HYBRID POWER GENERATION USING GRID MONITORING SYSTEM

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ABSTRACT

The project's goal is to use a smart phone to measure each resource's power (both analog and digital). The Bluetooth modem offers a text-based communication channel between the user and the system. This system also continuously checks the status of connected devices.. This project uses a Bluetooth module as a communication medium to monitor and automatically send the voltage produced by solar panels, piezoelectric sensors, and wind turbines to the user. This system returns confirmation messages to the calling user once the command implementation is complete. An automation solution for the present era called "Hybrid power generation grid monitoring through an Android smart phone" allows for remote control of appliance status. A sophisticated automation technology called "Hybrid power generation grid monitoring through an Android smart phone" allows for global control of appliance status. Here, the power generation sources are connected to a pic micro controller that has a Bluetooth interface and is able to convey information via short message service while also carrying out the required functions and updating LCD display status.

Keywords: Microcontroller, Bluetooth module, Solar Panel, Wind Turbine, Piezo electric sensor.

INTRODUCTION

Any nation's development depends in large part on its access to energy. It is a crucial component of the nation's growth and economy. Coal, oil, and natural gas are our main energy-producing sources. Energy is necessary for industrial, agricultural, commercial, and domestic purposes, as is common knowledge. The need for energy in the world is rising daily. Energy can be produced from coal, fossil fuels, oil, and other gases in a variety of ways [3]. However, because each of these sources is bad for the environment, there are restrictions on how and when they can be used. We require clean energy sources because of environmental pollution and global warming. In today's world, eco-green energy, or producing energy without affecting the environment, is the main focus. Then, we can choose among renewable energy options, including solar, wind, small hydro, biomass, and biofuel. There is a great deal of potential for renewable energy to meet energy demand. However, there are significant drawbacks to using these energy sources, and numerous studies are being conducted to increase their effectiveness. Because preserving natural resources is the primary goal, systems should be put in place to prevent global warming and carbon emissions. Instead of using coal or other fossil fuels to generate electricity, the nation will save money by switching to renewable sources. It is anticipated that using this renewable resource to produce energy will lower CO2 emissions

Therefore, if we combine these two instead of employing a single approach, they will aid one another in overcoming setbacks. Comparable to when a solar PV system generates power and a wind turbine system draws energy from a wind source. There is a backup system to meet load demand when wind conditions are not strong enough to create power. When wind conditions are insufficient to generate electricity, the solar system will be used as a backup to meet load demand.

LITERATURE SURVEY

In the chapter "An Integrated Hybrid Power Supply for Distributed Generation Applications Fed by Nonconventional Energy Sources," by S. Jain and V. Agarwal, a review of literature is recommended about the employment of contemporary technology in a hybrid power generation, its control, and monitoring. Introduce the tools used to manage the production of hybrid electricity [1].

Alternative energy sources It is relatively simple to set up a hybrid power plant, thus in this chapter by . C. K. Rai, a survey of literature is taken on how the actual hybrid power plant is being developed in large scale [2].

Deshmukh and Deshmukh, "Modelling of hybrid Renewable Energy Systems", Renewable and Sustainable Energy Reviews. In this chapter, a review of literature pertaining to techniques for modelling and designing hybrid Renewable Energy Systems is discussed, as well as problems associated with boosting the penetration of such systems [3].

The chapter "Hybrid solar/wind power system probabilistic modelling for long-term performance assessment" by Tina et al. Reviews the literature in order to assess the long-term performance of a hybrid wind/solar power system for both and grid-dependent applications [4].

PROPOSED SYSTEM

Power reading utilising a grid monitoring system offers a quick and affordable means to transmit wirelessly information about the energy utilised by the customer, as well as tools to identify unauthorised power usage.
The suggested system can monitor power consumption and alert both the energy provider and the consumer.
PIC Microcontroller 16F72 is used.

