

# A Novel Method of Energy Stored Management System using IOT

**J. Jayakumar<sup>1</sup>, P.Muthamizhi<sup>2</sup>, D.Krishnakumar<sup>3</sup>, S.Sanjai<sup>4</sup>**

Assistant Professor, Department of Electrical and Electronics Engineering,

Krishnasamy College of Engineering and Technology, Cuddalore, Tamil Nadu, India<sup>1</sup>

U.G. Student, Department of Electrical and Electronics Engineering,

Krishnasamy College of Engineering and Technology, Cuddalore, Tamil Nadu, India<sup>2-4</sup>

**Abstract:** In this paper, authors have focused on controlling of hybrid energy system using IOT. There is various combination of energy and all of them are alternative to each other like solar energy, wind energy, bio fuel, fuel cell, etc. But the need of controlling of hybrid energy system arises when it is installed for domestic and commercial purpose. At this point IOT plays an important role in controlling system. The main criteria being switching between the two source of energy i.e. solar and wind energy without any inconvenience through a website using ESP8266 Wi-Fi module. The data is transmitted wireless through website to module which controls the source of energy. The Transmitted data is controlled remotely using IOT. This enable user to have flexible control mechanism remotely through a secured internet web connection.

**Keywords:** IOT kit, Solar Panel, Wind Turbines. PIC microcontroller

## I.INTRODUCTION

Energy is the basic need for development and the requirement of energy is more due to the rapid increase in world population technology and other political and economic condition. Now-a-days electrical energy is generated by the conventional energy resources like coal, diesel, and nuclear etc. So, there is an urgent need to switch on to non-conventional energy resources. Solar and Wind are easily available in all condition can be good alternative source. With the rise in the demand of renewable energy resources the need of better utilization of these systems has aroused. This in turn has given rise to the hybrid energy system. Hybrid energy system is the combination of the two or more energy system. Two sources are used in solar and wind energy. In order to control the hybrid system IOT can be used. IOT (Internet of Things) is the inter-networking of physical devices embedded with electrons, software, sensors and network connectivity that enable objects to control and exchange data. IOT is used to switch the power supply i.e., Wind energy and solar energy of a house through secure website when the grid supply is off. A prototype is designed to control the switching between these two sources of energy.

## SOLAR-WIND HYBRID ENERGY SYSTEMS

Energy resources are classified into two ways:

**Non-renewable Energy:** Resources which are limited in quantity and can be depleted after few years. Example-petroleum, Natural gas, coal etc.

**Renewable Energy:** Resources which are abundantly available in nature. Example -Solar Energy, Wind Energy, Tidal Energy, etc.

### A. Solar PV cell

Photovoltaic cell absorbs light energy from the sun and converts it into electricity by the photovoltaic effect. Lots of modules are used to make wafer-based crystalline silicon cells or Thin-film cell. The load contained number of modules that can either be upper layer or the lower layer. It must be shielded from mechanical harm and humidity.

### B. Wind Mill

A wind Mill is a machine that converts the wind energy into rotational energy with support of venes called blades. Wind Turbines are the evaluation of the typical wind Mills that can be observe in more rural areas of the world. Their purpose is to lessen reliance on fossil fuels to create energy and also to create energy in a less wasteful manner.

**II.PROJECT HARDWARE OVERVIE****RELAY:**

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid state relays. Relays are used where it is necessary to control a circuit by a separate low power signal, or where several circuits must be controlled by one signal.



Figure 1. Relay

**GSM MODULE**

GSM Modem can accept any GSM network operator SIM and it can act just like a mobile phone with its own unique Phone number the necessity to use this is it can use RS-232 protocol which can be easily connected to the controller. It can be used like a phone where it can send and receive SMS and make a call. The GSM modem is connected to the controller through RS-232. The SMS is sent through the terminal to the number using AT commands. "AT-Attention" Commands which is used by the controller to control the GSM to perform the desired function.



