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Waste to Energy: Generation of Electricity Using Waste Materials

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Abstract : The gigantic growth in the amount and multitude of waste materials produced in India and their potentially dangerous results in the environment and human health which have led to create several diseases in human bodies. So we need to ingurgitate scholarly methods for safe arrangement of garbage.

This is an innovative idea of generating electricity using solid waste which leads to decrease pollution by stopping to produce almost all dangerous gases like CO₂, CO, SO₂, NO₂ and heavy metals such as mercury to a huge number.

With a population of millions India produces large number of waste every day to contemplate about this idea. So, we felt that it is valuable working on this project and it is high time to inject the idea of Waste to Energy in India. Firstly, a map plan was carried out for research to collect the fact of total waste generation in India. During this research it was found that some locals were generating electricity using this process ago which encouraged the researchers to carry forward this Project.

Keywords: Biodegradable Waste, Electricity India, Solid waste management, Agricultural waste, calorific value.

I. INTRODUCTION

The Purpose of Making this Project is to generate electric energy from waste materials such as plastic, rubber, waste and waste etc. and to convert that less electricity energy into more high power electricity energy by electric coil, this process is called boosting Process.

Normally waste is any undesirable substances which has been obtained as a outcome of all those Humans and Animals activities.

It also includes all those waste materials which is been collected by Municipals Corporation also which includes rotten food stuffs, treated biomedical solid wastes etc. 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 aslo produces less harmful gases as compare to other methods of genration. The large amount of waste can generate a large amount of heat energy by burning it in a controlled manor. In this Process we generate electricity by burning waste that is collected from the door to door, mostly house wastes. The main components used in this methods are heating panels, boosting coils, diodes, LEDs, capacitors, resistors, battery, PCB board etc. The demand of Electricity is increasing day by day, thus it is necessary to find out the different types of source which can be used as the input in production of the electricity especially for developing countries like India. This method is one of the best methods to generate electricity. The greatest advantage of this project is that it does not require any other fuel except waste.

According to the annual report under rule 24(3) of solid waste management rules, 2016.

The total amount of waste generated in the working year of 2017-18 is 15500TPD (Tons per day) from the cities like Lucknow, Varanasi, Kanpur, Prayagraj, Agra etc. The total solid waste processed is 3115TPD that is very small amount of waste in comparison of generating waste. The gap between the generated waste and processed is getting very large, and the need of electricity is increasing Everyday. In the month of July electricity demand of India increases by 19% (191GW), this is a huge amount of electricity.



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Calculation of calorific value of waste

Material - fraction	CV (MJ/kg)	%amount	%CV representing in waste mix
Hazardous waste	12	20%	2,4 (= 12 x 0,2)
Medical Waste	19	50%	9,5 (= 19 x 0,5)
Plastics - PVC	35	30%	10,5 (=35 x 0,3)
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		Total :	22,4 (= 2,4 + 9,5 + 10,5) MJ/kg

2. Literature Review

Waste to Energy generation is basically a form process for the generation of electricity directly or through heating first in both process we get Electricity as an output to use for the process.

This process is basically completed in 3 steps and in last step we get the output All these steps involves firstly waste materials is been collected from door to door from every places which is been useful for a long time After which in second step this waste material is been purified according to their calorific values and then in third step this waste is been burrned out in a container where heat is been generated and in result we find to get Electricity as an output.

Compared with other form of technology this is most attractive method of generation of electricity becaause of low cost, low pollution and easy way.

This project has been carried out in some of the areas of bihar also by a small unit call "HUSK POWER SYSTEM" which is one of the worlds leading off grid utilities which provides 24 hours a day power in rural areas.

