

GENERATION OF ELECTRICITY BY WASTE MATERIAL WITH USING POLLUTION CONTROL METHOD

¹Shaikh Adnan Hanif, ²Omkar Sanjay Ghatkar, ³Pathan Amankhan A., ⁴Dhole Sanket Arjun
⁵Atul A. Joshi

¹UG Scholar, Department Of E& TC, AVCOE, Sangamner, Dist- Ahmednagar, Maharashtra, India

²UG Scholar, Department Of E& TC, AVCOE, Sangamner, Dist- Ahmednagar, Maharashtra, India

³UG Scholar, Department Of E& TC, AVCOE, Sangamner, Dist- Ahmednagar, Maharashtra, India

⁴UG Scholar, Department Of E& TC, AVCOE, Sangamner, Dist- Ahmednagar, Maharashtra, India

ABSTRACT- In this project, we are implementing the concept of generation of electricity using waste material with less pollution. We are trying to reduce the burden of city dumping yard by creating a mini project on waste management in small villages around the city. As a result, we can get two solutions on increasing waste, one is waste management and another one is generation of electricity by waste. The amount electricity generated by waste material is then use in village for different purposes such as streetlights Gov. offices in village, etc.

Keywords: Electricity Generation, Incineration, Biodegradable, Non-biodegradable.

I. INTRODUCTION

Rapid population growth, booming economy, standard of living, lifestyle, rapid urbanization has accelerated municipal solid waste (MSW) generation rate in developing countries like India. The concept of municipal solid waste management in developing countries has receiving less attention from policymakers compared to environmental problems. Globally solid waste has increasing by a little bit percentage per year. According to the world Bank's new WHAT A WASTE 2.0: Global waste increase by 70 percent on present level by 2050 [3]. Waste management must be taken as a seriously by policymakers and it must also be a part of academics which can help next generations for a green future. The following Graph shows the total Municipal solid waste generation from year 1980 to 2018 and how it varies after per capita generation.

As per estimates more than 55 million tons of MSW is generated in India per year; the yearly increase is estimated to be about 5%. It is estimated that solid waste generated in small, medium and large cities and towns in India is about 0.1 kg, 0.3 – 0.4 kg and 0.5 kg per capita per day respectively.

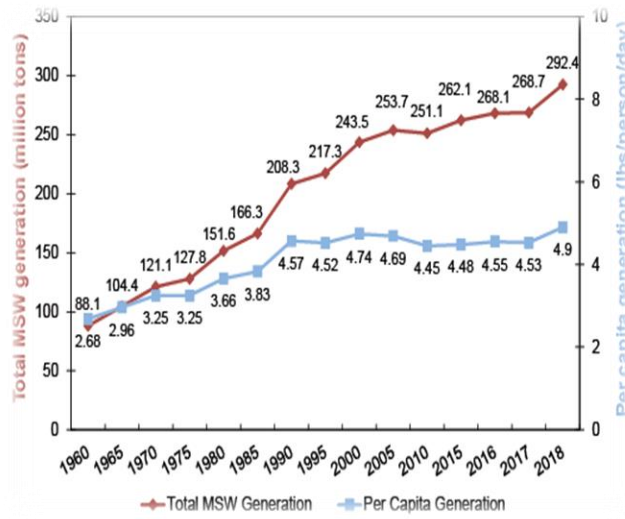


Fig1: Total MSW generation from 1980 to 2018

II. EXISTING SYSTEM

In the existing system for the Electricity generation by using waste material the waste (fuel) is burned, releasing heat. The heat turns water into steam. The high-pressure steam turns the blades of a turbine generator to produce electricity. An air pollution control system removes pollutants from the combustion gas before it is released through a smoke stack.

2.1 PROPOSED SYSTEM

In our the proposed system the main source of electricity generation in today's date is coal but instead of this we use waste material like rubber, plastic, paper, etc. By burnout them we generate electricity and store it in batteries through circuit and after that you all thought about what about those harmful gases that came after burnout waste material. For this we made our pollution control filter that reduce effect of this gases and control pollution by 50 to 60% which is highest in all ways.

