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## POWER GENERATION USING NON-CONVENTIONAL ENERGY SOURCES

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**Abstract-** This new generation needs lots of electrical power for their different operations. Due to this many sources are wasted and exhausted in a large amount. There are various ways to generate electricity. The human waste foot energy is being used to produce electricity by using piezoelectric sensor this would be a great evolution in electricity generation. When we walk then some of energy is wasted in the form of vibrations we can convert this energy or vibrations into energy using piezoelectric crystals. The use of piezoelectric crystal is to produce the electric output from surrounding vibrations. Piezoelectricity refers to the ability of some materials to generate an electric potential in response to applied pressure. Embedded piezoelectric crystals provide the ability to convert the human walking energy into the electric current due to the exerted pressure. Solar energy to produce electricity is not the same as using solar to produce heat. Solar thermal principles are applied to produce hot air. Using both of non-conventional energy sources we can generate the energy.

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**Keywords-** Piezoelectric sensor, Solar panel, LDR, Microcontroller, LCD module

### I. INTRODUCTION

India is fast growing country in the world. In recent years the electricity demand in India is increasing rapidly because of fast growing industry. 1.4 billion still has no access to electricity (87% of whom live in the rural areas) and 1 billion that only has access to unreliable electricity networks. We need smart and practical approaches because energy, as a driver of development, plays a central role in both fighting poverty and addressing climate change. The government of India's make in India campaign will introduce more industry in India then there will be acute demand for more and more reliable power supplies. The energy sources in India is mainly Coal(56.65%), hydro(19.13%), Gas(9.2%), Nuclear(2.32%), Oil(0.58%) and other renewable sources(12.9%). From all above the renewable energy sources are free and can be easily utilize to have more energy. The existing system has several disadvantages like solar energy and piezoelectric energy that are being in the system as an energy source can supply the load only for a particular period of time. A major drawback of the existing system is the charging of energy from the solar and piezoelectric is not always available.

### II. LITERATURE SURVEY

This new generation needs lots of electrical power for their different multiple operations. Due to this many sources are wasted and exhausted in a large amount. There are various ways to generate electricity. The human waste foot energy is being use to produce electricity this would be a great evolution in electricity generation. The average human can take 3,000 - 5,000 steps a day. Similarly, solar energy is present throughout the day but the solar irradiation levels vary due to sun intensity and unpredictable shadows cast by clouds, birds, trees, etc. The common inherent drawback of vibration and photovoltaic systems are their intermittent natures that make them unreliable Solar energy is the viable source of renewable energy over the last two-three decades. It is now used in variety of fields such as industries, domestic purpose. Solar energy system is designed to collect maximum power from sun and to convert into electrical power.

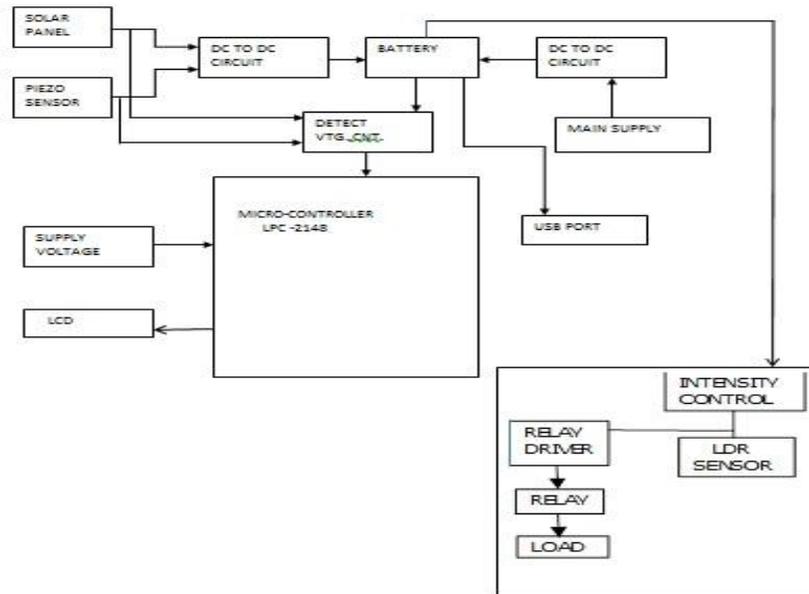
When a source is unavailable or insufficient in meeting the load demands, the other energy source can compensate for the difference by combining these two intermittent sources. When we walk then some of energy is wasted in the form of vibrations we can convert this energy or vibrations into energy using piezoelectric crystals. The use of piezoelectric crystal is to produce the electric output from surrounding vibrations. These materials have the ability to absorb mechanical energy from their surroundings, usually ambient vibration and transform it into electrical energy that can be used to power other devices.