3. METHODOLOGY

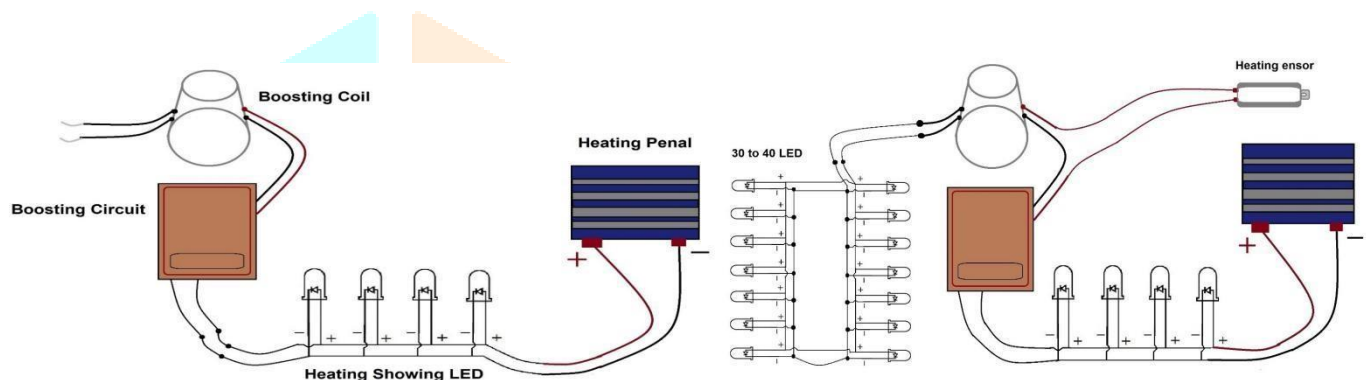
The methodology for this setup is simple and compact which includes very lesser number of devices to run the system accordongly, For making of small demo power plant to generate electricity we required devices which are Boosting Coil/Tesla Coil, Conveyor Belt, DC Motor, Heating Panel, Mode Switch, Step Switch, Heating Sensor are the some of devices which needed to setup this system.

In This Project We will show ,How to develop Heating Power Plat without increasing Heating Power Plat size or voltage ,We show this project In very small Heating Power Plat 2v ,when heating came to solar ,solar upper side is glass ,so heating comes by focus on Heating Power Plat , Heating Power Plat convert the heating to electricity and electricity go to Tesla coil and Tesla coil boost and save the electricity and give

the power to 40 to 50 LED Bulb and LED Bulb is Glow. Some of the devices which has been used in this project has working specification as following

Heating Panel – This is special type of device that allows input as a heat and converts it into Electricity, The shape of this heating panels vary differently in rectangular shape and a combination of rectangular shape and is been used.

Heating Sensor – Heating Sensor is basically used to detect the heat present in the system. It senses the system and found if temp. increases above the set value it indicated with the help of LEDs which is been setup with this panel this LEDs glows up. This panel is generally used to protect all those expensive devices which is been connected with system from damaging when overheats.



3.1 Determination of Calorific Values

Calorific value is normally energy present in any fuel or material substance present as output and measured by determining heat present in that substance.

one gram of rice husk and corn cob was collected. Then after all these were put in a vessel and left outside for 24 hr so that all water present inside can be fade away there should be minimum moisture present inside

Moisture present inside was normally determined by using the gallenkamp oven; model P165.

$$M.C = \frac{\text{initial weight} - \text{final weight}}{\text{initial weight}} * 100 \text{-----} 1$$

$$H = \frac{T * W_c}{W_s} \text{-----} 2$$

Where; T = corrected temperature rise, Wc= Energy equivalent of the calorimeter which is 2416 cal and Ws

= Weight of samples used.

Using both equation we find out calorific values for all those substances

4. RESULT

Result for all those various substances for various temp. have been following mentioned accordingly

Table 1: Variation of Temperature with Time for Rice Husk Powder, Sawdust Powder and Corn cob

Time (mn)	Average Temperature (°C)			
	Rice Husk Powder	Sawdust Powder	Corn cob	
0	24.66	25.91	25.33	Pre-firing period (0-6 minutes)
1	24.68	25.92	25.34	
2	24.70	25.94	25.36	
3	24.71	25.96	25.36	
4	24.72	25.96	25.38	
5	24.74	25.98	25.39	
6	24.78	25.98	25.39	



Table 2: Value of Intercept and slope for Original Samples

Sample	Intercept	Slope	T1 (Min)	T(Max)	T1 = Yc +273
Rice husk	24.501	0.1012	6	15	297.501
Briquette Rice husk	28.465	0.0976	6	16	301.465
Sawdust	25.654	0.1038	6	15	298.654
Briquette Sawdust	27.528	0.0875	6	15	300.528
Corn cob	25.089	0.0954	6	18	298.089
Briquette Corn cob	27.048	0.0987	6	15	300.048

5. CONCLUSION

India produces large amount of biodegradable waste, which can be used to produce huge amount of electricity. The high of the waste is organic in nature. Waste generally goes for a less number of recycling and produces no toxic gases, this waste obtained in our country is sufficient to generate electricity for much needed works in a lesser amount. Also as known in this course of study that in some areas the price for setting up plant is high but this price can be outweigh in long term which is eventually beneficial for government as well as public also

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