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WIRELESS MONITORING OF SOLAR AND WIND HYBRID SYSTEM

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ABSTRACT

In this paper the combination of two energy resources is take place that is wind solar energy we can do uninterrupted power by using hybrid energy. Basically this system involves the integration of two energy system that' will give continue power. Solar panels are used for converting solar energy and wind turbine are used for converting wing energy into electricity. This electrical power can utilize for various purchase and we analysis generated power by using GSM technique. In this technique we getting actual output of which system is to be generated energy on that condition and the major advantages of this our project is we monitoring the data of our project by remote area.

I.INTRODUCTION

Electricity is most needed for our day to day life. There are two ways of electricity generation either by conventional energy sources or by non-conventional source has some drawback like ash problem in coal power plant or nuclear waste in nuclear power plant etc. And it is harmful for nature and also it will be completely vanishes from earth. So we have to find another way to generate electricity like solar energy and wind energy. So in our project, we choose hybrid concept for generation of electrical energy. In our project we proposed solar energy and wind energy is used for electricity generation and us monitoring this energy by using GSM.

II.HYBRID ENERGY SYSTEM

Hybrid energy system is the combination of two energy sources for giving power to the load. In other word it can defined as "Energy system which is fabricated or designed to extract power by using two energy sources is called as the hybrid energy system." Hybrid energy system has good reliability, efficiency, less emission, and lower cost. In this proposed system solar and wind power is used for generating power. Solar and wind has good advantages than other than any other non-conventional energy sources. Both the energy sources have greater availability in all areas. It needs lower cost. There is no need to find special location to install this system.

Solar Energy:-

Solar energy is that energy which is gets by the directly sunlight. Solar energy is present on the earth continuously. Solar energy is freely available. It is pollution free&available in free of cost. It has low maintenance cost. It has one drawback that is it can not be work properly in rainy season and bad weather condition. As compare to other sources it give better efficiency. It has long life time and has lower emission.

Wind Energy:-

Wind energy is the energy which is extracted from wind. For extraction we use wind mill. It is renewable energy sources. The wind energy needs less cost for generation of electricity. Maintenance cost is also less for wind energy system. Wind energy is present almost 24 hours of the day. It has less emission. Initial cost is also less of the system. Generation of electricity from wind is depend upon the speed of wind flowing.

Block Diagram:-

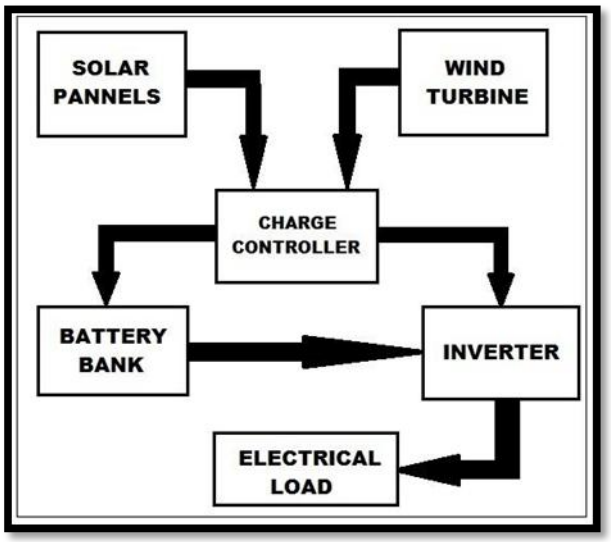

Figure 1:Block Diagram of Hybrid Energy Generation System

Solar Panel:-

The Solar-generated electricity is called Photovoltaic (or PV). It is possible to convert solar energy directly into electric energy by photovoltaic process. Energy conversion devices which are used to convert sunlight to electricity by photovoltaic effect are known as photovoltaic cell or solar cell. In our project we use 40 cell solar panel, which are connected in series. Each cell in solar panel has 12V voltage range and power of 20W with 16A current.[6] These solar cells in PV module are made from semiconductor materials. When light energy strikes the cell, electrons are emitted. The electrical conductor attached to the positive and negative scales of the material allow the electrons to be captured in the form of a D.C current. The generated electricity can be used to power a load or can be stored in a battery.Solar panel is use to convert solar radiation to the electrical energy. The construction of PV cell is similar to PN junction diode formed by semiconductor material. When the

junction absorbs light, the energy of absorbed photon is transferred to the electron-proton system of the material, creating charge carriers that are separated at the junction. The charge carriers in the junction region create a potential gradient, get accelerated under the electric field, and circulate as current through an external circuit.

Total load = 50W

Energy from solar panel for 12 hour= 50*12=600W

The period of the solar panel exposed to the sun= 50* 8hr=400W

Figure 2: solar Panel

Wind Turbine:-

In our project we used steel material for design of wind blade because of it is a light in weight due to that material we get high speed of blade rotation and generate more energy.

The ratio of peak rated wind velocity to average wind velocity is an important parameter which governs the overall performance of the wind mill system.