III. HARDWARE DESCRIPTION

The following is the schematic block diagram of Electricity Generation by waste Material

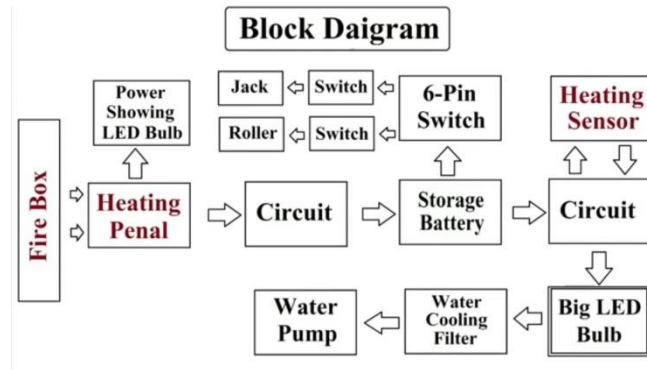


Fig. 2: Block diagram of Generation of Electricity Circuit

When we burn waste materials, the heating panels connected to it convert heat into electricity & this supplied to red LED bulb & it glowing by supplied electricity which is showing electricity power. After that the circuit take electricity & give to battery for battery charging, waste materials keep burning in burning box. After this burning the heating sensors connected getting get heated when they heated by heating of burning then heating sensor turn on LED bulbs. [This heating Sensor work as on/off switch]. By this process we are generating electricity from waste material & also we seen that the waste management & this process of generating electricity from waste material by burning it is called as Incineration.

3.1 Components used in Circuit Diagram

1) Capacitors

As we all know about they were storing the charge. capacitor Form of two or more Parallel Plates which is separated by dielectric medium (Paper, mica) In our project we are going to use electrolytic capacitors which of ratings 4700uF /10V & 4700 micro f /25 V. Types of electrolytic capacitors

1) Aluminium 2) Tantalum 3) Niobium

capacitors in series

$$CT = C_1 + C_2$$

capacitors in parallel

$$CT = (C_1 + C_2) / C_1$$

2) Resistor

A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses.

A resistor is an electrical component that limits or regulates the flow of electrical current in an electronic circuit. Resistors can also be used to provide a specific voltage for an active device such as a transistor. The main function of resistors in a circuit is to control the flow of current to other components. Take an LED for

example. If too much current flows through an LED it is destroyed. So resistor is to limit the current. When used in series, resistors can be said to be a “voltage dividing network”. This is because in a series circuit, current flowing through each resistor is the same value but the voltage present across resistor is only part of the total circuit voltage value.

3) Batteries

An electric battery is a device consisting of one or more [electrochemical cells](#) with external connections provided to power electrical devices. According to a 2005 estimate, the worldwide battery industry generates US\$48 [billion](#) in sales each year, with 6% annual growth. In our circuit we are using two types of battery.

- 1) 4volt battery which is rechargeable
- 2) 9volt battery which is not rechargeable
- 3) LED bulbs

A light-emitting diode (LED) is a two [lead semiconductor light source](#). It is a [p-n junction diode](#) that emits light when activated. A P-N junction can convert absorbed light energy into a proportional electric current. The same process is reversed here (i.e. the P-N junction emits light when electrical energy is applied to it). This phenomenon is generally called [electroluminescence](#), which can be defined as the emission of light from a [semiconductor](#) under the influence of an [electric field](#). The charge carriers recombine in a forward-biased P-N junction as the electrons cross from the N-region and recombine with the holes existing in the P-region. Free electrons are in the [conduction band](#) of energy levels, while holes are in the valence [energy band](#). Thus the energy level of the holes is less than the energy levels of the electrons. Some portion of the energy must be dissipated to recombine the electrons and the holes. This energy is emitted in the form of heat and light.

5) Heating Panel

Simply put, a Heating panel works by allowing photons, or particles of light or heat, to knock electrons free from atoms, generating a flow of electricity. Heating panels actually comprise many, smaller units called photovoltaic cells. (Photovoltaic simply means they convert heating or light into electricity.)



Fig3 .Heating Pannel

A p-n junction is formed by placing p-type and n-type semiconductors next to one another. 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.

6) DC Motor (5.9 V)

The DC motor is the device which converts the direct current into the mechanical work. It works on the principle of Lorentz Law, which states that **“the current carrying conductor placed in a magnetic and electric field experience a force”**. And that force is called the Lorentz force. The Fleming left-hand rule gives the direction of the force .

