

# GENERATION OF ELECTRICAL ENERGY BY REUTILIZING LOW GRADE WASTE

K.Vijay Kumar<sup>1</sup>, B.Pavan Sai Prakash Rao<sup>2</sup>, D.Sravan Siva Kumar<sup>3</sup>, B.Siva Sai Kumar<sup>4</sup>, B Rakesh<sup>5</sup>

<sup>1</sup>Assistant Professor, Dadi Institute of Engineering & Technology, Anakapalle  
[vijaykumar@diat.edu.in](mailto:vijaykumar@diat.edu.in), [pavansai9911@gmail.com](mailto:pavansai9911@gmail.com).

<sup>2,3,4</sup>Student, Dadi Institute of Engineering & Technology, Anakapalle

**Abstract:** In this present scenario everything is computerized. So, usage of power is increased. But production of power is less due to lack of Natural resources. For that we need to consume electricity as much as we can. Here we are using waste management for generating electricity through a heating panel. Industrial waste is generated in industrial processes which is not put into any practical use and is lost, wasted and dumped into the environment. Recovering the waste material can be conducted through various waste heat recovery technologies to provide valuable energy sources and reduce the overall energy consumption.

**Keywords:** Waste Management, Heating Panel, Generating electricity.

## 1. Introduction

The Purpose of making this project is to generate electrical energy from bad materials like plastic, rubber, garbage and bad stuff etc. and store that electrical energy in the battery through the circuit and use that electrical energy to operate the whole project. And the LED bulb is shown to be turned on and the use of filters to control pollution from energy production.

In this paper when burning start then heating generate and heating panel start converting heat to electricity and that electricity, we can see on multi meter display, we can see how much voltage generate by waste materials and we electricity generating perfectly then automatic heating sensor on the output power supply then LED Bulb start glowing and our idea everyone can see in live working. Our idea 100% work for generate electricity by waste materials and when we burn anything then pollution start generating so we use pollution control filter for controlling carbon pollution so when carbon cross to filter then we store the carbon and carbon use any area in real life. Each year, people around the world dump a staggering 2.12 billion tons of waste. One of the biggest reasons for this astounding amount of waste is that human being's trash approximately 99% of everything they purchase within six months.

## 1.2 Objective

The main objective of the paper is to generate electrical energy and control or minimize the pollution by using low grade waste and smoke absorber. The experimental study is carried out by performing load tests using different domestic waste and observe the energy from Thermocouple Heating Panel's and use this electrical energy for various loads.

## 2. Overview

Awareness of low-grade waste consumption in the home or building is a first step towards generation of energy. In this project firstly we dump low grade waste in the rat box when it full we close and give spark to it because of thermocouple heating panel it operates on principal of potential difference and this generated electricity is very minute so we place DC-DC step up module store this energy in battery utilize this energy when require.

### 2.1 Advantages:

The following are the advantages of Generation of Electrical Energy by Reutilizing Low Grade Waste are:

- Reliable source of energy.
- Environmentally Friendly.
- Have high scalability, which means they can be applied to heat source of any size.
- Lower the Production cost.
- Recycle wasted heat energy.
- Size requirement very less.
- Installation cost is low.

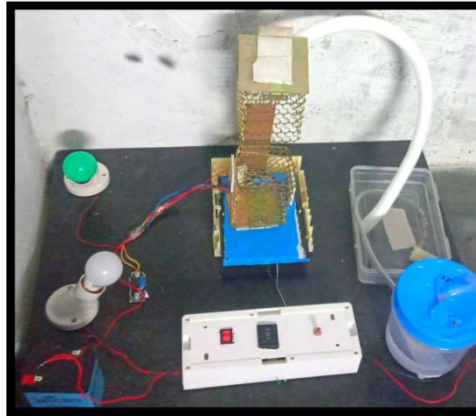
### 2.2 Limitations:

The following are the disadvantages of Generation of Electrical Energy by Reutilizing Low Grade Waste are:

- Low energy conversion efficiency rate.
- Require relatively constant heat source.
- Lack of industry education about thermoelectric generators.
- Slow technology progression.
- High output resistance.

### 3. Methodology

Generation of electrical energy by reutilizing low grade waste monitoring system is shown in figure 3.1.



**Fig 3.1: Real Time Implementing System**

The electrons dissipate energy in the form of heat for silicon and germanium diodes but in gallium arsenide phosphide (Ga As P) and gallium phosphide (Ga P) semiconductors, the electrons dissipate energy by emitting photons. If the semiconductor is translucent, the junction becomes the source of light as it is emitted, thus becoming a light-emitting diode. However, when the junction is reverse biased, the LED produces no light and—if the potential is great enough, the device is damaged.

