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Hybrid Power Generation and monitoring system using IoT

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ABSTRACT

The power of demand is always going to increase as today's technology is dependent on power. Thus it is very important to always look for Power Source with maximum gain. Using the Internet of Things(IoT) Technology for supervising Hybrid power generation can greatly enhance the performance, monitoring and maintenance of the plant. As there is advancement of technologies the cost of renewable energy is globally going down thus encouraging large scale solar plant installations. Sophisticated systems for automation of the power plant monitoring this massive scale of solar and wind system deployment requires as majority of them are installed in inaccessible locations and thus it is sometime unable to be monitored from a dedicated location. Primary objective of project is based on implementation of new cost effective methodology based on IoT to remotely monitoring a hybrid power plant for performance evaluation. This will make possible for preventive maintenance, fault detection of the plant in addition to real time monitoring.

Keywords : Hybrid power generation, Monitoring, Internet Of Things, ATmega 16C.

I. INTRODUCTION

Hybrid(Solar and wind) power plants need to be monitored so that we can obtain optimum power output. This will provide efficient power output from power plants while monitoring for faulty solar panels, technical faults in wind turbine, connections, and dust accumulated on panels lowering output and other such issues affecting solar performance and wind turbine performance. This project provide the automated IoT based Hybrid power monitoring. We use ATmega 16 controller based system to monitor solar panel parameters and wind turbine(vertical axis) parameters. Our system constantly monitors the power output to IOT system over the internet. IoT Thingspeak is use to transmit Hybrid(solar and wind) power parameters over the internet to IoT Thingspeak server. This makes easy to remotely monitor the Hybrid power plants and ensures best power output.

II. LITERATURE SURVEY

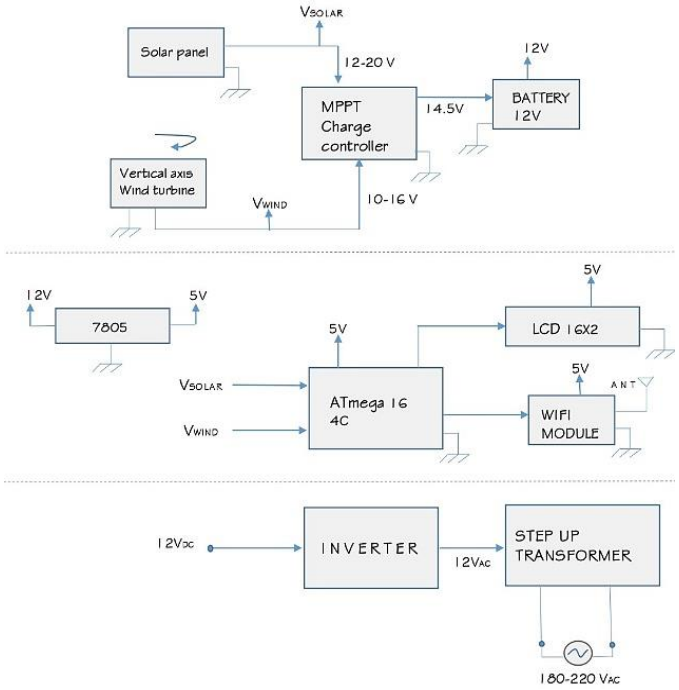
[1] Development of an online monitoring and control system for distributed Renewable Energy Sources (RES) based on Android platform. This method utilizes the Bluetooth interface of Android Tablet of Mobile phone, as a communication link for data exchange with digital hardware of power Conditioning Unit.