7) Heating Sensor

This sensor gives the battery to the LED bulb only when this sensor is heated by heating. If this sensor is not heated, then LED bulb will not glowing. Here is heating sensor use for switching battery power, because A heating sensor is an electrically operated switch.

IV. MODEL

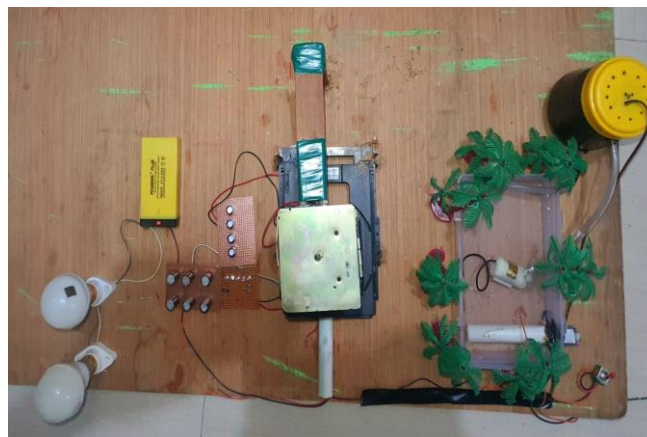


Fig4. Prototype

In our project we set our incineration box in middle on the CD drive trolley and we use upper one steel cage open box for incineration and we connect 3 heating panel attach with our incineration box. We burn the waste material in our incineration box and heating panel convert heat into in energy. We also use heating sensor in our incineration box when we burn the waste material in that at that time it sense the heat and give signal to our circuit and led light glow and battery getting start charging and then as a output we get glowing light bulb.

4.1 CIRCUIT DIAGRAM

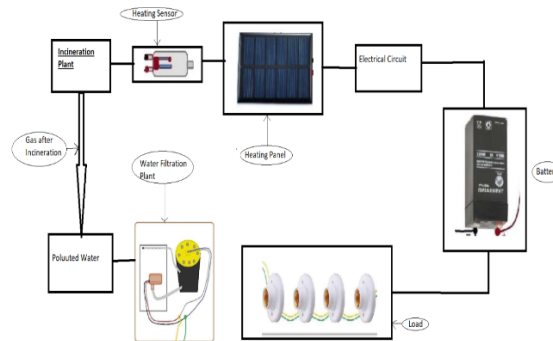


Fig5. Circuit Diagram

The above circuit diagram shows the connection of our electricity generation module our incineration box is connected at two end heating and that after by pipe it is connected with pollution control filter. In first after heating sensor it comes to heating pannel and then on heating circuit in circuit we use led lights for heat detection and battery start charging just after that battery have rating 4 V 2.5 A and then after the charging the LED bulb start glowing.

V. RESULT and CONCLUSION

Sr. No.	Weight of the waste material to be used for Incineration process	Incineration Time	Battery Back up after Incineration	Generation of Voltage During Incineration
1.	100 grams	10 minutes	5 minutes	6 V
2.	1 kilogram	30 minutes	15 minutes	18 V
3.	100 kilograms	50 Hours	25 Hours	1.8 KV
4.	1 Tone	500 Hours	250 Hours	180 KV

From this project we conclude that if we use 100 grams of waste material for Incineration then this waste will burn for ten minutes which will generate 6 volts continuously then we get battery back up or our bulb will glow for five minute, Similarly we can generate Electricity in more amount by using more waste material.

If a country generates electricity using waste material, then it is one of the best economical problem solutions. By incineration process, the generation of pollution is not totally controllable. But we are decreasing it about 30 to 40 % less by observation it is the highly lucrative process because of it, we can get two types of solutions on increasing waste: Better waste management and remedy over problem of landfill. Generation of electricity without using conventional sources.

REFERENCES

- 1.Surajit Bag, Rambharosh Dubey, Nimadi Mondal. (2015) “Solid waste to energy status in India” a short review. Discovery, 2015, 39(177), 75-81



2. Brar, G.P.S., Jain, V.K., and Singha, A., (2014), “ Modeling and Economic analysis of Energy generation from Biomass Energy”, International Journal of Computer Applications, Vol. 108.
 - Forsyth, T., (2006),” Cooperative environmental governance and waste-to-energy technologies in Asia”, International Journal of Technology Management and Sustainable Development, Vol.5.
 4. <https://youtu.be/c6QqzC0rzgc> accessed on Feb 2021, Vid by RS industries.
-