International Journal of Scientific Research in Computer Science, Engineering and Information Technology
© 2017 IJSRCSEIT | Volume 2 | Issue 2 | ISSN : 2456-3307

Generation of Electricity by Using Multiple Resources

Kamble Prajkta R, Phule Pallavi G, Kokate Komal L

Electrical Engineering, Solapur University, Sahakar Maharshi Shankarrao Mohite Patil Institute of Technology & Research , Shankarnagar Akluj, Maharashtra, India

ABSTRACT

To conquer the negative impacts on the atmosphere and other problems associated with fossil fuels have forced many countries to request and change to alternatives that are renewable to uphold the increasing energy demand. To meet energy demand, renewable energy and some unconventional source of energy can provide the necessary amount of clean energy for climate stabilization and reduce the consumption of fossil fuel. The concept of Energy harvesting is to avail the energy that is usually available in the surroundings and convert it into useful electrical energy. Most people do not realize that there is a lot of energy that is formed around them all the time. Energy can be harvested from various sources such as vibrations, thermal and mechanical sources, etc. Currently, the energy harvesting makes little impact on the overall electricity consumption in a built environment. However, it does improve the overall consumption by a little margin and in the future; this margin magnified will be by the production and implementation of more and more energy harvesting products in the market.

Keywords : Energy Generation, Solar Energy, Piezoelectricity, Revolving Door Generation, Peltier Effect, Batteryunit, Inverters, Energy Efficient Lighting.

I. INTRODUCTION

Solar Energy is accepted as a key resource for the future of the world. The utilization of solar energy could cover a significant part of the energy demand in the countries. Using of solar energy in its various aspects, therefore, is very attractive in this part of the world. This energy is ubiquitous, freely accessible, and environmental pleasant. Economic aspects of this Renewable Energy technology are adequately promising to contain it for rising power generation ability in expanding countries. Solar energy is one of the best renewable energy sources with least negative impacts on the environment. More countries have formulated solar energy policies to reducing dependence on fossil fuel and increasing domestic energy production by solar energy. Solar panels are the medium to convert solar energy into the electrical energy. They can convert the energy directly or heat the water with the induced energy.

Piezoelectric Energy Harvesting is a new and innovative step in the direction of energy harvesting. The word piezoelectric means the electricity caused by pressure.Vibration energy can converted into electrical energy through piezoelectric, electromagnetic and capacitive transducers. As a result, the use of piezoelectric materials for scavenging energy from ambient vibration sources has recently seen a dramatic rise for power harvesting. There are two types of piezoelectric effect,direct piezoelectric effect and inverse piezoelectric effect. The direct piezoelectric effect is derived from materials generating electric potential when mechanical stress is applied and the inverse piezoelectric effect implies materials deformation when an electric field is applied. The energy harvesting via Piezoelectricity uses direct piezoelectric effect.

Revolving doors concept to harness energy is relatively new in the market. This green energy solution makes use of an everyday occurrence to produce some electrical energy can be used for large range of low powered electronics. The objective of this concept designed fabricated of a prototype revolving door, which can generate energy by amplifying the initial RPM of door shaft. The revolving door produces power

by harnessing energy that dissipated by human during walked through the door. Manual revolving doors rotate with push-bars, causing all wings to rotate. Revolving doors typically revolve counter-clockwise (as seen from above), allowing people to enter and exit only on the right side of the door. Direction of rotation is often enforced by the door governor mechanism.

A peltier element is a simple tool that has no moving parts and can be used to heat or cool or generate electricity.Thermoelectric cooling uses peltier effect to create heat flux between the junctions of two different types of materials. The thermoelectric effect is the direct conversion of temperature differences to electric voltage and vice versa. A thermoelectric device creates voltage when there is a different temperature on each side. Conversely, when a voltage applied to it, it creates a temperature difference. At the atomic scale, an applied temperature gradient causes charge carriers in the material to diffuse from the hot side to cold side. This effect used to generate electricity, measure temperature of object. Because the applied voltage determines the direction of heating and cooling, thermoelectric devices are used as temperature controllers.

II. LITERATURE SURVEY

[1]C. Hemalatha, A. Archana.al[1] In this paper the implementation of solar panels in indoor application with the consideration of effective utilization of the waste energy from lighting sources in household areas are taken in to account. This paper deals with the electricity generation using solar power.

