

Electricity Generation Using Medical Waste

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ABSTRACT

Medical centers including hospitals, clinics and places where diagnosis and treatment are conducted generate wastes that are highly hazardous and put people under risk off at all diseases. The study reveals that there is no proper, systematic management of medical wastes except in a few private hospitals that segregate their infectious wastes. Some cleaners were found to salvage used sharps, saline bags, blood bag and test tubes for resale or reuse. The management of medical waste is of great importance due to its potential environmental hazards and public health risks. In the past medical waste was often mixed with municipal solid waste and disposed of in residential waste landfills or improper treatment facilities. Over this problem the electrical energy generation from medical wastage with the help of thermoelectric generator is done by this project.

1.INTRODUCTION:

In the present scenario, power has become fundamental need for human life. Energy is an important in put in all sectors of any countries economy. Energy crisis due to two reasons, firstly the population of the world has been increasing rapidly and secondly the standard of living human being has also increased. Due to this number of resources are generated and wasted. As we know the electrical energy generated by regular conventional fossil fuels, but there is a fear that they will get exhausted eventually in the next few decades. Therefore investigate some alternative new sources for power generation, specially the waste material can use for it. Thus, as we know one of the most discussed topics at the tables of environmentalists and ecologists is the medical waste management. With the number of patients from the COVID-19 pandemic in the millions, an increase in the amount of medical waste. The implementation of a medical waste management system requires skilled professionals, being essential for the preservation of life quality. Medical waste must be properly managed and disposed of to protect the environment, general public and workers, especially health care and sanitation workers who are at risk of exposure to biomedical waste as an occupational hazard. As heat energies are more attractive artificial to electrical energy. In this innovative project, we are using one device which is used to be created and introduced by human as a renewable energy that is thermo electric generator equipment to generate electricity from the medical waste. To have great impact of this and will create difference in the electrical power generation system as well as medical waste management.

2. PROBLEM STATEMENT:





2.1 Literature review: After analysing study papers it is observed that the production of medical waste has been increased to a great extent due to the current situation (COVID-19).

2.2 Problem: The medical waste produced due to COVID-19 is highly contagious and has become threat for the society as well as human life. So its proper disposal is very important.

2.3 Solution: Instead of disposing the waste, proper utilization can be done. This project will use the medical waste to generate electricity. By burning medical waste electricity can be generated.

3. SYSTEM REQUIREMENTS:

3.1 Hardware Requirement:-

Sr no	Parameters	Description	Quantity
1	Ultrasonic Sensor	Supply voltage 5V . Global current consumption -15mA. Frequency -40kHz Maximal range- 400cm Minimal range- 3cm Outline dimension- 43*20*	
2	Thermocouple	Voltage-12V Vmax- 15.4V Imax-6A Qmax92W Internal resistance -1.9 ohm Type-Cooling Cells	
3	DC Motor	Operating voltage- 3V-6V. No load current -350mA RPM -150 rpm Axial length -9mm Shaft diameter-2mm	
4	Heat sink	It is a passive heat exchanger that transfer the heat generated by an electronic or a mechanical device to a fluid medium often air or a liquid coolant, where it is dissipated away from the device, there by allowing regulation of the device's temperature.	

3.2 Software Requirement:-

Sr no.	Parameter	Description
1.	Atmega8 IC	The ATmega8 is a low-power CMOS 8-bit microcontroller based on the AVR RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega8 achieves throughputs approaching 1 MIPS per MHz, allowing the system designer to optimize power consumption versus processing speed.

