

# Hybrid Energy Generation & Power Monitoring Over IoT

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**Abstract**— Among the race in the countries of the world, Energy consumptions and power requirement is one of the most vital things in the world. Due to increase in the power consumption. Conventional energy resources depleting day by day. Owing to considering this and also issue of the global warming and pollution, important of the non-conventional energy resources is increasing. The principal objective of this project is rural electrification via hybrid system which includes wind and solar energy. Our intension is to design a wind turbine compact enough to be installed on roof tops. So, we decided to design a vertical axis wind turbine (VAWT) over horizontal axis wind turbine (HAWT). Advantages of VAWT over HAWT are compact for same electricity generation, less noise, easy for installation and maintenance and reacts to wind from all directions. The motto of the project is to produce the energy in an eco-friendly way by using renewable sources of energy and to gain maximum intensity with solar and vertical axis wind turbine for maximum power generation.

**Keywords:** Wind Turbine, Inverter, DC Generator, Charge Controller

## I. INTRODUCTION

This 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 resource like coal, diesel and nuclear etc. And these are depleting day by day. 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 system 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 systems. Here, two sources are used 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 device embedded with electronic ,software ,sensors and network connectivity that enable objects to collect 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. With the advancement in technology provide sensors, metering, transmission, Distribution, and flexibility to consumers of electricity, it can be possible to control the sources of energy of a house by this prototype.

Hybrid renewable energy sources can be used as standalone for supplying power to the load and or as grid-connected for supplying power to the load and selling power to the utility company .Because of the variable nature of the resources, sometimes, renewable systems are used in conjunction with storage systems .In general, standalone

systems require battery and advanced energy management strategies but grid connected systems do not require battery and advanced energy management strategies.

## II. METHODS & MATERIAL

### A. Solar Energy & Wind Energy

Solar energy is widely available throughout the world and can contribute to minimize the dependence on energy imports. In 90 minutes, enough sunlight strikes the earth to provide the entire planets energy need for one year .Solar PV entails no greenhouse gas (GHG) emissions during operation and does not emit other pollutants. Solar has many benefits like system – friendly deployment, improved operating strategies, like advanced renewable energy forecasting and enhanced scheduling of power plants and also investment in additional flexible resources, comprising demand-side resources ,electricity storage, grid infrastructure and flexible generation.

The internet of things (IOT) is a system of related computing devices, mechanical and digital machines, objects, people or animals that are provided with unique identifiers and also the potential to transfer data over a network without requiring human - to- human or human-to-computer interaction. Physical items are no longer disconnected from the virtual world, but can be controlled remotely through internet services. In fact – due to their diminishing size, constantly falling price and declining energy consumption processors, communications modules and other electronic components are being increasingly integrated into everyday objects today.

The monitoring is used to monitor the power with the help of the Wi-Fi-module .If any fault can occurs in the solar cell or wind turbines then they can give signal to the cloude and with the help of Wi-Fi module it can be display at LCD. Applications of the monitoring system are in the rooftop solar, Solar street lights. Consumer products like solar water heating systems; Solar home lighting systems; solar lanterns; solar pumps; solar mobile chargers; solar cookers ; LED solar torch; solar RO plant; solar fan, solar inverters etc. can be monitor through this project. Commercial products like solar traffic signals, solar road studs/blinkers and also be monitor through the proposed system. India, where frequent power cut is very common. Due to which it is important to use renewable energy and monitoring it.by monitoring the energy forecast, households and communication and consumption during good weather.

### B. Component

- 1) ATmega16
- 2) Potentiometer
- 3) LCD.
- 4) Solar Panel
- 5) Wind mill generator
- 6) MPPT charge controller.
- 7) Battery.

- 8) Wi-Fi module
- 9) Breakout board.
- 10) Relay module.
- 11) Copper clad.
- 12) Resistors.
- 13) Capacitor.

C. Advantages

- 1) Both solar as well as wind power generating systems can be established at the same place.
- 2) As the solar panels are mounted on tower of windmills, space occupies less.
- 3) Flexible to use.
- 4) Low maintenance compared to non-renewable energy power generation sources.
- 5) More efficient than a traditional solar or wind power project.
- 6) As sources of energy are renewable, it is environment friendly. Thus our motto of protecting and retaining the environment is served.

D. Application

- 1) Grid formation in village by using this hybrid system.
- 2) On the top of ship.
- 3) Village (On top of water tank).
- 4) Large scale billboards.
- 5) On highways for street lightning.
- 6) Near to railway track.