#### 3.1 Real -Time Implementation Monitoring:

In this paper we had shown and implemented that the generation of electrical energy by reutilizing low grade waste or ecofriendly garbage waste. The output is generated during the process is 3 volts a minor amount of voltage is generated that generated voltage furtherly implemented by the method called boosting by using an instrument which is named DC to DC step up module.

Then the voltage of 12 volts can be obtained because of bursting of waste that voltage is used to blow the bulb which is nothing but generation of electricity if the access voltage is generated during burning that voltage is stored in a 12 volts battery which can be furtherly used. we had observed a small drawback that the accusive amount of external supply should be given for the working of centrifugal pumps. The external supply required to run the centrifugal pumps is 3 to 6 volts this problem can be implemented fatherly by using different methods.

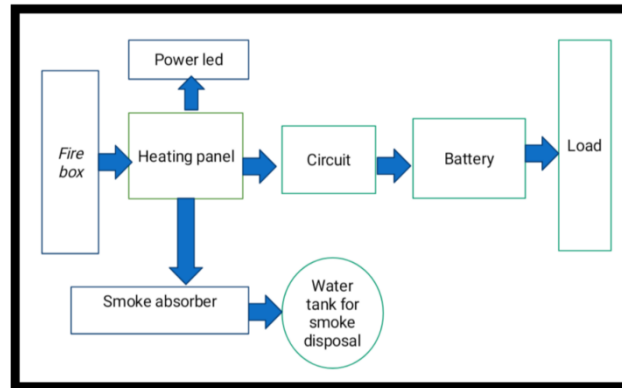
#### 3.2 Applications:

- The heat source of the thermoelectric generator serves as a radioactive element for many space probes including the Mars Curiosity rover.
- Solar cells employ only the high frequency part of radiation, and the low frequency heat energy is wasted. Thermoelectric devices integrated with the solar systems can convert the wasted heat energy into useful electricity.
- Waste heat produced from cars and other automobiles, microprocessors and industrial processes can be harvested using thermoelectric generator, thereby increasing the efficiency of the processes/systems.
- It can be used to power outdoor lights, fans, and several instruments like guard alarm systems, radio receivers and TV sets.
- It can also supply energy to green houses, trading kiosks, garages, hangars, cottages, country houses, and amenity rooms.

## 4. Hardware Description

### 4.1 Equivalent Circuit Model:

An approximated model of Generation of Electrical Energy by Reutilizing Low Grade Waste was live monitoring and controlling has been done in live. The electrical equivalent circuit of this model is as shown in the figure 4.1



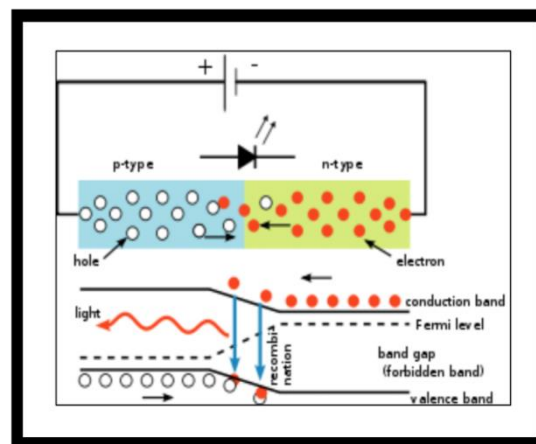
**Fig 4.1: Equivalent Circuit Model**

The smoke also generated during the process of generation of electricity this problem can be rectified by using cooling filters so finally by the above process we have generated electricity by using low grade waste. All these drawbacks and increasing the voltage in further status or we enhance it.

Then the voltage of 12 volts can be obtained because of bursting of waste that voltage is used to blow the bulb which is nothing but generation of electricity if the access voltage is generated during burning that voltage is stored in a 12 volts battery which can be furtherly used. we had observed a small drawback that the accusive amount of external supply should be given for the working of centrifugal pumps. The external supply required to run the centrifugal pumps is 3 to 6 volts this problem can be implemented fatherly by using different methods.

### 4.2 Working Principle

The below figure 4.2 shows the Working Principle.



**Fig 4.2: Working Principle**

Under 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.

### 4.3 Heating Panel Principle:

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.)