### III. OBJECTIVE

The principle objective of this project is to utilize energy in home by monitoring different conditions using different sensor as well as calculate the generated energy using renewable energy sources. Then calculate the total energy consumes and expends will lead to energy budget. It's a very easy way to save energy and cost in your home. Energy budget system

helps you easily, comfortably control your heating, ventilation, and air conditioning systems as well as lights, blinds, and many other devices around your home with generation of energy as well. For you, that can mean up to 30% less heating energy used and lower CO<sub>2</sub> emissions for your home. The innovative system design not only makes it especially simple automate room conditions, but also harmoniously blends in into environmentally surroundings, even into exclusive interiors. An energy budget will lead to balance sheet which calculates your energy expenditure against energy generated means to reduce your energy bill.

#### IV. BLOCK DIAGRAM AND DESCRIPTION



**Figure 1. Block Diagram**

#### 4.1 Description of blocks:

##### A. ARM7 Microcontroller

The LPC2141/42/44/46/48 microcontrollers are based on a 16-bit/32-bit ARM7TDMI-CPU with real-time emulation and embedded trace support, that combine microcontroller with embedded high speed flash memory ranging from 32 kB to 512 kB. A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at the maximum clock rate. For critical code size applications, the alternative 16-bit Thumb mode reduces code by more than 30 % with minimal performance penalty. Serial communications interfaces ranging from a USB 2.0 Full-speed device, multiple UARTs, SPI, SSP to I2C-bus and on-chip SRAM of 8 kB up to 40 kB, . Various 32-bit timers, single or dual 10-bit ADC(s), 10-bit DAC, PWM channels and 45 fast GPIO lines with up to nine edge or level sensitive external interrupt pins make these microcontrollers suitable for industrial control and medical systems.

- Single power supply chip with POR and BOD circuits: CPU operating voltage range of 3.0 V to 3.6 V (3.3 V ±10 %) with 5 V tolerant I/O
- ARM has 37 registers all of which are 32-bits long. 1 dedicated program counter
- 1 dedicated current program status register
- 5 dedicated saved program status registers
- 30 general purpose registers

- The current processor mode governs which of several banks is accessible. Each mode can access a particular set of r0-r12 registers a particular r13 (the stack pointer, sp) and r14 (the link register, lr) the program counter, r15 (pc) the current program status register, cpsr

### B. Piezoelectric sensor:

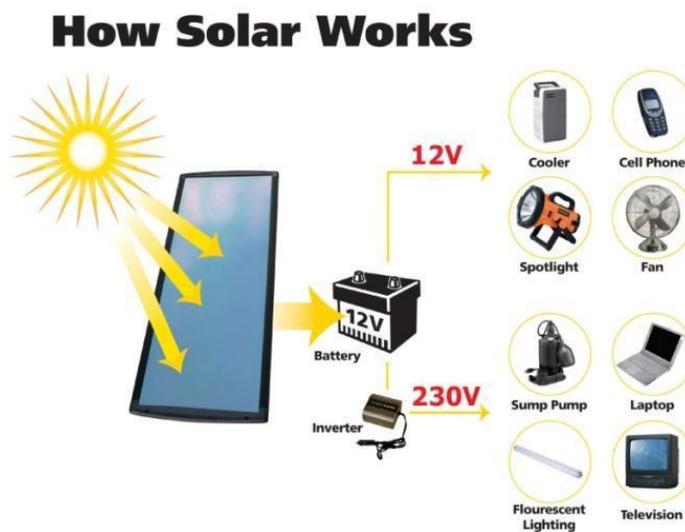
A piezoelectric sensor is a device that uses the piezoelectric effect to measure changes in pressure, acceleration, temperature, strain or force by converting them to an electrical charge. Two main groups of materials are used for piezoelectric sensors: piezoelectric ceramics and single crystal materials. The ceramic materials (such as PZT ceramic) have a piezoelectric constant/sensitivity that is roughly two orders of magnitude higher than those of the natural single crystal materials and can be produced by an expensive sintering process.



