



GENERATION OF ELECTRICITY FROM WASTE

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ABSTRACT:

This paper aims to reveal the role of waste management practices for environmental sustainability and explores people's awareness level about waste management, its generation, and primary treatment practices in educational institutions. The empirical study is conducted in India through a well-structured questionnaire distributed among engineering students. Six critical aspects of e-waste, i.e. generation, management, nature of waste components, progressive use of waste management, control and training are studied. Plastic plays an essential role in packaging materials because of their durability to different environmental conditions. With its importance in the community lies the problem with waste disposal. Plastic is non-biodegradable material, making it a big problem especially when thrown in dumpsites. In solving the plastic problem, one efficient way to reduce its volume is through thermal processing such as

pyrolysis. The main goal stated at the end of this document is to reduce recycle and reuse garbage, and eventually generate electricity from waste. We use the process of converting biomass strength into electricity. In a way, the phenomena of biomass strength and this biomass electricity will be changed into power, and by doing so, pollutants will be reduced and the impact of global warming will be reduced.

1. INTRODUCTION

Currently, the world generates 1.3 billion tonnes of Municipal Solid Waste (MSW) annually. By 2025 the world could generate 2.2 billion tonnes of MSW per year. Such a prediction forces us to consider and develop alternatives for addressing our future waste management (WM) challenges. The most significant challenge to WTE technology adoption is the awareness that waste can be used as a source of clean and reliable energy. Waste management is

an important objective of planning to ensure that the future generations inherit an environment that is as pollution free as possible given the present scientific, economic, social and political constraints. Waste to Energy describes the process of utilizing waste to generate energy, in the form of electricity, heat or fuels. The large amount of waste can generate a large amount of heat energy by burning it in a controlled manner. In this Process we generate electricity by burning waste that is collected from the door to door, mostly house wastes. This is basically an advanced process where cost of generation of electricity is also been saved as we didn't need to use fossil fuel, coal or any other raw materials which costs high and it also produces less harmful gases as compare to other methods of generation. Most solid waste goes to landfills/water bodies, causing serious pollution with methane and CO₂. Finding new landfill sites is no solution. Permanent and eco-friendly solution lies in gainful utilization of this garbage into energy, by processing and treating the waste before final disposal. This can reduce the waste by up to 90%, and at the same time, recover fuel gas for cooking and lighting and electricity.

2.LITERATURE REVIEW

The world is experiencing a rapidly growing population and rising public living standard, which leads to increases in the generation of municipal solid waste (MSW) and consumption of energy and goods. Previous estimation related to WTE showed that by 2025, 2.3 billion tons of solid waste will be generated annually, which will have huge potential effects on power generation (Islam 2016). Thus, the waste to energy approach is a

promising energy alternative option for the future because of having potential to fulfil 10% of total global electricity demand (World Energy Council 2013). Another report suggests the utilization of WTE technology for the treatment of approximately 261 million tons per year of MSW by 2022, which has potential to generate around 283 terawatt (TWA) hours of heat and electricity (World Energy Council 2013).

3. MATERIALS AND MODEL

Hardware Components:

- **Heating Panel:** 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. A Solar Panels which are also known as “PV panels”. It is a device that converts light from the sun, which is composed of particles of energy called “Photons”, into electricity that can be used to power electrical loads. The Solar panels can be used as a heating panel. The ratings of the Panel is 6V.



- **Heating sensor:** The main property of a heat sensor is to sense the heat, which is present around the sensor. A heat detector is a fire alarm device designed to respond when the converted

thermal energy of a fire increases the temperature of a heat sensitive element. Here heating panel use for switching battery power, Because A Heating Sensor is an electrically operated switch.

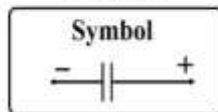
Heating Sensor/ Tubelight Starter



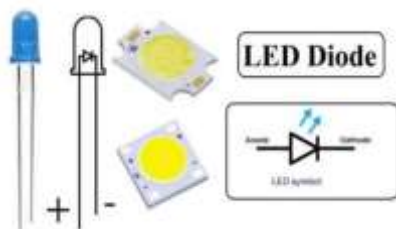
- **Capacitor:** A voltage applied across the conductors creates an electrical field in the capacitor, which stores energy. A capacitor operates like a battery in that, if a potential difference is applied across it that can cause a charge greater than its "present" charge, it will be charged up.



Electrolytic Capacitor
4700uf/25v



- **LED bulb:** A Light Emitting Diode (LED) is a device that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons.



- **Resistor:** A passive electrical component with two terminals that are used for either limiting or regulating the flow of electric current in electrical circuits. The main purpose of resistor is to reduce the current flow and to lower the voltage in any particular portion of the circuit. 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.



- **DC Motor:** 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. When kept in a magnetic field, a current-carrying conductor gains torque and develops a tendency to move. In short, when electric fields and magnetic fields interact, a mechanical force arises. This is the principle on which the DC motors work.



- Battery:** An electric battery is a device consisting of one or more electrochemical cells with external connections provided to power electrical devices. Such as flashlights, smartphones, and electric cars. When a battery is supplying electric power, its positive terminal is the cathode and its negative terminal is the anode. The terminal marked negative is the source of electrons that when connected to an external circuit will flow and deliver energy to an external device.



