

Generation of Electricity by using Waste Heat

Sachin Kawade¹, Avinash Patil², Mayur Gavli³, Kirti Kulkarni⁴

Student, Electrical, MET Institute of Engineering, Nashik, India ^{1,2,3}

Professor, Electrical, MET Institute of Engineering, Nashik, India ⁴

Abstract: A Thermoelectric generator also called a See Beck generator, is a solid state device that converts heat (temperature differences) directly into electrical energy through a phenomenon called See beck effect. Thermoelectric generators function like heat engines, but are less bulky and have no moving parts. However, TEGs are typically more expensive and less efficient. Thermoelectric generators could be used in power plants in order to convert waste heat into additional electric power and in automobiles the thermoelectric generators to increase fuel efficiency. Another application is radio isotope thermoelectric generators which are used in space probes, which has the same mechanism but use radioisotope to generate the heat require heat peltier.

Keywords: Peltier Plates, Thermoelectric generators, Peltier Module

I. INTRODUCTION

The “Thermoelectric generators using Peltier Module” is specially designed for to save electricity. It helps to avoid load shading. At the place of heating are we can place peltier module and which produce energy and also it can stored into battery.

In our system we are going to use this energy in an efficient way that is one of the daily used vehicles are our private cars. So as most of the vehicles is using internal combustion engine, it produce a considerable heat and dissipated into the environment.

We have proposed a system with a thermoelectric generation technique in which a direct energy transducer are used which produced the electrical power proportional to heat difference maintained around the transducer. Basically this transducer are working on the principle of see beak effect of peltier module technique in which it states that whenever there is a difference between the two junction of a material made with a combine elements so that this temperature difference makes the electron flow between the two junction held at different item.

The energy generated in terms of voltage is forwarded to charge pumping circuitry each boosts the current for further operations towards the useful utilization of energy. To enhance the efficiency and utilization a post generation module is implemented which generate the different form of energy to drive and satisfy our daily needs.

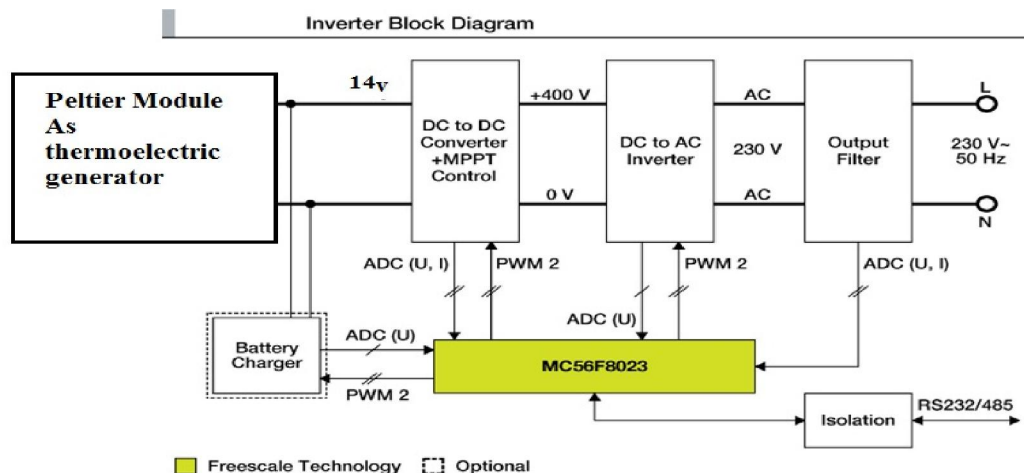
II. LITERATURE REVIEW

In this paper presentation we have studied, there is tremendous amount of waste heat is emitted by vehicles on daily basis. Working of peltier plates is when the current flows through the plates the heat is removed from one side and cooling occurs. Heat is deposited at the other side of peltier plate. The main application of the plates is cooling. [Ref.1] In our project, we have used these peltier module in opposite way of its working. Instead of connecting peltier plates directly to the voltage supply, we are placing the plates between hot and cold medium. Because of this arrangement, due to temperature differences between both sides of the peltier plates, the current starts flowing through the connected terminals of peltier plates. Hence small amount of current is produced by this kind of arrangement. This kind of working of peltier plates refered as see beak effect. The amount of output current can be increased by connecting more number of peltier plates.[Ref.2]