Figure 2: GSM Module

**BLUETOOTH MODULE HC-05**

HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. The HC05 Bluetooth Module can be used in a Master or Slave configuration, making it a great solution for wireless communication. This serial port Bluetooth module is fully qualified Bluetooth V2.0 +EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and base band. It uses CSR Blue core 04-External single chip Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature).



Figure 3: Blue tooth Module HC-05

**16x2 LCD MODULES**

Liquid crystal displays (LCDs) have materials which combine the properties of both liquids and crystals. Rather than having a melting point, they have a temperature range within which the molecules are almost as mobile as they would be in a liquid, but are grouped together in an ordered form similar to a crystal. An LCD consists of two glass panels, with

the liquid crystal materials and witted in between them. The inner surface of the glass plates is coated with transparent electrodes which define the character, symbols or patterns to be displayed polymeric layers are present in between the electrodes and the liquid crystal, which makes the liquid crystal molecules to maintain a defined orientation angle. One each polarizer is pasted outside the two glass panels. These polarizers would rotate the light rays passing through them to a definite angle, in a particular direction.

### VOLTAGE SENSOR

A voltage sensor is a used to calculate and monitor the amount of voltage inobject voltage sensor can determine both the AC voltage and DC voltage level. The Input of the sensor can be voltage output is the switched, calculate voltage signal, a current signal an analog signal

### CURRENT SENSOR

A current sensor is a device that defect electric current in a wire and generates a signal proportion to that current. The generator signal could be analog voltage or current or even digital output. The generated signals can be then used to display the measured current in an ammeter can be stored for further analysis in a data.

## III.PROJECT SOFTWARE OVERVIEW

### EMBEDDED SYSTEM

An embedded system is a system that has embedded software and computer-hardware which makes it a system dedicated for an application or specific part of application or product or a part of a larger system. An embedded system is a system that has three main components embedded into it

It embedded hardware similar to a computer

It embedded main application software

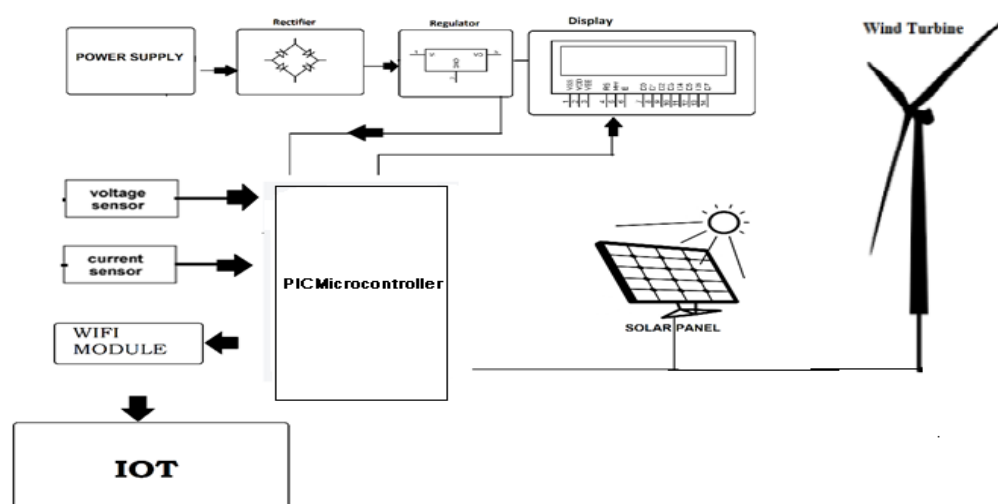
It embedded a real-time operating system

