



## **Design and Fabrication of Portable Thermoelectric Refrigerator Using Thermoelectric Peltier Module**

**Prof. Sangram Mane<sup>1</sup>, Sanket Ranaware<sup>2</sup>, Vinayak Kholase<sup>3</sup>, Vishvajeet Phadtare<sup>4</sup>, Pradip Mulik<sup>5</sup>, Ajay Keskar<sup>6</sup>**

<sup>1</sup>Mechanical Engineering, College Of Engineering Phaltan

<sup>2</sup>Mechanical Engineering College Of Engineering Phaltan

<sup>3</sup>Mechanical Engineering College Of Engineering Phaltan

<sup>4</sup>Mechanical Engineering College Of Engineering Phaltan

<sup>5</sup>Mechanical Engineering College Of Engineering Phaltan

<sup>6</sup>Mechanical Engineering College Of Engineering Phaltan

### **ABSTRACT---**

*This project aims at developing a highly cost effective solar refrigerator which would cater to the needs of the people of the rural society. The refrigerator uses non polluting natural resources and is so eco friendly. It can be easily be customized as per requirements and available resources to suit the needs of the different rural households. It can be used in the remote areas. It also reduces power consumption. The solar refrigeration system employs a PV panel, vapor compressor and electronic controls the process that makes refrigeration possible is conversion of sunlight into DC electrical power, achieved by PV panel. The DC electrical power drives the compressor to circulate refrigerant through a vapor compression refrigeration loop that extract heat from a insulated enclosure. This enclosure includes the thermal reservoir and the phase change material. Proper sizing of the highly insulated cabinet, phase change thermal storage, variable speed compressor, and solar PV panel allow the refrigerator to stay cold all year long.*

### **1.Introduction**

The solar refrigerator is the refrigeration system that runs on solar energy . The solar refrigerator comprises of all the traditional components like peltier plate, condenser, expansion valve. The power is supplied not by the domestic electrical supply system, but from the solar panel which is provided. From last century till now refrigeration has been one of the most important factors of our daily life. The current tendency of the world is to look at renewable energy resources as a source of energy. This is done for the following two reasons; firstly, the lower quality of life due to air pollution; and, secondly, due to the pressure of the ever increasing world population puts on our natural energy resources. From these two facts comes the realization that the natural energy resources available will not last indefinitely. The basic idea is implementation of photovoltaic driven refrigerating system powered from direct current source or solar panel (when needed) with a battery bank. In 1821, the first important discovery relating to thermoelectricity occurred by German scientist Thomas Seebeck who found that an electric current would flow continuously in a closed circuit made up of two dissimilar metals, provided that the junctions of the metals were maintained at two different temperatures. Without actually comprehending the scientific basis for the discovery, Seebeck, falsely assumed that flowing heat produced the same effect as flowing electric current.

### **2. LITERATURE SURVEY**

[1] "Performance Evaluation of a Thermoelectric Refrigerator", Onoroh Francis, Chukuneke Jeremiah Lekwuwa, Itoje Harrison John International Journal of Engineering and Innovative Technology (IJEIT) Volume 2. From above research paper we have studied about the Seebeck effect, thermoelectric refrigerator, hybrid refrigerator and thermo electric materials.

[2] "Design and Development of Thermoelectric Refrigerator ", Mayank Awasthi International journal of mechanical engineering and robotics.From above research paper we have studied about thermoelectric component like heat sink.

[3] "A Review on use of Peltier Effects ",Ajitkumar Nikam Dr.Jitendra hole Mechanical Engineering Department, Rajashri Shahu college of engineering ,Pune.From above research paper we have studied about use of peltier plate in refrigerator.