**Figure 2. Piezoelectric Sensor**

### C. Solar Panel:-

Components used to provide solar power: The four primary components for producing electricity using solar power, which provides common 110-120 volt AC power for daily use are: Solar panels, charge controller, battery and inverter. Solar panels charge the battery, and the charge regulator insures proper charging of the battery. The battery provides DC voltage to the inverter, and the inverter converts the DC voltage to normal AC voltage. If 220- 240 volts AC is needed, then either a transformer is added or two identical inverters are series-stacked to produce the 240 volts.





**Figure 3. Solar Panel**

**D. Light Dependent Resistor :**

A light dependent resistor also know as a LDR, photo resistor, photoconductor a resistor whose resistance increases or decreases depending on the amount of light intensity. LDRs (Light Dependent Resistors) are a very useful tool in a light/dark circuits. A LDRs can have a variety of resistance and functions. For example it can be used to turn on a light when the LDR is in darkness or to turn on a light when the LDR is in light. It can also work the other way around so when the LDR is in light it turns on the circuit and when it's in darkness the resistance increase and disrupts the circuit.

**How it Works**

The reason they have a high resistance is that are very few electrons that are free and able to move because they are held in a crystal lattice and are unable to move. When light falls on the semi conductive material it absorbs the light photons and the energy is transferred to the electrons, which allow them to break free from the crystal lattice and conduct electricity and lower the resistance of the LDR.

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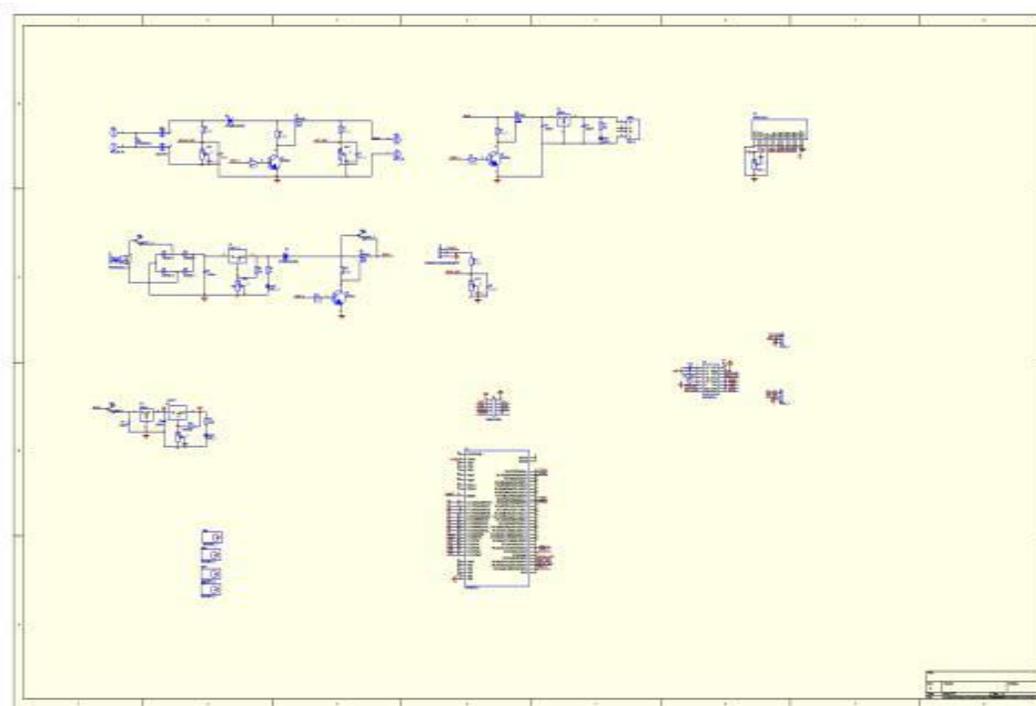


**Figure 4. LDR**

#### **E.DC to DC CIRCUIT:**

A buck converter is a voltage step down and current step up converter the simplest way to reduce the voltage of dc supply is to use linear regulator(such as 7805),but linear regulators waste energy as they operate by dissipating excess power as heat. buck converters, on the other hand can be remarkably efficient (95% or higher for integrated circuits),making them useful for task such as converting the main basic operation of the buck converter has current in an inductor controlled by to switches (usually transistor and a diode). In the idealized converter all the components are consider to be perfect .

