Energy Management for Large Society by using Renewable Energy

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Abstract: *The world is fast becoming a global village due to the increasing daily requirement of energy by all population across the world while the earth in its form cannot change. The need for energy and its related services to satisfy human social and economic development, welfare and health is increasing. Returning to renewables to help mitigate climate change is an excellent approach which needs to be sustainable in order to meet energy demand of future generations. The study reviewed the opportunities associated with renewable energy sources which includes: Energy Security, Energy Access, Social and Economic development, Climate Change Mitigation, and reduction of environmental and health impacts. Despite these opportunities, there are challenges that hinder the sustainability of renewable energy sources towards climate change mitigation. These challenges include Market failures, lack of information, access to raw materials for future renewable resource deployment, and our daily carbon footprint. The study suggested some measures and policy recommendations which when considered would help achieve the goal of renewable energy thus to reduce emissions, mitigate climate change and provide a clean environment as well as clean energy for all and future generations.*

Keywords: Energy Conservation, Solar Based, Useful For Agriculture, Finding Renewable Resources

I. INTRODUCTION

For very long time power outage, power interrupt and also unexpected routine of power line maintenance is of the major problem faced in industries, hospitals, office and residential areas whole over the world. For that case, this project provides an automatic operation of electrical power distribution system; the rapid and reliable transfer of the system from one power source to another during specific event such as power outage, power interrupt, routine power line maintenance to achieve the reliability of such system. And also sudden fluctuation in voltage is very big and serious problem in industries and home appliances and it causes losses in electrical circuits. These losses causes low power factor in the supply and by much amount of power is going to be wasted. These fluctuations may significantly impact the power quality as well as the reliability of other voltage controlling devices. Therefore due to this fluctuation; much costly & precious equipment may get damaged. To avoid all over problems we design system for under over voltage protection, auto power switch between mains and solar power inverter. Also include energy generation for solar power, smart security system using presence detector and 3phase breakdown management. Here we are using different sensors like voltage sensor, current sensor, PIR and LDR sensor, fire sensor to give input to microcontroller. In this project we will use PIC 18f4520 microcontroller. All parameter will display on LCD display. To control switching between power sources as well as light, sprinkler, load we will use different relays.The process of this system is whenever there an overvoltage or under voltage or absence of any phase the relay sense the input from voltage and current sensor and gets trip and the load is off. Thus it protects the electrical appliance.

II. LITERATURE REVIEW

Now day's high quality power is basic need of highly automated industries and home appliances. So this high quality power may be got by the help of this circuit and it will improve the power factor and thus power can be fully utilized. In this way, we can remove over and under voltage problems as well as absence of any phase and get benefited. Protection against sudden over voltage's n substations is a vital part of the overall reliability of power systems. The protection from overvoltage is mainly necessary for Humans because the peoples are dead due to over voltage shock. The process of this system is whenever there an overvoltage or under voltage the relay sense the input from operational amplifier and gets trip and the load is off. Thus it protects the electrical appliance. The objective of this system is to provide protection to the equipment's and avoid their failure due to abnormal conditions like under/over voltage, absence of any phase. This system provides protection for industrial, commercial and residential equipment's. Energy generation from renewable energy source like solar power. Auto transfer switch between mains and generator. Smart security system by present detect sensor like PIR motion sensor. Smart street light using LDR sensor.