[2]U. K. and R. H. Middleton.al [2]This paper presents a model of a piezoelectric transducer, a mechanical vibration spectrum, the simulation of the model, prototype of the power scavenging circuit, experimental results and its future perspectives.

[3]Raju Ahamed, M. M. Rashid.al[3] The objectives of this paper is to design and fabricated of a prototype revolving door which can generate energy by amplifying the initial RPM of door shaft. In this paper, prospect and feasibility of power generation by using revolving door investigated.

[4]Ajitkumar N. Nikam, Dr. Jitendra A. Hole.
The research and development work carried out by different researchers on development of novel thermoelectric R&AC system thoroughly reviewed in this paper.

III. BLOCK DIAGRAM

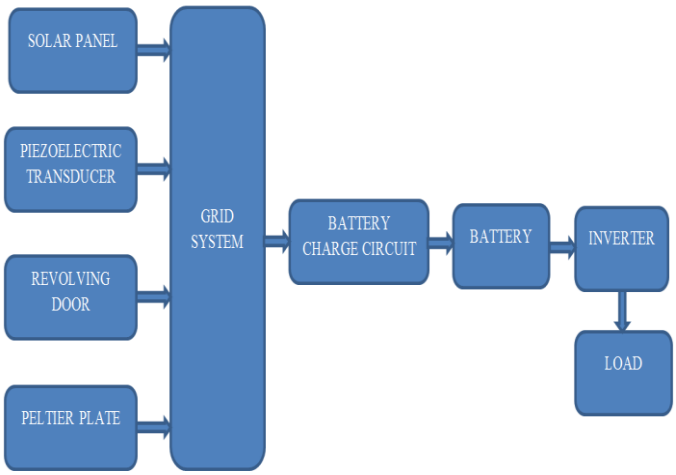

Figure1. Block Diagram for Generation of Electricityby Using Multiple Resources

This block diagram contains different blocks of energy generation circuit. Energy surrounds us in all aspects of life. It is up to us weather we use it constructively for the benefit of humankind or we use it destructively to harm others. Alternative energy resources are not based on fossils fuels or atom distribution. The alternatives are:

- Solar Panel
- Piezoelectric Plates
- Revolving Door
- Peltier Plate

Block Diagram Element

- Solar panel (PV cell)
- Piezoelectric Transducer
- Revolving Door (Door harvesting energy)
- Peltier Plate
- Charge Controller along with Grid System
- Rechargeable Battery
- Inverter Circuit
- Load

IV.IMPLEMENTATION

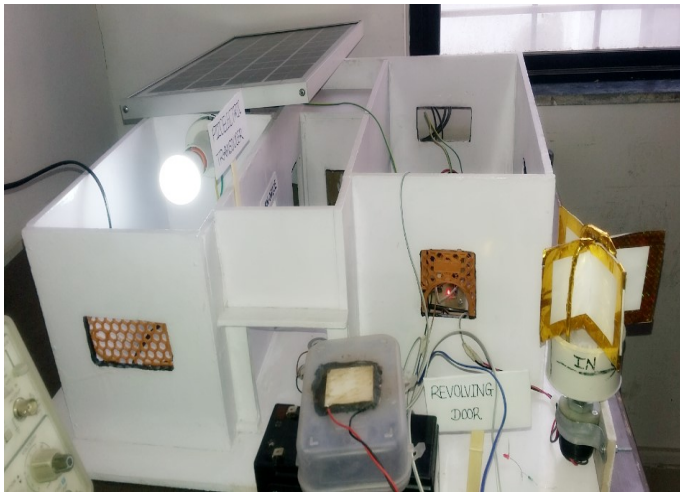

Figure 2. Circuitry of Project

Three different sections have been employing in this system. They can be divided like**:**

1. Generation
2. Storage
3. Automation

1. Generation

This part includes the generation by using four different sources such as solar panels, piezoelectric transducers, revolving doors and peltier plate, which interconnected, by using grid system.

2. Storage

As all the used sources are mostly active at the daytime but need have electricity mainly arises during the night-time. Therefore, for the use as per requirement we are using the battery for storage purpose.

3. Automation

This section includes the incoming and outgoing of electricity as per the need. Whenever the generation rate is high, we can transfer the electricity to MSEB or others based on tariff.