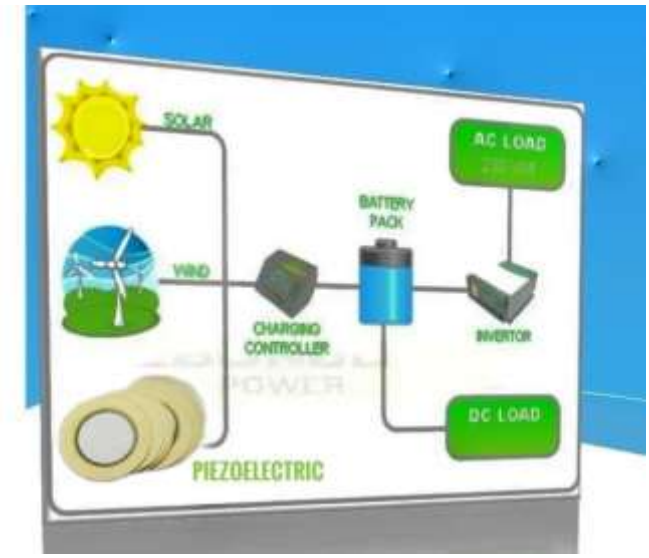
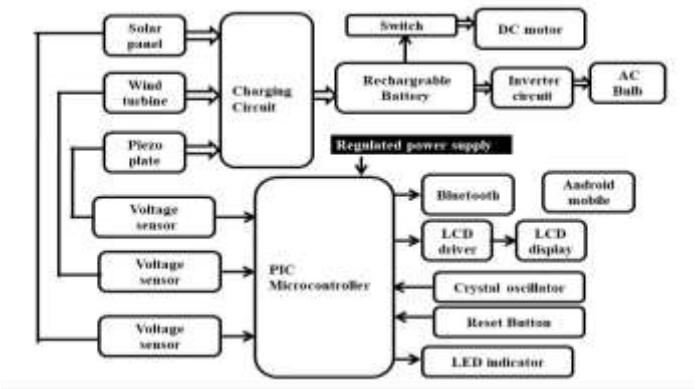


Fig. Power Generation System

BLOCK DIAGRAM



RESULTS

The project makes use of wind turbines, piezo plates, and solar panels. A battery stores the collected wind, solar, and piezoelectric energy. Using a pulse generator, a MOSFET that can produce ON/OFF pulses at various frequencies is supplied with power from the battery. This generates low voltage AC using a step-up transformer. This AC is used to turn on and off electrical devices like lighting. Using a switch to connect A DC load, such as a DC motor, to the battery. To get 5V DC, we can use the RPS circuit. In order for the PIC Microcontroller to function, we must feed it with 5 volts. The pic micro controller will use sensors to detect the sun, wind, and piezo voltage levels, display them on an LCD module, and then transmit those readings to an Android mobile application using HC-05 Bluetooth module.

