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Empirical study of Power Supply unit for cooling and Heating system: Medical Refrigeration in rustic and downpour Affected Area

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Abstract: Automation is consider to be back bone of today era and in todays technological era automation takes leading roll in every sector, electrical segment is also not an exception, Every country is tring to make them a fully automated with letest trend in technology, in india Solar and electrical sector is major contributor to economy of india, so has to make it more strong we have to take an intiative and change the routine trends of power supply to cooling and heating unit,so keeping that thought in mind we have designed suply unit used in medical refrigiration system . The essential objective of these system is to provide proper supply to cooling and heating system used in medical domain so that medicine used in pandemic situation should be protected.This Design defently helps to minimised the effort,supply volatge, tempreture controlling and little contribution to be part of Atma Nirbhar Bharat and Make in India.

Keywords: Medical sector, Refrigerator, tempreture control,solar pannel.

I. INTRODUCTION

Current tendency of the first 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. Therefore, the ideal solution would be to use some type of renewable energy resource to provide these houses with energy without an expensive electrical grid connection [1]. One solution is a RAPS (Remote Area Power Supply) using an alternative form of energy. A study done by the University of Cape Town's Energy Development Research Centre came up with interesting facts that can be used to support the application of PV systems to Third World housing. The thermoelectric cooler it will utilize the power from the PV panels when the battery is fully charged, and at night, will use a small amount of power to maintain the temperature in the cooler box

The main purpose of the project is to monitor and control the Refrigerator temperature by using a solar panel. This system controls the mini refrigerator which uses solar power as the power supply. Thus, the project saves the electrical power up to the maximum extent. In today's world global warming is being increasing year by year. There are many reasons like pollution, deforestation, water contamination etc... In coming years the major problem before us is depletion of ozone layer which is caused by the release of CFC's. Some of the requirements which cause this effect are refrigerators, AC'S. In this project we are mainly focusing on a solution to control the problem we have focused on refrigerators which releases CFC's. Here we are designing a mini solar based refrigerator which is cheaper as well as eco friendly.

II. PRAPOSED METHODOLOGY

In earlier days refrigerators were there, but there was no proper control over the temperature (dynamic control) in the sense there were no proper control mechanism that could maintain the temperature as desired , the refrigerator would just provide a cooling effect continuously this effect would not be helpful in storing the medicines and preserving them and even other perishable food items and refrigerator are run on electrical supply and cfc's, ammonia are used as coolants which effect ozone layer . It is a general object of our project to provide a solution for the above mentioned problem by using microcontroller based temperature control mechanism, i.e., a required temperature can be set in refrigerator for preserving medicines, other stuff which are to be preserved, and design a refrigerator which would run on solar power supply and here we are using semiconductor transducer (peltier device) as coolant in place of cfc's & ammonia.

The circuit is programmed for on/off control. It can be implemented for several applications including airconditioners, water-heaters, snow-melting equipments, ovens, heat-exchangers, mixers, furnaces, incubators, thermal baths and veterinary operating tables. We developed this project, which is relatively inexpensive to sense the temperature. The

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temperature is read by the ADC (Analog to Digital Converter) module of the microcontroller Unit. This ADC data is processed and converted into the actual temperature reading by the microcontroller. This processed data is sent to the LCD for user display.