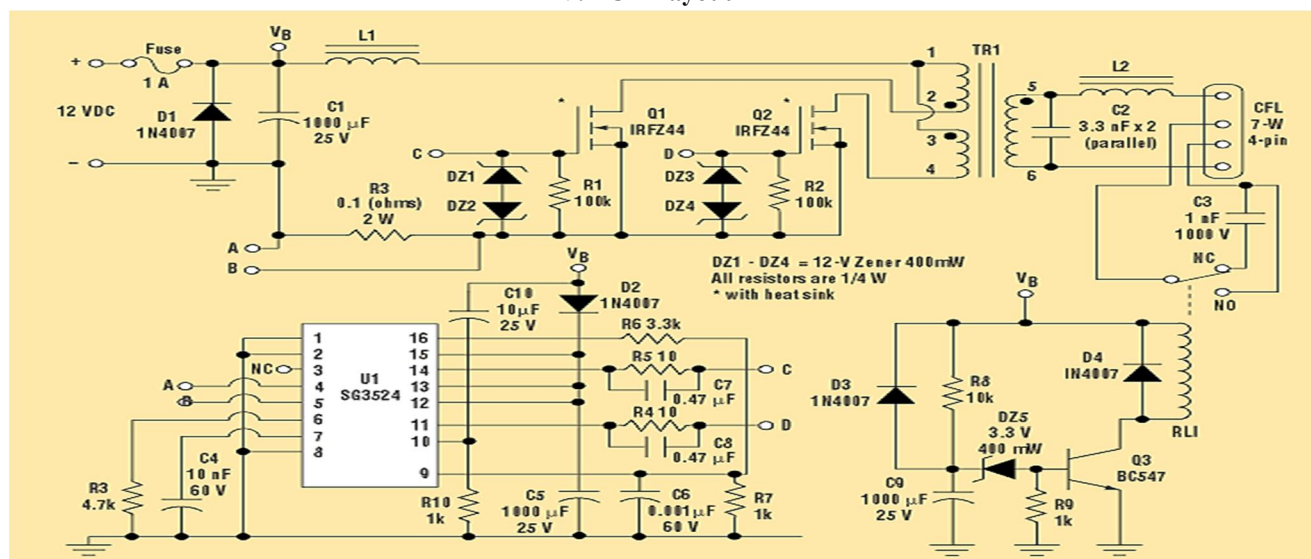
III. PROPOSED METHODOLOGY

- 2 Peltier plates are used to generate the voltage and current.
- DC voltage booster is used to increase the voltage
- DC charging IC is used to charge the battery
- The output of DC battery is converted into AC

IV. PROPOSED BLOCK DIAGRAM



IV. PCB Layout



V. COMPONENTS REQUIRED

LM317-

LM317 is an adjustable 3 terminal positive voltage regulator capable of supplying in excess of 1.5A over an output voltage range of 1.2v to 37v.

HCF4050-

It is an non inverting Hex Buffer/Converter and feature logic level conversions using only one supply voltage.

SG3524-

This contains all the control circuitry for a regulating power supply inverter or switching regulator. This device can be used for switching regulators of either polarity, transformer coupled DC to DC converters.

VI. ADVANTAGE

- a) Environment Friendly
- b) Recycles wasted heat energy
- c) Reliable source of energy
- d) Lower energy production cost
- e) Scalability, meaning that the device can be applied to any size heat source from a water heater to manufacturer equipment.

VII. APPLICATION

- a) In Solar water heater
- b) Near to heated boiler
- c) Near to IC engines
- d) Applicable for every domestic customer
- e) Used for industrial purpose
- f) Used for emergency lightning purpose.

VIII. CONCLUSION

By this way we have concluded that it is very useful to save electricity, to save money, to avoid wastage of electricity. It is possible to reduce the use of fossil fuels. By this project we learned following things-

- a) Importance of project
- b) How to make ckt diagram
- c) To make pcb layout on copper clad
- d) component mounting and soldering

VIII. ACKNOWLEDGEMENT

We would like to thanks Dr. Deepak Kadam, (HOD) of Electrical department, MET IOE Nashik, and Prof. Kirti Kulkarni, Professor of Electrical department MET IOE Nashik, for their inspiration, guidance and valuable suggestions.

REFERENCES

- [1] Sarinee Oitrakul, preliminary experiment for electricity generation using peltier modules, 78-1-47999-2993-1/14/\$31.00 IEEE
- [2] P.M Solanki, Dr.D.S.Deshmukh, Dr, V.R.Diware, A review on factors to be considered for a thermoelectric power generation system design, International conference on global trends in engineering, technology and management
- [3] Dr. Steven O'Halloran, Mr. Mathew Rodrigues, Power and effecienct measurement in a Thermoelectric Generator, AC 2012-3976.