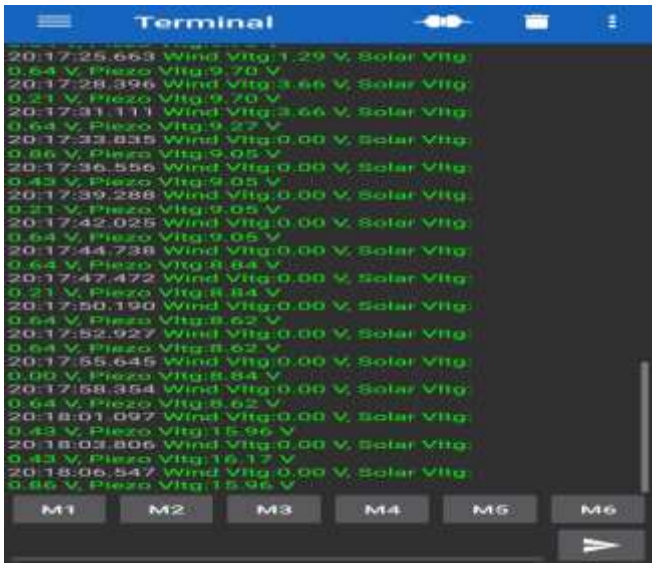


Fig. Data of solar ,wind and piezo voltage's

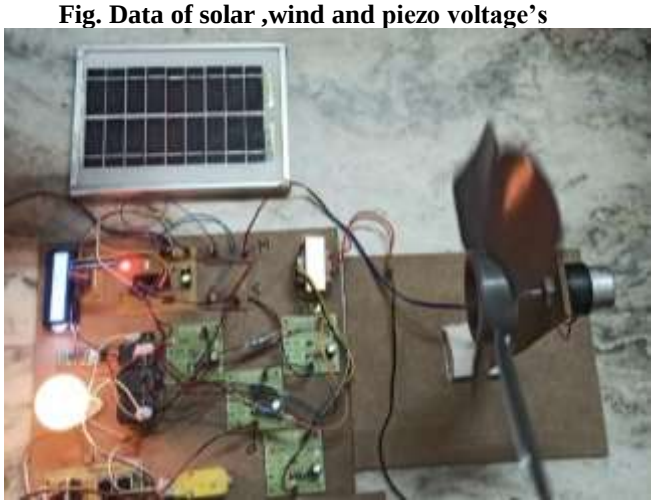


Fig: Hardware of Power Generation System

CONCLUSION

An excellent and efficient alternative to traditional energy sources for power generating is a hybrid power generation system. It can deliver to far-off locations that the government cannot access. So that the energy can be used where it is produced, lowering the cost and transmission losses.

It was designed with features that integrate with all of the hardware components used. The placement and arrangement of each module has been carefully thought out, allowing the unit to operate as efficiently as possible. Second, the project has been successfully completed with the aid of evolving technology and cutting-edge ICs. The project's design and testing were successful as a result. Overall, it is a good, dependable, and economical option for producing power.

FUTURE SCOPE

This small-scale hybrid power generation aids in the construction of hybrid power plants with the largest producing capacity at the lowest possible cost.

Although utilizing electrical energy is somewhat expensive and difficult to obtain, this may be done through the power generation system. Consuming electrical energy is one of the essential things that humans would like to have at a lower cost and convenience.

This project may be expanded using the Raspberry Pi processor. We can trace the energy sources into the cloud so that users can access the data from any location because it comes with built-in Wi-Fi, so there's no need to connect an additional Wi-Fi module and another one.

REFERENCES

[1] "An Integrated Hybrid Power Supply for Distributed Generation Applications Fed by Nonconventional Energy Sources," IEEE Transactions on Energy Conversion, vol. 23, June 2008, by S. Jain and V. Agarwal.

[2] Smt. C. K. Rai's Non-Conventional Energy Sources.

[3] "Power Fluctuations Suppression Of Stand-Alone Hybrid Generation Combining Solar Photovoltaic/Wind Turbine And Fuel Cell Systems," Energy Conversion by Ahmed, N.A., Miyatake, and Al-Othman, A.K.

[4] Deshmukh, M.K., and Deshmukh, S.S. "Modelling Of Hybrid Renewable Energy Systems", Renewable and Sustainable Energy Reviews, Vol. 12, No. 1, pp. 235-249.

[5] Tina, G., S. Gagliano, and S. Raiti "Hybrid solar/wind power system probabilistic modelling for long-term performance assessment", Solar Energy, Vol. 80, pp. 578–588 (2006).

[6]Celik,A.N., "Techno-Economic Analysis Of Autonomous PV-Wind Hybrid Energy Systems Using Different Sizing Methods", Energy Conversion And Management, Vol. 44, pp. 1951–1968, 2003.

[7] "Power Monitoring and Control for Electric Home Appliances Based on Power Line Communication" I2MTC 2008 - IEEE International Instrumentation and Measurement Technology Conference Victoria, Vancouver Island, Canada, May 12-15, 2008.