DC Grid System

Figure 3. DC Grid System

The DC grid system has four DC input supply is given and this supply is regulated in voltage regulator IC LM317. When making output of the constant voltage for battery charging purpose. Diode is used to current flowing in unidirectional.

Relay

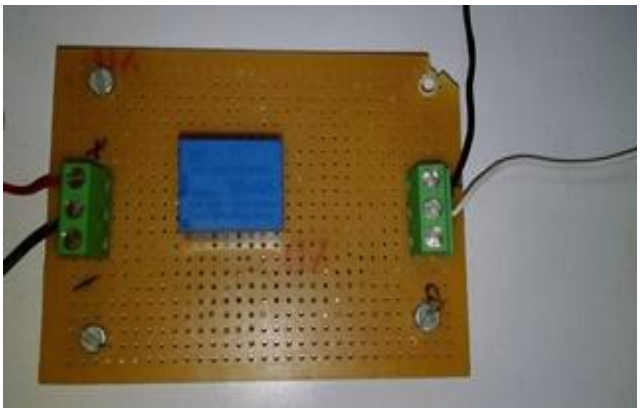

Figure 4**. Relay**

A relay is an electrically operated switch. Relay is a device, which used to provide connection between two or more points or device in response to the input signal applied. In another words relay provide isolation between the controller and the device, as we know devices may work on AC as well as on DC. However, they receive signalsfrom controller, which works on DC;hence, we require a relay to bridge the gap. Relay is extremely useful to control a large amount of current or voltage with small electrical signal.

Inverter

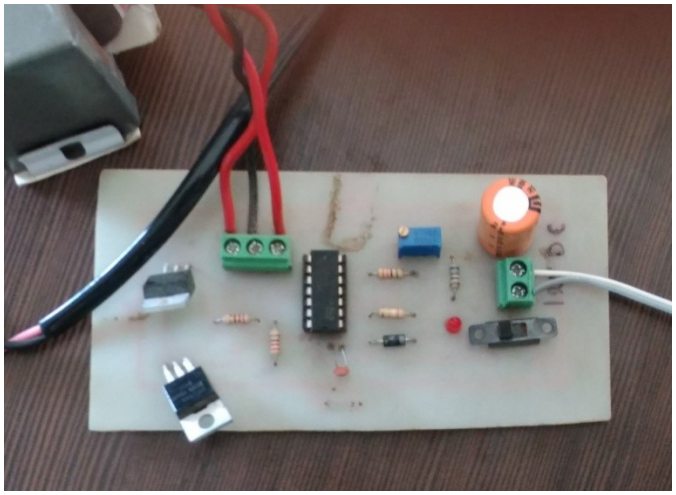

Figure 5**.** Inverter Circuit

The inverter used to convert 12V DC into 230V AC by using IC CD4047. The step up 12-0-12 volt transformer used and interfaced with relay circuit and microcontroller to the load. The relay circuit used to interface with load and LDR sensor.

Microcontroller

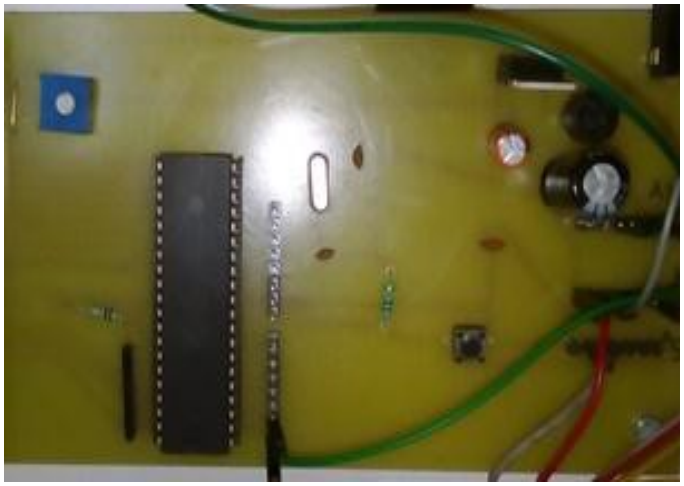

Figure 6**.** Microcontroller

The 18F452 PIC microcontroller is, as with all the other 18F series parts, optimized for using C.It has important features such as 256 bytes of EEPROM, Self programing ,an ICD,2 capture or compare or PWM functions ,8 channels of 10-bit analog to digital converter,the synchronous serial port can be configured as either 3-wire serial peripheral interface (SPI) ,etc.