III.HARDWARE IMPLIMENTATION AND WORKING

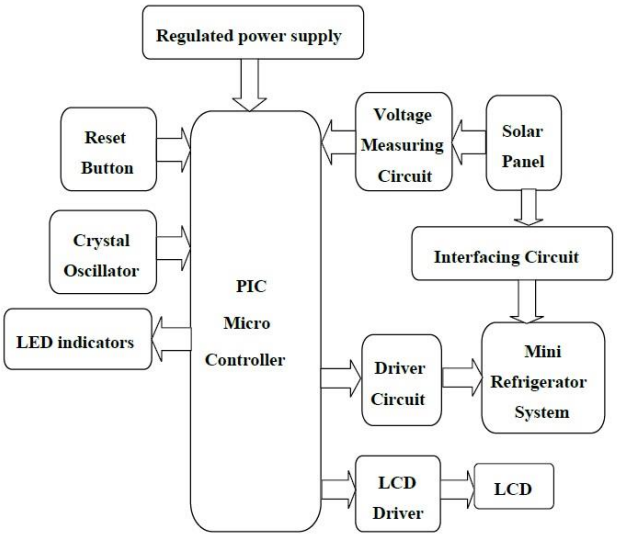

Fig. 1 Block Diagram

Figure no 1 shows the systematic block diagram of project. It consit of different sections like microcontroller LeD Module, voltage measuring circuit,Oscillator,Refreigration system

IV. COMPONENT USED

MICROCONTROLLER: Microprocessors & microcontrollers are widely used in embedded systems products. Microcontroller is a programmable device. A microcontroller has a CPU in addition to a fixed amount of RAM, ROM, I/O ports and a timer embedded all on a single chip. The fixed amount of on chip ROM, RAM and number of I/O ports in microcontrollers makes them ideal for many applications in which cost and space are critical. The microcontroller used in this project is PIC16F72. The PIC families of microcontrollers are developed by Microchip Technology Inc. Currently they are some of the most popular microcontrollers, selling over 120 million devices each year. There are basically four families of PIC microcontrollers:

- PIC12CXXX 12/14-bit program word,
- PIC 16C5X 12-bit program word,
- PIC16CXXX and PIC16FXXX 14-bit program word, PIC17CXXX
- PIC18CXXX 16-bit program word

REGULATED POWER SUPPLY: Power supply is a supply of electrical power. A device or system that supplies electrical or other types of energy to an output load or group of loads is called a power supply unit or PSU. The term is most commonly applied to electrical energy supplies, less often to mechanical ones, and rarely to others.

A power supply may include a power distribution system as well as primary or secondary sources of energy such as Conversion of one form of electrical power to another desired form and voltage, typically involving converting AC line voltage to a well-regulated lower voltage DC for electronic devices. Low voltage, low power DC power supply units are commonly integrated with the devices they supply, such as computers and household electronics.

• Batteries.

• Chemical fuel cells and other forms of energy storage systems.

• Solar power.

• Generators or alternators.

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PELTIER DEVICE: It is different electron densities, the semiconductors are placed thermally in parallel to each other and electrically in series. Then joined with thermally conducting plates on each side, an voltage is applied on free ends of semiconductor there is a flow of dc current across the junction causing temperature difference, the side with a cooling plate absorbs heat which is then moved to other side end where heat sink is present.

SOLAR PANEL: The use of batteries requires the installation of another component called a charge controller. Batteries last a lot longer if they aren't overcharged or drained too much. That's what a charge controller does. Once the batteries are fully charged, the charge controller doesn't let current from the PV modules continue to flow into them. Similarly, once the batteries have been drained to a certain predetermined level, controlled by measuring battery voltage, many charge controllers will not allow more current to be drained from the batteries until they have been recharged. The use of a charge controller is essential for long battery life.

V. ADVANTAGE

- Improved efficiency.
- Decrease the power consumption
- Durable and clap as low cost materials are used.
- Less Maintenance cost.
- No extra manpower required.

VI. APPLICATIONS

- Medical Sector
- Dissaster management
- Miltery Apllications

VII. CONCLUSION

In this project we design a system to overcome the problems faced by medical domain in his/her day to day routine. Thus our project concludes that solar energy systems must be implemented to overcome increasing electricity crisis. In this work, a portable solar operated system unit was fabricated and tested for the cooling and heating purpose. The system was designed based on the principle of a thermoelectric module to create a hot side and cold side. The cold side of the thermoelectric module was utilized for cooling purposes whereas the rejected heat from the hot side of the module was eliminated using heat sinks and fans. And hot side of the thermo electrical module was utilized for heating purpose. In order to utilize renewable energy, solar energy was integrated to power the thermoelectric module in order to drive the system. Furthermore, the solar thermoelectric cooling and heating system avoids any unnecessary electrical hazards and proves to be environment friendly.

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