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GSM based Automatic Monitoring System for Efficient Power Management

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Abstract: Electrical device and wind mill square measure devices that cleanly convert renewable energy (sunlight, air) into electrical power and provide a sensible resolution to the matter of power management (utilize and save) in domestic and industrial areas. This project involves the development of an automatic monitoring system of energy from Solar and Wind mills that could be further used for domestic and industrial purpose, making use of a GSM Module as the control system. Non-renewable energy is comparatively a short-run energy supply consequently; the uses of an alternate sources like star and wind energy are getting additional wide unfold. planned during this paper may be a system that monitors the movement of a star and wind mill so it's perpetually offers data to GSM.

Keywords: Arduino, GSM, Solar, Wind, Power Management

I. INTRODUCTION

We have a disposition to need electricity for operational most the appliances we have a disposition to use in our day to day life. therefore it's become an essential a sign in our life. Now there area unit 2 ways that to provide electricity 1st by victimization non-renewable energy sources as well as second by renewable sources of energy. With increase in population and advancement of technology, consumption of electricity is additionally increasing exponentially. Simultaneously, we have to increase the production of electricity so as to complete the needs of growing population. The biggest disadvantage with the usage of standard resources is that their usage causes pollution because of the assembly of varied pollutants like ash just in case of a coal power station, smoke just in case of diesel power station, material just in case of atomic energy plant.

Maintaining these pollutants isn't a simple task and it conjointly needs tons of cash. therefore we've to search out another ways to supply electricity. The best attainable approach is by victimization non-conventional sources of energy. Out of all the attainable choices obtainable in non-conventional sources of energy, stand wind at the most effective strategies. As natural event energy are going to be used to the ocean shores, ocean thermal energy can used within the center of the ocean and its setup is to boot very hard. whereas star and wind unit of measurement on the market altogether the areas of the earth and fixing their powerhouse is to boot not a cumbersome task.

II. METHODOLOGY

Presently we have got become even extra interested in usage of renewable energy sources as associate degree alternate methodology of producing electricity. Hybrid systems unit of measurement primarily associate integration of star panels and rotary engine, the output of this mixture is utilized to charge batteries, this keep energy can then be transmitted to native power stations. during this system turbine will be wont to turn out electricity once wind obtainable is out there is on the market is obtainable is accessible is offered} and alternative energy panels are used once star radiations are available. Power will be generated by each the sections at a similar time additionally.

The usage of batteries is to produce uninterrupted power provide. this technique desires high initial investment. but the reliable, long span and fewer maintenance structure for that disadvantage. The microcontroller is utilized among the system to control the amendment between the converters with the help of a driver circuit. solar battery or physical phenomenon cells (PV) has absorbed sun rays by radiation and offers electrical energy output. star panels unit the ways to convert different energy into electrical power. A turbine gain its power input by dynamic the pressure of the wind into torsion (turning force) acting on the rotor blades.

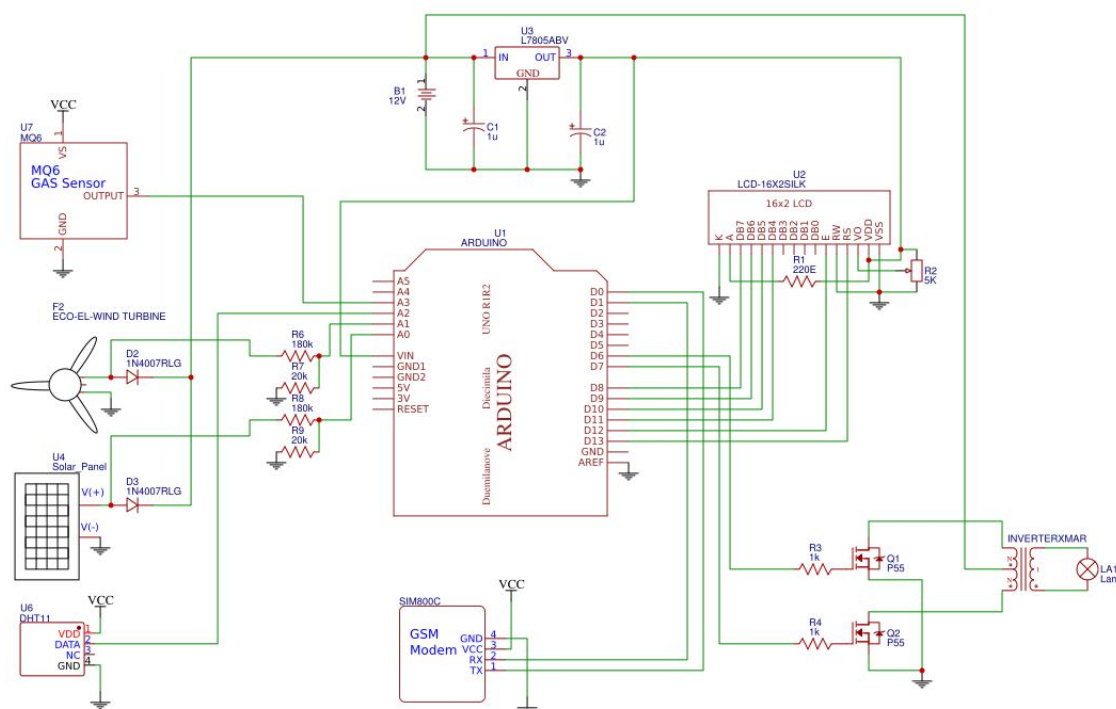
The quantity of energy that the wind transfers to the rotor depended on the density of the air, the rotor area, and thus the wind speed. every system (Solar & Wind turbine) has created DC power. The each wattage has hold on among the battery by device. each powers has controlled by electrical converter (DC/AC) and provide to the lighting system.