#### **V. CIRCUIT DIAGRAM**



**Figure 5:Circuit Diagram**

The Battery will be charge from available source either solar panel or Piezoelectric. If both are not available then we use the emerging charging circuit. From Battery there are two outputs one is for USB port and other is go for LED tube through microcontroller. LCD is use for show the status of Battery. There are three ADC ,one is for solar panel, second is for piezoelectric sensor, third is for battery. LDR is use for ON/OFF the LED tube by using relay driver circuitry. From one piezo sensor we get 2 to 4 voltage it is very less as compared to solar so we use the array of piezo sensor (2\*2) so we get 11 to 18 voltages from piezo array. Solar give 18v that we give to battery through

DC to DC charger circuit because battery is 12v,7.25A so it step down to 14v. If both non conventional energy sources are not available then we use home supply it is 230v so we use the DC to DC charger circuit to step down to voltage. The output voltage of solar panel, piezoelectric sensor and battery is detect the current and voltage on AD0 to AD2 pin of LPC2148 micro controller and display the current and voltage of battery on LCD display which is 16\*4 through microcontroller. LED tube is ON/OFF through LDR sensor ,and other output is USB port for mobile charging or other application.

## VI. FLOW CHART

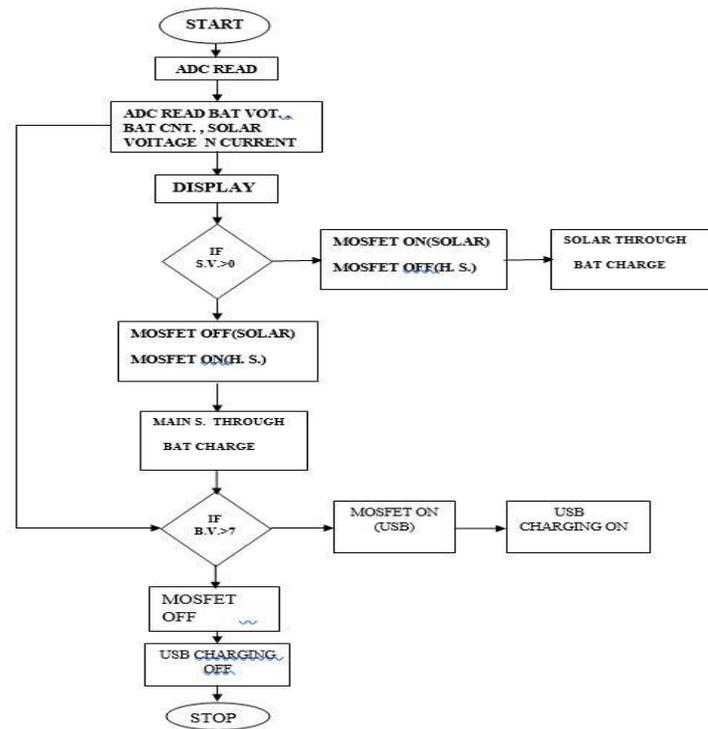


Figure 6. Circuit Diagram

## VII. SOFTWARE USED

- 1)Microvision Kill.5
- 2)Flash Magic
- 3)Protel
- 4)Proteus.

## VIII. TEST AND RESULT



## **IX. CONCLUSION**

The project “POWER GENERATION USING NON CONVENTIONAL ENERGY SOURCES” is successfully tested and implemented which is the best economical, affordable energy solution to common people. This can be used for many applications in rural areas where power availability is less or totally absence. As India is a developing country where energy management is a big challenge for huge population. By using this project we can drive both A.C. as well as D.C loads according to the force we applied on the piezoelectric sensor.

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