4. SYSTEM ARCHITECTURE:-

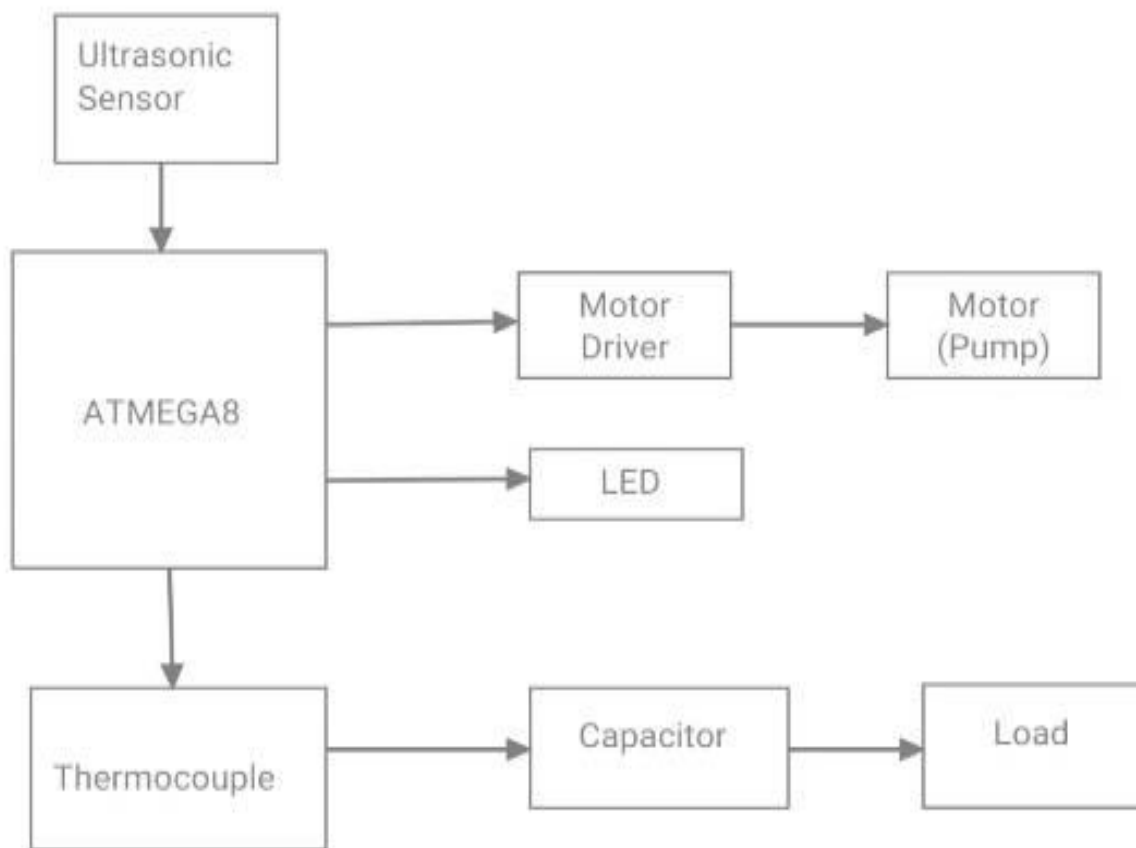


Fig: 1 Block Diagram of the system.

5. METHODOLOGY:-

•Thermocouple:-

5.1 Peltier History:-

Early 19th century scientists, Thomas Seebeck and Jean Peltier, first discovered the phenomena that are the basis for found that if you placed temperature gradient across the junction of two Dissimilar conductors, electrical current would flow. Peltier, on the other hand, learned that passing current through two dissimilar electrical conductors, caused heat to be either emitted or absorbed at the junction of the materials. It was only after mid-20th Century's advancements in semiconductor technology, however, that practical applications for thermoelectric devices became feasible. With modern techniques, we can now produce thermoelectric efficient solid state heat-pumping for both cooling and heating; many of these units can also be used to generate DC power at reduced efficiency. New and often elegant uses for thermo-electrics continued to be developed each day.

5.2 Peltier Structure:-

A typical thermoelectric module consists of an array of Bismuth Telluride semiconductor pellets that have been carrier-either positive or negative- carries the majority of current. The pairs of P/N pellets are configured so that they are connected electrically in series, but thermally in parallel. Metalized ceramic substrates provide the platform for the pellets and the small conductive tabs that connected them.

5.3 Peltier Theory:-

When DC voltage applied to the module, the positive and negative charge carriers in the pellets array absorb heat energy from one substrate surface and release it to the substrate at the opposite side. The surface where the heat energy is absorbed becomes cold; the opposite surface where heat energy is released becomes hot. Reversing the polarity will result in reversed hot and cold sides.

5.4 Basic Principle:-

When a p type semiconductor (doped with holes) is use instead, the holes move in a direction opposite the current flow. The heat is also transported in a direction opposite the current flow. The heat is also transported in a direction opposite the current flow and in the direction of the holes. Essentially the charge carriers dictate the direction of heat flow.