Blade Length= 1.5 Ft

Angle Between Each Blade= 72˚

Total Height of Wind Mill= 4.5 Ft

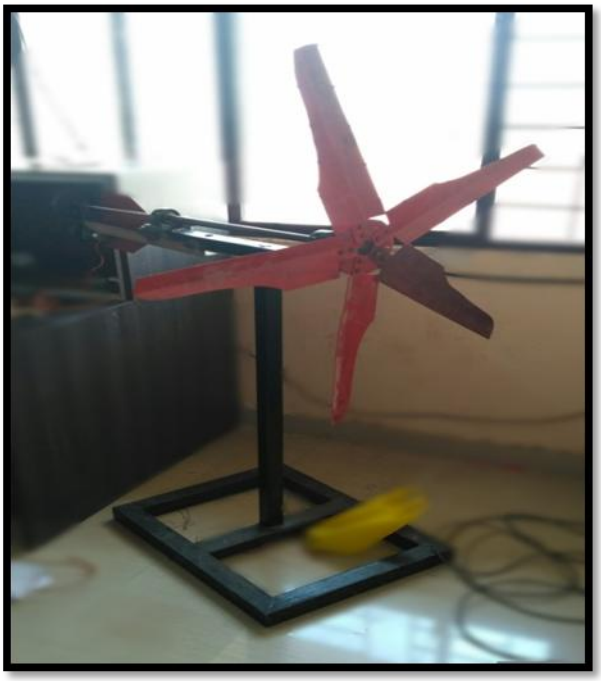

Fig 3. Actual Model of Wind Mill

Charge Controller:-

Charge controller control the both active or inactive sources. Itperform both operations at a time that is charge the battery and supply to the load. The controller provide protection for over-charge protection, short-circuit protection, etc. It has additional functionality that is it can vary power according to load demand.Due to this addition of the both the power and fulfill the load. And when power is not generating it should extract power from battery and give it to the load. In this our project we used PIC Microcontroller (PIC16F874A/877A).[5]

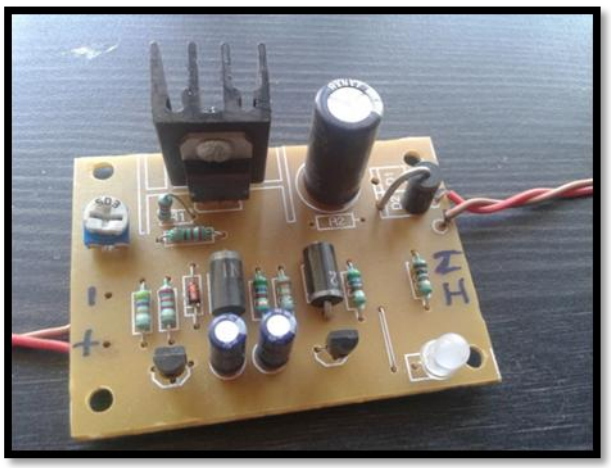

Fig. 4: Charge Controller Circuit

Battery Bank:-

In our project, we have to choose size of the battery bank according to the different load requirement. In our project we used 3 batteries in series and each battery having 4 Volt rating and the total rating of our battery bank is 12 Volt. For increase in battery bank size we need to connect cell in series so that we can get the larger battery bank size.

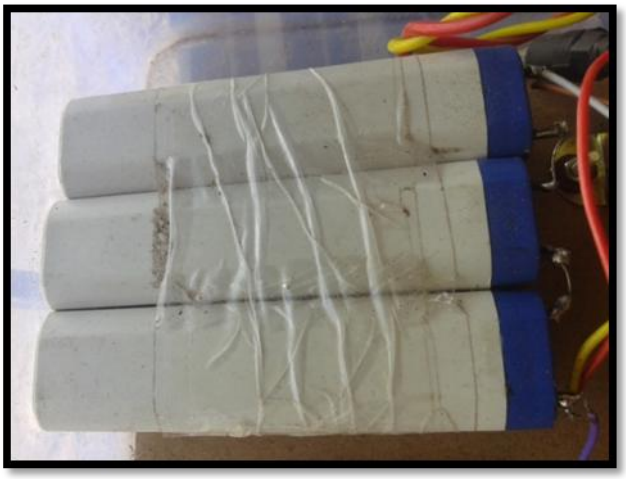

Fig 5. Battery Bank

GSM System:-

GSM is the Global System for Mobile communication. GSM is a digital mobile telephony system.due to digitalization is widely used in many countries. By using time division multiple access (TDMA) GSM can be operated. GSM digitizes and minimizes data, then forward to down a channel with two other sources of user data, so due to this feature we used GSM system to our project. GSM is 2G standard. GSM is available in variety of size like micro, macro, Pico, umbrella cell, etc. In our project we use 1800MHz frequency range for GSM.[3]

Proposed Calculation:-

Total power generated in system is given by,

$P=N_1*P_1+N_2*P_2$

Where,

P= total power generated.

P1= power generated by wind turbine

P2= power generated by solar panel

N1= number of wind turbine

N2= number of solar panels used

A)Calculation for wind energy:-

The power generated by wind energy is given by,

P1=(density of air*swept area*velocity cubed)/2

B) Calculation for Solar Energy:-

The power generated by solar panel is given by,

P2= Ins(t) * As * Eff(pv)

Eff(PV) is the overall efficiency of PV panel

Total efficiency is given by,

Ef(pv) = H*PR

III.RESULT

Sr. No.	Output Voltage	LED Operation
1	Less than 16V	LED Off
2	More than 16V	LED On

Table 1: Observation Table

The observation table shows the magnitude of highest output voltage which is greater than 16V. At this instant any value above the 16V is sensed and transmitted. Below 16V LED turn OFF again this value is transmitted to display.

IV.CONCLUSION

Thus we generate energy by using hybrid concept and monitored output voltage it by using GSM system. Thus there is no need of separate manual operation.

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