III. RESULTS & DISCUSSION

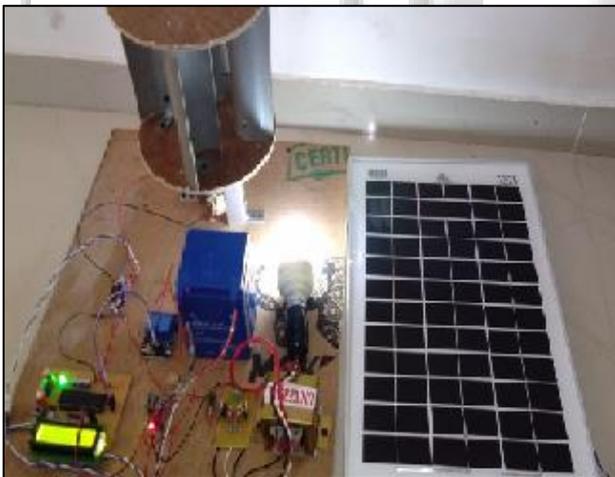


Fig. 1:

As we design savonius type with curved shape vertical axis wind turbine where the main rotor shaft is connect to wind turbine while the main components are located at the base of turbine. The air that passes through the blades of the wind turbine so the main shaft is rotate however generator shaft is also rotated through rotational momentu. The PMDC generator then converters rotational that is mechanical energy to the electrical energy. It maintains the 12V DC constant. We are using solar panel of 12V, 25W. From the solar panel, solar energy is given to the charge controller. Charge controller is fundamentally voltage or current controller to charge the battery which is connected to load.

The charge voltage could be kept at a best level while the time needed to completely charge the electric

storage devices is lessened. This permits the solar systems to work optimally constantly. By running higher voltage in the wires is diminished fundamentally.

The solar charge controllers can also control the reverse power flow. The charge controllers can distinguish when no power is originating from the solar panels and open the circuit separating the solar panels from the battery devices and halting there verse current flow. Output of the solar is connected to the battery via charge controller to the same battery and display shows the measured output of the solar panel.

A. Figures & Tables

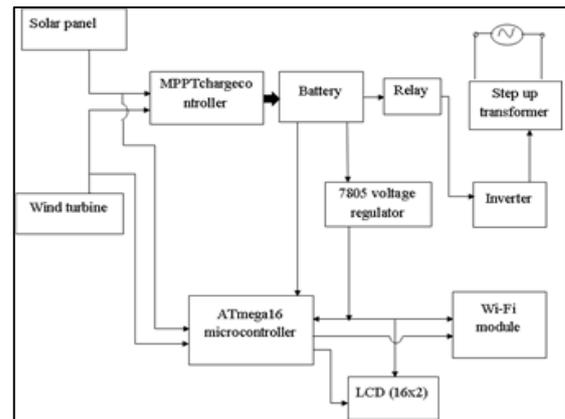


Fig. 2: Block Diagram of Hybrid Energy Generation & Power Monitoring Over IoT

IV. CONCLUSION

This Paper 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 or commercial purpose. At this point IOT plays an important role in controlling system. The main criteria being switching between the two sources of energy i.e. solar and wind energy without any inconvenience through a website using NODEMCU Wi-Fi module. The data is transmitted wirelessly through website to NODEMCU module which controls the sources of energy. The transmitted data is controlled remotely using IOT. This enables user to have flexible control mechanism remotely through a secured internet web connection. This system helps the user to control the sources of energy, manually and remotely using smart phone or personal computer. This system is very efficient, cheaper and flexible in operation.

REFERENCES

- [1] J.B.V.Subrahmanyam, P.K.Sahoo and Madhukar reddy, " Local PV-Wind hybrid systems development for supplying electricity to industry" Acta Electrotechnica, Vol.53, No.1, 2012, pp10-15.
- [2] N.Sivaramakrishna & Ramakrishna Reddy, " Hybrid Power Generation through combined solar – Wind power and modified solar panel" International Journal of Engineering Trends and Technology (IJETT) - Volume4 Issue5- May 2013, pp1414-1417.

- [3] Urban Eco-Greenergy™ Hybrid Wind-Solar Photovoltaic
- [4] Energy System and Its Applications, ' ' INTERNATIONAL JOURNAL OF PRECISION ENGINEERING AND MRANUFACTURING Vol. 16, No. 7, pp. 1263-1268.