V. CONCLUSION

This paper involves both nature and man for generation of electrical energy. It meets the increasing demands of energy in the most significant way by converting daily habits into energy by significant use of technology. The constructed system model can be applied in the residential area for alternative electricity generation.This project is self-sustained and does not require any other external energy source. This concept is going to be game changer in near future and its effect can be seen in every residential and industrial areas. It saves the energy in most appropriate way without any dependence on any human resource. By this arrangement, the maximum output power obtained is about35 watt and is depend on climatic conditions as well as peoples' movement.

VI.ACKNOWLEDGEMENT

We would like to express our regards to Prof. Daphale D. D. for guiding us thorough the entire B.E. final year project. We would also like to thank Prof.Sunanda Dodamani (Head of Department), and for giving her valuable time to guide through the project. Prof. Jadhav R.S. supported this work in part.

VII. REFERENCES

[1]. C. Hemalatha, A. Archana B.Jayaprakash2, Parvathi Jayakrishnan2 ,"Advancement in SolarPanels and Improvement in Power Production with Indoor Applications" Assistant Professor, Dept. of EEE, Gnanamani College of Technology.

[2]. U. K. Singh and R. H. Middleton, "Piezoelectric power scavenging of mechanical vibrationenergy" Australian Mining Technology Conference, 2-4 Oct. 2007, pp. 111-118.

[3]. Raju Ahamed1, M. M. Rashid1*, Jahidul Islam 2, Asief Javed2 and Hazlina Md. Yusof1"Energy Generation from Revolving Door" Department of Mechatronics, InternationalIslamic University Malaysia.

[4]. Ajitkumar N. Nikam1, Dr. Jitendra A. Hole2 "A Review on use of Peltier Effects" Mechanical Engineering Department, Rajrashree Shahu College of Engineering, Pune, India.

[5]. Keskar Vinaya N. “Electricity Generation Using Solar Power” M.E (Electronics) Govt.College of Engg. Aurangabad.
[6]. Tanvi Dikshit, Dhawal Shrivastava2, Abhijeet Gorey3, Ashish Gupta4, Parag Parandkar5and Sumant Katiyal6 “Energy Harvesting via Piezoelectricity”.
[7]. Syed Faizan-ul-Haq Gilani1, Syed Ihtsham-ul-Haq Gilani2, Zuhairi Baharudin1 andRosdiazli Ibrahim1 “Development of Energy Harvesting System Using Rotation Mechanism of aRevolving Door” 1Electrical and Electronic Engineering Department, University Technology PETRONAS, Bandar Seri Islander, Trenah, Malaysia 2Mechanical Engineering Department,University TechnologyPETRONAS, Bandar Seri Islander, Trenah, Malaysia.
[8]. Rahul S. Chavan1, Manoj Dhawde2 “Review on Performance and Analysis of Thermoelectric Cooling in Various Applications” Department of Mechanical Engineering Lokmanya Tilak College OF Engineering, Navi Mumbai M.S. (India)
[9]. Vijay Devabhaktuni, MansoorAlam,SomaShekaraSreenadh Reddy Depuru, Robert C. GreenII, Douglas Nims, Craig Near, “Solar energy: Trends and enabling technologies,”Renewable andSustainable Energy Reviews 19 (2013) 555–564.
[10]. Y C Shu1 and I C Lien “Analysis of power output for piezoelectric energy harvesting systems” Institute of Applied Mechanics, National Taiwan University, Taipei 106, Taiwan, Republic of China.
[11]. Miguel Romero, Rafael Lemuz, Irene O. Ayaquica- Mart´ınez, Griselda Saldana-Gonz'alez, “A Calibration Algorithm for Solar Tracking System”, 10th Mexican InternationalConference on Artificial Intelligence, IEEE 2011.
[12]. Bisoyi B, Das B. Adapting Green Technology for Optimal Deployment of RenewableEnergy Resources and to Generate Power for Future Sustainability. Indian Journal of Scienceand Technology.2015; 8(28).