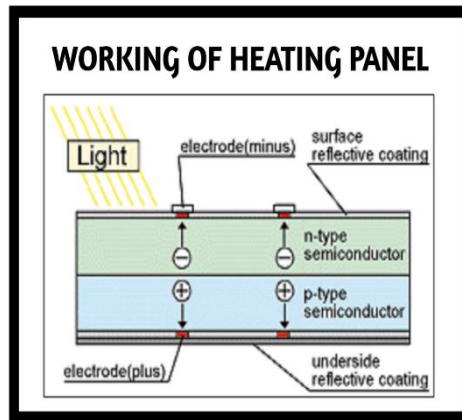


Fig: -4.3: Heating Panel Principle

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. When heat hits the semiconductor, an electron springs up and is attracted toward the n-type semiconductor. This causes more negatives in the n-type semiconductors and more positives in the p-type, thus generating a higher flow of electricity. This is the photovoltaic effect.

## 5. Calorific Value of Waste

The Calorific value (CV) of the waste depends on the composition of the waste. Waste with a lot of PVC has a higher calorific value than waste with less PVC and more paper. To estimate the calorific value of the waste mix you have, you can make an average on your composition.

For example: To calculate the average calorific value of a waste mix:

- We have a waste mix consisting out of 3 fractions,
- Hazardous waste represents 20% of the mass amount and has a calorific value of 12 MJ/kg.
- Medical waste represents 50% of the mass amount and has a calorific value of 19 MJ/kg.
- Plastics - PVC waste represents 30% of the mass amount and has a calorific value of 35 MJ/kg.

Table 5.1: Calorific Value Table

Type of material	CV (MJ / kg)	CV (kCal / kg)
Medical waste	19 - 24	4540 - 5735
Industrial & hazardous	22 - 40	5257 - 9558
Domestic waste (with)	7 - 16	1673 - 3823
Domestic waste (after)	10 - 14	2389 - 3345
PVC	41	9797
Dry wood	14,4	3441
Paper	13,5	3226
Braun carbon	7 - 12	1673 - 2867
Petrol (benzine)	45 - 47	10573 - 11231
Coal	15 - 27	3584 - 6452
Diesel	46	10992
Ethanol	30	7168

## 5. Conclusion:

The limited availability of primary energy resources, increasing concern of environmental issues of emission and the growing global demand for conserving energy continue to accelerate the search for technologies of generating electrical power. Thermoelectric power generators have now merged as a promising alternative green technology owing to their potential to directly convert waste-heat energy into electrical power. The application of this alternative green technology in converting waste-heat energy into electrical power can improve the overall efficiencies of energy conversion systems. Currently, a large amount of waste heat is discharged from industry including power utilities and manufacturing plants. Hence most of the research activities have been directed towards the utilization of industrial waste heat. Research on thermoelectric generators might be needed to focus on finding suitable thermoelectric materials that can withstand higher temperatures of various industrial heat sources at a feasible cost with good performance.

## 6. Future Scope:

- Electricity will largely replace petrol and diesel as a fuel for road vehicles. It will decrease the pollution.
- The future of the sector looks bright since by 2026-27 the country's power generation installed capacity will close to 620 GW, of which 38 per cent will be from coal and 44 per cent from renewable energy sources.
- In the Present days the wastage drastically increasing day by day in this entire waste we can Reutilize the waste.
- Sadly, present we are not using but by using this project we can Reutilize the waste the input is Garbage Waste and the output is Electrical Energy.
- We install it in a small box near the Municipal Dustbins people put their Garbage Waste in it. This is a very simple process and easy to install and maintenance

## References

1. Modak P, Jiemian Y, Hongyuan Yu, Mohanty CR, Municipal solid waste management: turning waste into resources. In Shanghai manual: a guide for sustainable urban development in the 21st century, pp. 1–36, 2010.
2. Taste success from waste, Opportunities in the Indian solid waste to energy sector, Classification of waste, Report, EAI renewable energy consulting and research.
3. Sharholi M., Ahmad K., Mahmood G., Trivedi R.C. (2008) "Municipal solid waste management in Indian cities –A review" Waste Management, Vol. 28, 459–467.
4. Generation of solid waste, The Ministry of New and Renewable Energy (MNRE), Lok Sabha -Unstarred question no.2974, January 2018.
5. Rohith Kakkar, Management of Municipal Solid Waste focus on Waste to Wealth, Ministry of Urban Development, Govt of India, 2014.
6. Solid Waste Management Practices in the Informal Sector of Gweru, Zimbabwe by Steven Jeriel and Daniel Tevera.
7. Salman Zafar, Waste to Energy Conversion Routes, Bioenergy consult.
8. Patil A Avinash, Kulkarni A Amol, Patil B Balasaheb. Waste to energy by incineration. ResearchGate, Jun 2014.