**Materials used:**

1. Peltier Unit
2. Cooling Fan.
3. Heat Sink.
4. Battery.

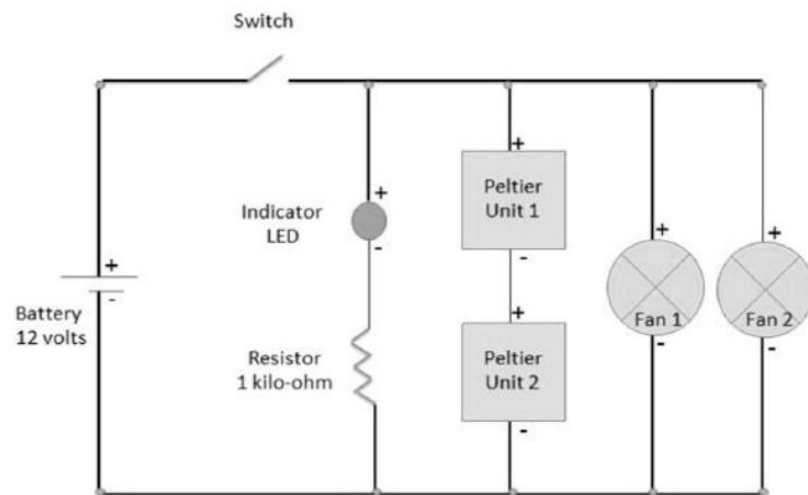
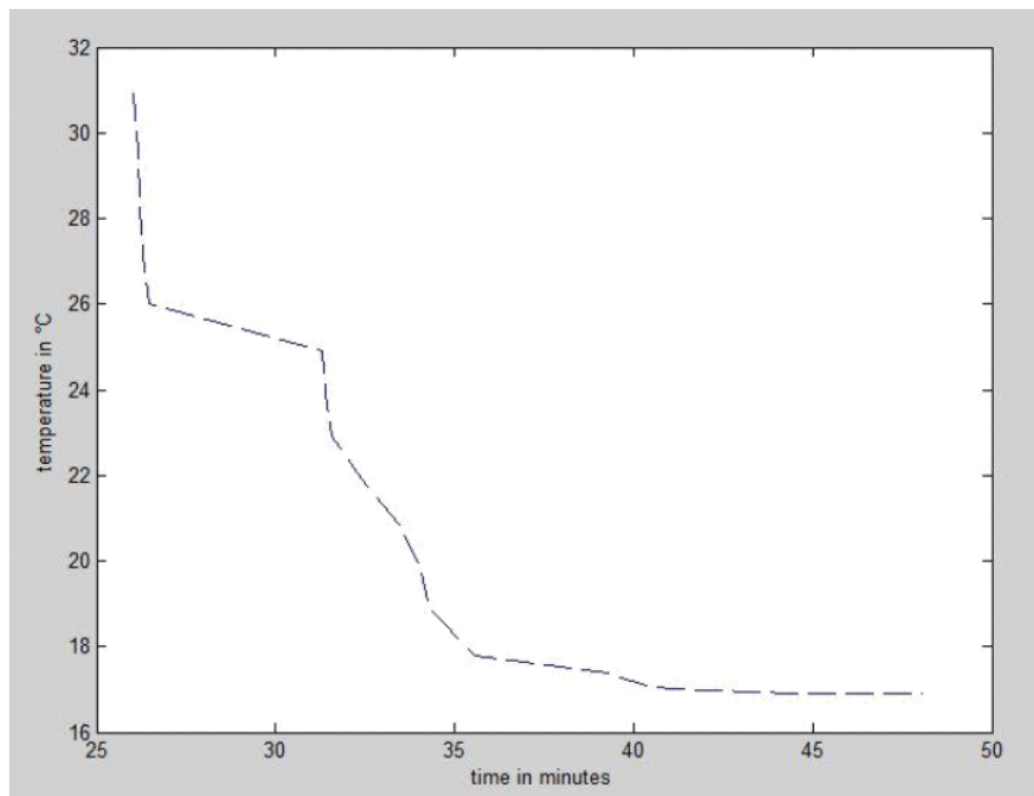


Fig :Circuit Diagram Of fridge.

**Results:**

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**Conclusion:**

Solar power nowadays is playing a major role in meeting the energy requirements of our country. It is being developed at a very fast rate and its applications in many areas are being explored. The fridge is intended at exploring the same and provides an efficient and economical solution to the areas where there is no electricity and cooling is required. This project main objective was to develop a mini compressor less solar fridge and this has been successfully done. The applications of this fridge are very wide and it can be used in various places for variety of operations. Also the main purpose for which this fridge is made is being fulfilled as the space inside the fridge is sufficient enough to cool appropriate amount of medicines and injections needed at the primary health care centres in the villages where there is sporadic or no power supply