5.5 Thermoelectric Performance:-

TE performance depends on the following factors

- The temperature of the cold and hot sides.
- Thermal and electrical conductivities of the device's materials.
- Contact resistance between the TE device and heat source/heat sink.
- Thermal resistance of the heat sink.

•Automatic Sanitizer Dispensing Machine:-

Sanitization means cleaning or sterilizing an object or body part like hands or whole body. Sanitization can be done in many ways including UV Sanitization, Soap Sanitization, Alcohol Sanitization, Bleach Sanitization and so on. Of the above methods, alcohol was found to be more useful for human beings since it is harmless on skin surface, vaporizes easily and kills most of the viruses, bacteria, and also removes dirt in our hands. Alcohol may be expensive for mass scale sanitization of buildings or rooms and a major disadvantage is that, alcohol is highly inflammable and requires careful storage to avoid catastrophe. Alcohol also makes hands dry since it absorbs moisture, and hence also needs addition of moisturizers. Alcohol based hand sanitizers are also provided with antiseptic disinfectants like Chlorohexidine Gluconate. Minimum concentration of alcohol in hand sanitizers must be greater than 70% for effectiveness against viruses. But, repeatedly touching the hand sanitizer containers to get a drop of sanitizer again initiates contact with persons, which may be risky. Hence there is need for non contact based hand sanitizer dispenser.

6.WORKING:-

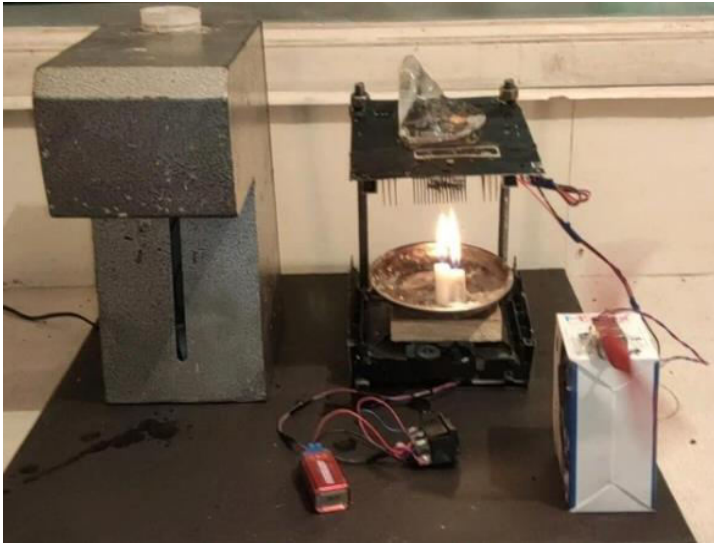
6.1 Working Arrangement:-

In this system a sanitizer section is placed which has a ultrasonic sensor which will sense any movement and accordingly spray the sanitizer to sanitize the medical waste. After sanitizer section a combustion chamber is placed which will burn the medical waste in the chamber of appropriate size . The heat energy produced by burning will be converted into electrical energy with the help of thermocouple.The energy converted by the thermocouple will be given to the load.

6.2 Expected Result:-

Appropriate voltage must be generated which would be given to the load.





•ADVANTAGES AND DISADVANTAGES:-.

Advantages:-

1. Decrease quality of waste.
2. Efficient waste management.
3. Production of heat and power.
4. Production of pollution.
5. Saves on transportation of waste.
6. Provide better control over odour and noise.
7. Eliminate harmful germs and chemicals.

Disadvantages:-

1. Pollute the environment in some manner due to smoke.
2. Ash waste can potentially harm people and the environment.
3. It is expensive.
4. possibility of long term problems.

• APPLICATIONS:-

- Street Lighting
- Commercial Purpose
- Residential Purpose
- Electric Vehicles
- Electric Traction
- Power Plant
- Industrial Sector

• RESULT:-

In this project a voltage of 3 to 5 volts is generated which is then connected to the load or battery.

7. CONCLUSION:-

By performing this project Electricity can be Generated by using Medical Waste. Instead of disposing the medical waste it can be combusted to generate electricity. Also it will help the surrounding as well.

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