provided to us.

5. REFERENCES

1) Ismael anchez lopez.; Antonio Gallardo; Natalia edo-alcon.2017, Study of the Energy Recovery of the Reject Materials from Municipal Solid Waste Treatment Plants in Spain. Project Management and Engineering Research, pp.81-93.
2) Pablo Emilio Escamilla-García.; Raúl Horacio Camarillo-López.; R. Carrasco Hernandez; E. Fernandez. Technical and economic analysis of energy generation from waste incineration in Mexico. 2020Energy Strategy Reviews 31:100542. DOI: 10.1016/j.esr.2020.100542.
3) Ryu, C.; Shin, D.; Ryu, C.; Shin, D. Combined Heat and Power from Municipal Solid Waste: Current Status and Issues in South Korea. Energies 2012, 6,45- 57.
4) Beyene, H.D.; Werkneh, A.A.; Ambaye, T.G. Current updates on waste to energy (WtE) technologies: A review. Renew. Energy Focus 2018, 24, 1–11.
5) Mr. Swapnil B Patondet. Al —Experimental Analysis of Solar operated thermo electric heating and cooling system. IJETT Volume 20 Number 3 Feb-2015.