[2] Introduction to an instant monitoring infrastructure of renewable energy generation system that is constituted with a wind turbine on current and voltage measurements of each renewable source .The related values are measured with the developed sensing circuits and processed by 18F4450 microcontroller of Microchip. The processed

parameters are then transmitted to personal computer (PC) over universal series bus (USB) to be saved in database and to observe the system instantly. The Coded visual interface of monitoring software can manage the saved data to analyse daily, weekly and monthly values of each measurement separately

[3] Goto, Yoshihiro, explained about an integrated system that manages and remotely monitors telecommunication power plants has been developed and has started operations. The system is used to operate and maintainmore than 200,000 telecommunication power plants which includes devices such as rectifiers, inverters, UPS's and air-conditioning plants installed in about 8000 buildings. Feature of the system are to integrate the management and remote monitoring functions into single system and improved user interfaces which uses information and communication technology

III. PROPOSED SYSTEM



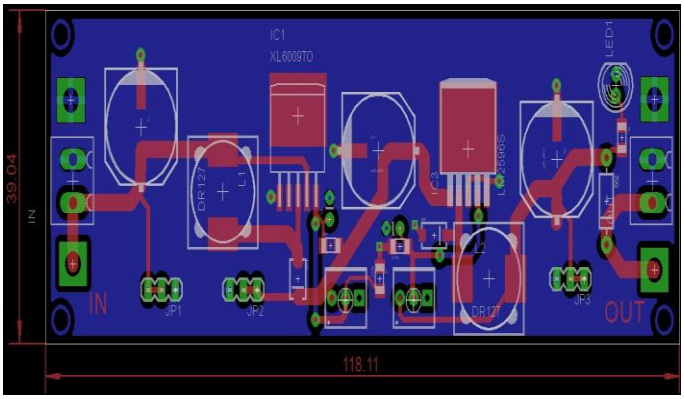
3.1 COMPONENTS:

A) ATmega 16:

ATmega 16 comes with low power consumption and high noise immunity. ATmega 16 bridges the gap between Hybrid power plant system and IoT.

B) MPPT CHARGE CONTROLLER:

The major principle of MPPT (Maximum power point tracking) is to extract the maximum available power from PV module by making them operate at the most efficient voltage (maximum power point) o/p of both source is fed to MPPT charge controller then following o/p is fed to battery.



C) Wi-Fi module (ESP8266):

All the calculated data by ATmega 16-P is further processed by Wi-Fi Module in order to store on IoT (Internet of Things) Server or Cloud. In order to analyse this data on daily, weekly and monthly basis we are using popular IoT platform Thingspeak.

D) Liquid Crystal display (LCD):

LCD is used for displaying voltage generated by solar panels and wind turbine and any defect in Solar panels and wind turbine.

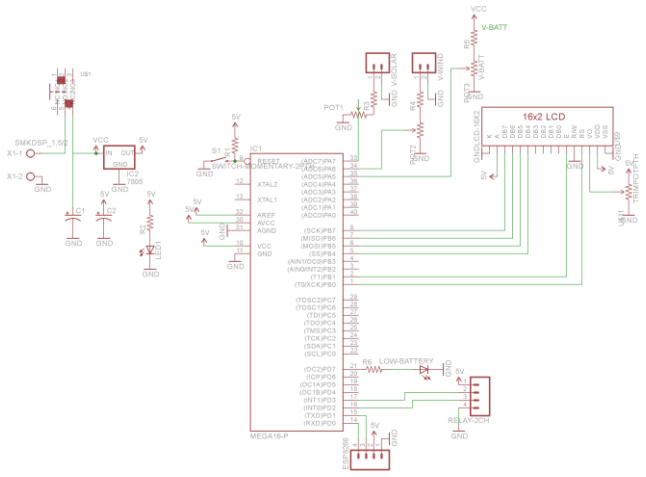
E) INVERTER:

As output from battery is direct current it get converted into alternating current using inverter.

F) STEP UP TRANSFORMER:

Output from inverter is only 12Vac so to boost the voltage we use 'step up transformer' to convert it upto 220v.

Schematic Diagram



IV. EXPECTED RESULT

As this system keeps continues track of hybrid power plant ,the daily weekly and monthly analysis becomes easy and efficient also with the help of this analysis it is possible to detect any fault occurred within power plant as the generated power may show some inconsistency in data of hybrid power plant.

V. CONCLUSION

By taking continuous track of Hybrid power plant it is possible to detect any malfunction occurred within power plant as the generated power may show some inconsistency in data of solar or wind turbine power plant.

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