III. SYSTEM REVIEW

The solar power energy plays a major role for Generating Electricity. That is why we used pv panels for generating electricity from sun energy. solar panels are used as the medium for the conversion of energy into heat or electricity. the solar panels are made using semiconductor materials. the semiconductor materials used in the solar cells are silicon where the sunlight strikes the surface of cell and gets absorbed. and These electricity we save in Power Bank. because of environmental changes. If our Power bank is also dead and sun is not providing the energy because of cloud then we have also the backup solution of these problem we use three phase supply of our home. We use these energy to operate different home appliances and as well as use in the farming also. below block diagram shows operation of this project.
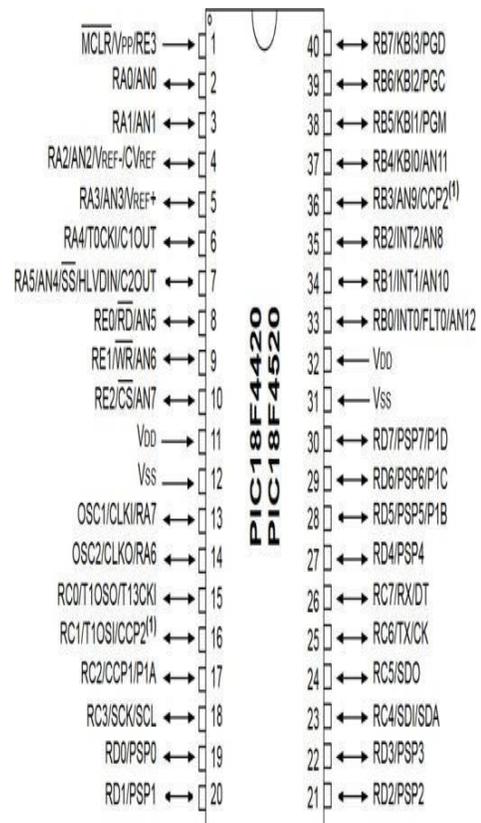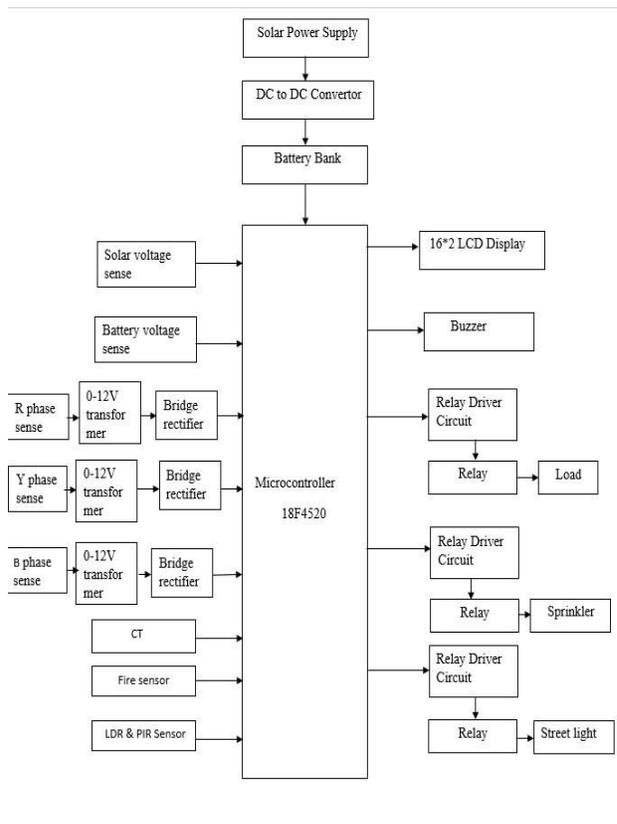
3.1 PIC 18f4520 Microcontroller

PIC18F4520 is a low-cost, low-power, high-speed 8-bit, fully- static Microcontroller unit that has 40 pins out of which 36 pins can be used as I/O pins. It has Power-on-Reset (POR) as well as the Extended Watchdog Timer (WDT) circuitry, which can be programmed for 4ms to 131s. It has Power Management Features, which is useful for low-power applications. It has 3 power management modes. 1) RUN mode 2) SLEEP mode 3) IDLE mode. PIC18F4520 also comes with 3 programmable external interrupts & 4 Interrupts-On-Change (IOC) pins, which are reliable features for interrupts related applications. Also, the system has a 13-channel 10-bit ADC converter module.It has a wide operating voltage range, from 2V to 5.5V., Thus it can be used in 3.3V or 5.0V logic level operations. The below image is showing the detailed pin diagram of the PIC18F4520.

3.2 Current Transformer

Current transformer is the same as that of the power transformer. Like the power transformer, the current transformer also contains a primary and a secondary winding. Whenever an alternating current flows through the primary winding, alternating magnetic flux is produced, which then induces alternating current in the secondary winding. In the case of current transformers, the load impedance or "burden" is very small. Therefore the current transformer operates under short circuit conditions. Also the current in the secondary winding does not depend on load impedance but instead depends on the current flowing in the primary winding. The current transformer basically consists of an iron core upon which primary and secondary windings are wound. The primary winding of the transformer is connected in series with the load and carries the actual current flowing to the load, while the secondary winding is connected to a measuring device or a relay. The number of secondary turns is proportional to the current flowing through the primary; i.e., the larger the magnitude of current flowing through the primary, more the number of secondary turns.

3.3 Fire Sensor

Flame sensor is the most sensitive to ordinary light that is why its reaction is generally used as flame alarm purposes. This module can detect flame or wavelength in 760 nm to 1100 nm range of light source. Small plate output interface can and single-chip can be directly connected to the microcomputer IO port. The sensor and flame should keep a certain distance to avoid high temperature damage to the sensor. The shortest test distance is 80 cm, if the flame is bigger, test it with farther distance. The detection angle is 60 degrees so the flame spectrum is especially sensitive. The detection angle is 60 degrees so the flame spectrum is especially sensitive.