### KEIL C

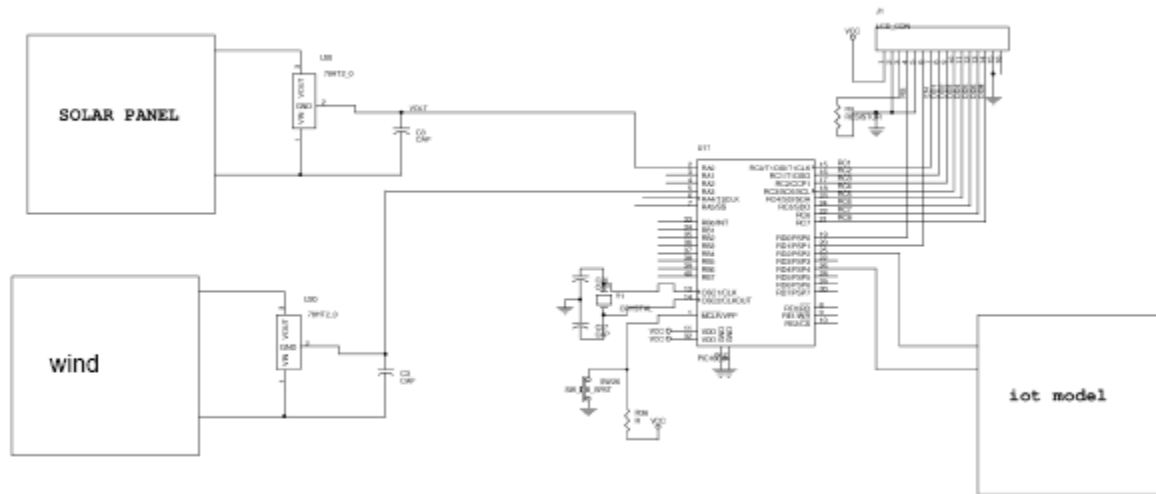
The C programming language is a general-purpose, programming language that provides code efficiency elements of structured programming, and a rich set of operators. C is not a big language and is not designed for anyone particular area of application. Its generality combined with its absence of restrictions, makes C a convenient and effective programming solution for a wide variety of software tasks. Many applications can be solved more easily and efficiently with C than with other more specialized languages. The Cx51 Optimizing C Compiler is a complete implementation of the American National Standards Institute (ANSI) standard for the C language. Cx51 is not a universal C compiler adapted for the 8051target. It is a ground-up implementation dedicated to generating extremely fast and compact code for the 8051 microprocessor. Cx51 provides you the flexibility of programming in C and the code efficiency and speed of assembly language. The C language on its own is not capable of performing operations that would normally require intervention from the operating system. Because these functions are separate from the language itself is especially suited for producing code that is portable across a wide number of platforms. Since Cx51 is across compiler, some aspects of programming language and standard libraries are altered or enhanced to address the peculiarities of an embedded target processor.

## IV. CIRCUIT DIAGRAM AND CONNECTIONS

### BLOCK DIAGRAM



**CIRCUIT DIAGRAM**



**WORKING PRINCIPLE**

When the data received from SPU the connection between GPRS and PIC16F877A microcontroller are initialized. After initializing GPRS now the data are collected from SPU and stored in temporary buffers. When all the parameter received from the SPU, then microcontroller starts to transmit the data to a GPRS module serially. Now the GPRS Module will host the data in cloud server in specified time interval. Thus, the GPRS modem has hosted all the parameter in the web page via internet. In webpage received data are stores in a My SQL database which runs the cloud server with the help of server-side scripting language. Then the stored data in the database are processed and manipulated with help of Java script. Finally, the parameters are displayed in a user end webpage. After the successful connection to the server for monitoring the parameters of SPU

**V. CONCLUSION**

This combination of solar-wind energy source will be highly effective in commercial areas. It is eco-friendly at the same time prevents accidents due to lightening. It is used to cut short power charge. By this system electricity charge could be saved as very less maintenance charge is required for equipment. Moreover there is no power cut or load shedding at any times. In addition to this, the system is controlled by INTERNET OF THINGS as site manager is able to received a detailed information of facility at site, efficient maintenance for regular check up and failure could be performed conveniently. It is the most reliable and cost efficient. This research is at an under developed stage and may take years to bring it into market. We encourage the scientific community to consider this technology along with others when contemplating efforts and resources for renewable energy.

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