III. OBJECTIVES

This analysis is planning to style the model of hybrid solar radiation rotary engine in single setup so investigate the practicableness of the hybrid star vertical turbine system, energy output and storage. The target of this project is to induce inexperienced energy from the renewable energy sources like star and Wind Energy.

By pattern this Hybrid Power Generation pollution free fastening system and to require care of the quantity of non-renewable energy resources is obtained. By pattern the star and wind energy generation system the global warming are reduced. to review of the hybrid wind-solar station. to style and construction of a wind- star hybrid power generation system. To show power output employing a crystal rectifier lighting system.

Circuit Diagram



A. Circuit Description

The system consists of Arduino microcontroller. It is used as the brain of this project. The function of this section is to collect the measured data from the voltage monitoring circuit which provides the voltage of wind turbine, voltage of battery as well as solar and also the values of humidity, temperature and the status of gas leakage. The microcontroller and circuit components require power for their operation. For the fulfilment of this power demand of the system a 12v battery followed by a transformer IC LM7805 is employed. This regulator IC provides regulated 5V provide to the microcontroller and to the desired circuit elements. The system uses wind turbines vertical axis for the power generation. Above circuit diagram of the system shows that this turbine is interfaced in the system.

The power generated by the turbine will be stored in the battery used in the system. The voltage of the turbine is to be measured for the monitoring purpose. For this purpose we have designed voltage divider circuit and connect to pin A1 of the Arduino board as show in the above circuit diagram. The system is designed to monitor the surrounding geographical parameters like humidity, temperature. For this purpose we have used a DHT11 humidity sensor and temperature. This sensor is connect to the pin number A2 of the Arduino board. This sensor detects the wetness and dryness of the surrounding where the system is implemented. This sensor provides the standard values to the microcontroller. The system also consists of a gas sensor used to monitor the presence of any dangerous gas in the surrounding area of the system.

For this reason we've used and interfaced a MQ6 gas device as shown within the circuit diagram of the system. This device provides the analog signal to the microcontroller at the analog pin A3 of the Arduino board as shown within the circuit diagram of the system. The Arduino board i.e. a microcontroller receives all the signals from the voltage monitoring system and sensors. These data will

compare to the premeasured value by the microcontroller. If the values are not in the proper range of the predefined values then the system will send an message alert to the authorized person. For this purpose we've used and interfaced a GSM electronic equipment with the board equipped with Arduino as shown within the circuit diagram of the system.

This GSM modem consists of TX and RX pins connect to the TX and RX pins i.e. D0 and D1 of the Arduino board respectively as show in the above circuit diagram. The purpose of the GSM modem is to establish a wireless communication between system and the authorized person. The power output of the turbine is provided to the battery for storage purpose.

IV. WORKING

In this planned system 2 reusable energy sources work in bicycle to charge battery via controllers. The energy sources offer the load singly or at the fixed time relying upon their handiness. every supply operates on its most wall socket operation for generating maximum power. The combine power generation system improves the potency of the system.

it's a lot of appropriate for isolated power applications. Addition of additional power supply helps in activity continuous power. the mix of wind turbines and star arrays generate the electrical power with the assistance of various controllers. Generated power could provide the connected house load. This 2 energy sources area unit acting at the fixed time to come up with electrical power.

Load sharing takes place during this planned system. And it are often operated on their most outlet. Continuity of power offer additionally takes place during this system, if anyone didn't generate power the opposite one can offer the load. This load observance was done by the individual management algorithms. below this each power generating systems works to generate the power. By this the overall system performance is increased and will get continuous power supply. The energy is reborn to AC from DC by exploitation electrical converter circuit. The AC provide is employed for operate AC masses. GSM could be a reasonably itinerant. it's inbuilt SIM. the choice creating half are going to be allotted by the Microcontroller. GSM module and sensors square measure interfacing with Arduino microcontroller.

The sensing element senses numerous close parameters like temperature, gas and humidity. The output from the star and wind panel is connect with the DC battery, and so the battery incessantly charged. Main operate of the electrical converter circuit is to convert the dc voltage into AC offer that is connect with the appliances utilized in our day to day life. The standing of the system is displayed every and each second on the LCD display. When there is an error in the values of solar/wind mill associate degree alarm is generated forthwith associate degree conjointly an alert message (SMS) is shipped to the licensed person through the GSM. The system conjointly supports to produce period of time watching of concentration of the values.

This battery is controlled by microcontroller based mostly GSM module. this can be through with the assistance of Arduino microcontroller. It becomes a tough task in handling and maintaining the facility as per the growing necessities. It becomes terribly tough in season. Presently maintenance of the ability is additionally a vital task.

this technique is additionally accustomed management industrial and residential appliances tenuously and supply economical power management.

A. Advantages

- 1) Reduction in operating costs, Efficiency & life of system will increase.
- 2) Stress and failure of the system can be avoided.

B. Disadvantages

- 1) High initial Cost
- 2) Power generation is less
- 3) Depends upon environmental condition

C. Applications

- 1) The system is used for domestic purpose.
- 2) Street lighting,
- 3) Traffic signals .

V. CONCLUSION

The main purpose of this project was to give more stable power from wind-solar hybrid system. our project has been completely designed & constructed, which is able to collect sun radiation and wind velocity all the day to operate the system. It can be commercially applicable in village and remote areas where air velocity and sun radiation is perfectly available



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