- DVD Gate:** The DVD Gate is a classic addition to flexible learning areas. Featuring Flat, Smooth that is free from rails and edges generous enough to the carry forward the action of In and Out. This helps us in carrying the input i.e., plastic to our processing action in generating electricity.

DVD Gate (DVD Trolley)



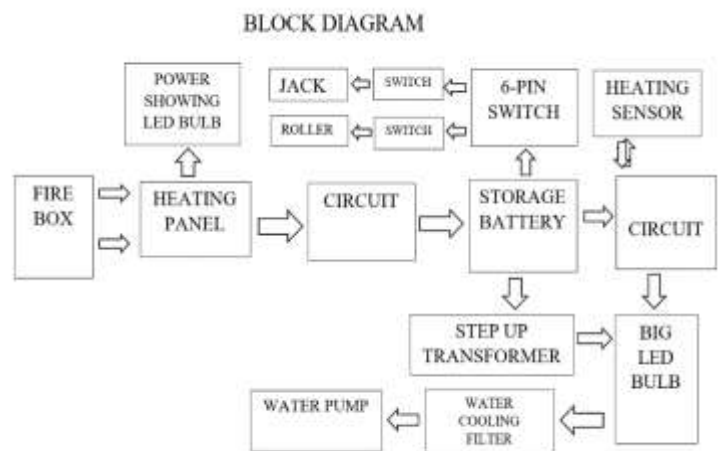
(More use in open close/ Home Door and Gate System For Project)

- Step-up Transformer:** A transformer designed to increase the voltage from primary to secondary is called a step-up transformer.

Transformer mainly works on the principle of mutual induction. Step-up transformers increase the voltage from the input to the output of the transformer. In this configuration, the primary winding features fewer turnings than the secondary winding. This greater number of windings produces a higher voltage in the secondary side, increasing the output voltage.

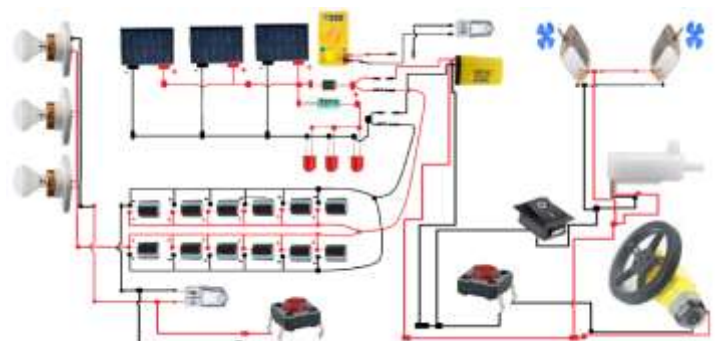


4.Block Diagram:



5.Circuit Diagram:

The connections are as follows:



6.RESULT:

- The Purpose of making this project is to generate electrical energy from Wastage like Plastic, Rubber, Garbage and Biomass etc and store that electrical energy in the battery through the circuit and use that electrical energy to operate the whole project. And as a result, the LED bulb is shown to be turned on.
- In this Project when burning of wastage starts those results in heating and Solar Panel starts converting heat to electricity and that results on multi meter display of voltage produced.
- Now, We can see how much voltage generated by waste materials and further we can generate the electricity by the action of heating sensors and the obtained energy further resulted on the output power supply which turns On the LED Bulb.
- Now the main concern arrives, that is the emitted gas resulted from the burning of wastage and thus focusing on that concept so that the evolved gases cannot interrupt the environmental condition. Thus, we came up with the solution for filtration of gases.

POLLUTION CONTROL FILTER :

- In This Idea we show theoretically Idea Based Pollution Control System that is When Smoke generated then it travels by pipe line to water tank then on the surface the carbon roller starts collecting the gases and thus with the assistance of water the heat evolved gets absorbed.



7.SCOPE:

- Turning waste into energy which is accumulating will turn into usable product.
- IOT enabled practices: we can even develop this concept with our upcoming technology in all forms of waste (dry-wet, biomass)
- Reducing the environmental and health hazards that arise from indiscriminate dumping of waste and pollution of natural resources like the land sea and air .
- Our Vision of Global energy production with the Green world gets into brighter paths.
- The success of this idea will definitely lead the world with 10 steps at a time towards Economy and Economical condition of our country and nation.

OUTPUTS:

- The combustion at the Zaar box which represents the primary step of the pyrolysis.



- The result of the display of LED light which is in contact with the Solar panel which proves the primary step of the Solar Panel principle.



- The glow of LED bulbs which are the result of generation of Electrical Energy with the pyrolysis process with the combination of solar panel.



- The output of another LED bulb which is connected with the step-up transformer which

depicts the assistance of step-up energy of the produced Electrical Energy.



- The output of the resulted Energy with the backup Energy from the battery at the same time.



- The action of cooling towers with the cooling system of the evolved emissions due to the combustion of wastage.

CONCLUSION:

Now, getting to the point of Using wastage in generation of electricity not only integrates the healthier environment it mainly focus on the World Economy. If a country generates electricity from the wastage which is DISASTER by using the technology which results in FORTUNE. Thus, what more can we ask and we strongly believe

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“WASTE NOT THE WASTE”