3.4 PIR Sensor

The PIR sensor itself has two slots in it, each slot is made of a special material that is sensitive to IR. The lens used here is not really doing much and so we see that the two slots can 'see' out past some distance (basically the sensitivity of the sensor). When the sensor is idle, both slots detect the same amount of IR, the ambient amount radiated from the room or walls or outdoors. When a warm body like a human or animal passes by, it first intercepts one half of the PIR sensor, which causes a positive differential change between the two halves. When the warm body leaves the sensing area, the

Impact Factor: 6.252

reverse happens, whereby the sensor generates a negative differential change. These change pulses are what is detected. The blocking time potentiometer is also provided on-board to set the blocking time during which the sensor does not respond to any change in motion. The minimum blocking time that can be set is seconds and maximum of 10 seconds.

3.5 Relay

A relay is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism mechanically, but other operating principles are also used. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal. A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and most have double throw (changeover) switch contacts as shown in the diagram.

3.6 16*2 LCD Display

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD. Click to learn more about internal structure of a LCD.
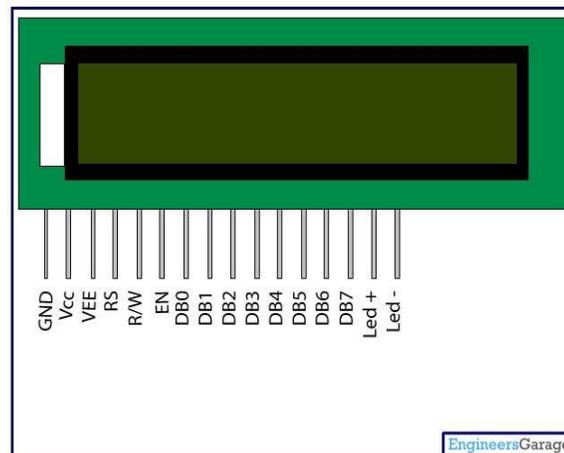
3.7 Software
A. PCB Wizard

PCB Wizard 3 is a powerful package for designing single-sided and double-sided printed circuit boards (PCBs).It provides a comprehensive range of tools covering all the traditional steps in PCB production, including schematic

drawing, schematic capture, component placement, automatic routing, Bill of Materials reporting and file generation for manufacturing. In addition, PCB Wizard 3 offers a wealth of clever new features that do away with the steep learning curve normally associated with PCB packages.

B. Protel ES955

Most designs today are built on Printed Circuit Boards (PCBs), which consist of multiple layers of electrical copper and insulating material sandwiched together. Several Electronic Design Applications (EDA) exist to both create schematics of a circuit and transfer them to a working PCB layout. At the University of Florida, we have access to Protel 99SE for these functions. The resulting PCB design can then be sent to a company for a professional board with silkscreens, multiple layers, etc. MIL also has the ability, through a T-Tech Quick Circuit, to make single and double sided circuit boards PCBs out of copper-plated sheets of *insulating material*. The latter process is unable to make complicated designs, but it both quick and cheap. This tutorial covers the creation of a sample design using Protel 99SE, and its preparation to be milled out by the T-Tech.

C. Embedded C

Embedded C is a set of language extensions for the C Programming language by the C Standards committee to address commonality issues that exist between C extensions for different embedded systems. Historically, embedded C programming requires nonstandard extensions to the C language in order to support exotic features such as fixed- point arithmetic, multiple distinct memory banks, and basic I/O operations. Embedded C uses most of the syntax and semantics of standard C, e.g., main() function, variable definition, datatype declaration, conditional statements (if, switch, case), loops (while, for), functions, arrays and strings, structures and union, bit operations, macros, etc.

IV. FUTURE SCOPE

Now day's high quality power is basic need of highly automated industries and home appliances. So this high quality power may be got by the help of this circuit and it will improve the power factor and thus power can be fully utilized. In this way, we can remove over and under voltage problems as well as absence of any phase and get benefited. Protection against sudden over voltage's n substations is a vital part of the overall reliability of power systems.

V. CONCLUSION

Degrading entire ecosystems and drastically violating natural balance, man also conditions the immediate future of mankind, and thus the existing social relationships. First of all, this requires a change of the frame of mind, and then the rooted habits, which is the most difficult part of the policy of changing. Reprogramming, for nature harmful habits requires time, knowledge and continuity, but it is certainly the direction in which man-kind must and should move. A modern man must not live in the belief that the riches of nature are inexhaustible and that he can in that nature carry out activities, regardless of the consequences that result from such behaviour. growing need of mankind for energy is a trend that will not change the direction or intensity of today's development. shortage of that same energy would cause cataclysmic changes in the present way of life and in general survival and it is quite certain that from all the crises that could befall humanity, the scariest would be the energy crisis. It would be, on the basis of the existing knowledge of the functioning of the world and the world economy, a crisis that would in catastrophic proportions simultaneously accompany hunger, cold, darkness, trace cessation, suspension of industrial production, etc. Sustainable use of energy and other resources of the population and economy imply improving their efficiency, saving and using clean Renewable energy sources and other resources. In that sense, the implementation of "clean" energy and the use of renewable sources is an important step that should be taken by all important industries because this reduces the emissions of harmful substances into the environment.

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