

Energy Harvesting By Using Various Non-Conventional Energy Sources

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Abstract - This paper implements an efficient way to power generation system, using solar power, wind power and also Piezo material. This sources which makes use of wind, solar and Piezo energy for rural electrification. Wind and solar energy are the renewable energy sources which are easily available in atmosphere. The project makes use of renewable energy sources which stored in battery and this energy which is to be used in electrical appliances.

Keywords— Solar panel, wind, piezo, battery, inverter

1. INTRODUCTION

As electricity become a vital part of human society. Day by day as increased in population of world the demand of electricity is also going to increase the proportionality. To meet this increasing demand we have to alternative solution for the electricity generation. There is one way of electricity generation which is by using Piezoelectric material. Until now Piezo electric material are used only as a sensor or transducer in various measurement because its lower output. But now it can be used as energy source for domestic as well as industrial application.

In our project we have utilized normally wasted mechanical energy by using this piezoelectric material. We tried to make a complete package device which is ecofriendly and utilized solar, wind and piezoelectricity for harvesting of energy. The wind energy obtained is stored in a battery. The battery supply is fed to pulse generator and in turn to a Inverter which is capable of generating ON/OFF pulses of different frequencies. This is fed to a step up transformer to generate a low voltage AC. This AC is fed to switch ON/OFF the electrical appliances.

2. LITERATURE SURVEY

A. A hybrid piezoelectric- solar based power generation system

This paper implement an efficient way to power generation system, using solar power and Piezo power. Solar energy system is used to collect maximum power from sun. The idea is to use the solar panel more efficiently and to carry out realistic experimental approaches to enhance the solar output power to a significant level. Piezoelectric based energy harvesting technology is applied to generate electricity found mechanical stress. The goal of this experiment is to investigate whether

piezoelectricity would be able to provide sufficient sources of voltage to charge configuration allows the two sources to supply the load separately or simultaneously depending on the availability of the energy sources. This project implements an efficient way to electrify or generate electricity using solar power and piezoelectric plates.

B. Solar PV- Wind hybrid generation system

Renewable energy sources that are energy generated from solar, wind, hydro power, geothermal and ocean resources are considered as a technological option for generating clean energy. But the energy generated from solar and wind is much less than the production by fossil fuels as compared to electricity generation by utilizing PV cells and wind turbine increased rapidly in recent years. This project presents the solar-wind hybrid power system that harnesses the renewable energies in sun and wind to generate electricity.

3. IMPLEMENTATION

Hybrid power generation using wind, Piezo, solar and mains

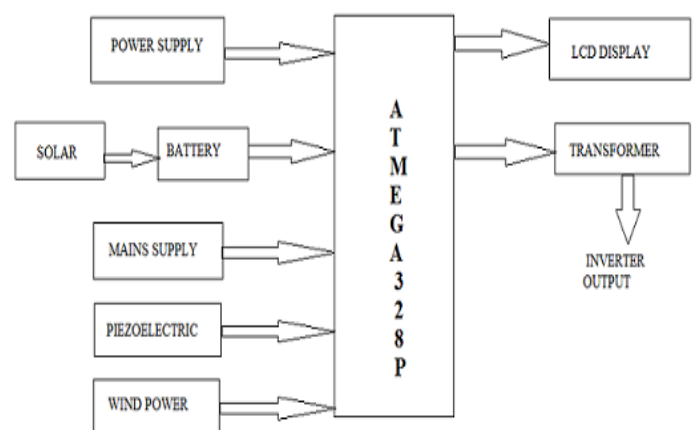


Fig. No. 1

From the above figure we can see that device which is able to perform the task is based on solar energy, wind energy, Piezo energy and mains supply. The alternating energy is used to turn ON/OFF electrical devices.

4. RELATED WORK

The system depending on the sun energy, wind energy, pressure applied to the Piezo plate. The hybrid energy (i.e., solar energy, wind energy, piezo energy) stored in a battery. The brief introduction in our project we discussed in below :

SOLAR PANEL

A solar cell or photovoltaic cell is a device that converts solar energy into electricity by the photovoltaic effect. Sometimes the term solar cell is reserved for devices intended specifically to capture energy from sunlight, while the term photovoltaic cell is used when the source is unspecified. Assemblies of cells are used to make solar panel, solar modules, or photovoltaic arrays. Photovoltaic is the field of technology and research related to the application of solar cells for solar energy.



Solar cells can also be applied to other electronics devices to make it self-power sustainable in the sun. There are solar cell phone chargers, solar bike light and solar camping lanterns that people can adopt for daily use.

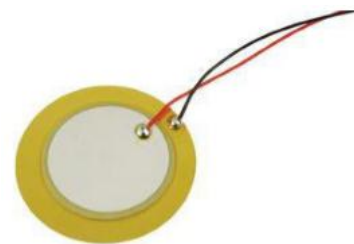
WIND TURBINE

A wind turbine is a device that converts kinetic energy from the wind, also called wind energy, into mechanical energy; a process known as wind power. If the mechanical energy is used to produce electricity, the device may be called a wind turbine or wind power plant. If the mechanical energy is used to drive machinery, such as for grinding grain or pumping water, the device is called a windmill or wind pump. Similarly, it may be referred to as a wind charger when used for charging batteries.



PIEZO PLATE

A piezoelectric sensor is a device that uses the piezoelectric



effect, to measure changes in pressure, acceleration, temperature, strain, or force by converting them to an electrical charge. Squeeze certain crystals (such as quartz) and you can make electricity flow through them. Piezoelectricity (also called the piezoelectric effect) is the appearance of an electrical potential (a voltage, in other words) across the sides of a crystal when you subject it to mechanical stress (by squeezing it).

BATTERY

A rechargeable battery, storage battery, or accumulator is a type of electrical battery. It comprises one or more electrochemical cells, and is a type of energy accumulator. It is known as a secondary cell because its electrochemical reactions are electrically reversible. Rechargeable batteries come in many different shapes and sizes, ranging from button cells to megawatt systems connected to stabilize an electrical distribution network. Several different combinations of chemicals are commonly used, including: lead acid, nickel cadmium (NiCd), nickel metal hydride (NiMH), lithium ion (Li-ion), and lithium ion polymer (Li-ion polymer).



5. RESULT

Sr. No.	Input Energy Source	Theoretical Values		Practical Values	
		V	I	V	I
1.	Piezo module	14.4V	600mA	9.16V	450mA
2.	Solar PV panel	18V	1.12A	18V	8mA
3.	DC wind generator	12V	0.5A	5.5V	0.5A

6. CONCLUSION

From this Project we conclude that we can use piezoelectric material as an electricity generator rather than only as a sensor. We can also use Solar and Wind power system with combination of piezoelectric system to increase reliability of system. This Project can be implemented on large scale to achieve greater energy output. If piezoelectric material is manufacture in large plates the output can be increased with proportional to pressure. It requires investment in this eld.

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