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Solar Wind Hybrid Power Generation System

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Abstract: ***In today's technology as we all knows, wind and solar are the most optimistic renewable source for the production of energy. So various research is being carried out for utilization for this energy resource is the best way. The moto of this project is to produce the energy in an eco-friendly way by using renewable source of energy. A microcontroller ensure the optimum utilization of the sources and it also increases the efficiency of the combined system as compared to the individual mode of generation. It helps in decreasing the dependence on one single source and makes the system more reliable. The solar wind hybrid system can be used for both industrial and domestic applications .But in there system we use to the 3rd application which is use for the noise pollution to convert the energy system.***
Keywords: solar energy, wind energy, sound energy, Hybrid power system and electricity.

I. INTRODUCTION

The mixture of the renewable energy sources, wind, sound ,solar are use for the generation power are called hybrid system. For generating electricity we will use solar panel cells sound energy wind turbine. We require electricity In our day to day life. In there we design the hybrid system. Now there are using the two way of technique first of non-renewable source producing the energy source system and 2nd is renewable source by renewable sources of energy. With increase in population and advancement of technology, consumption of electricity is also increasing exponentially. To meet the demand of growing population we need to increase the production of electricity simultaneously.

In there the using the source of energy are like solar, wind, sound noise to convert to the energy source using the methology are determine the system are represent the hybrid generation system. We using a microcontroller and the best possible way is by using non-conventional sources of energy. Out of all the possible options available in non-conventional sources of energy, solar and wind are the best methods. As well as ardiuno, microcontroller. In which are to clarify the solar wind power system is this paper we will be describing a solar-wind hybrid power system.

A. Solar Energy

In india the annual global solar radiation is about is 5Kwh/sq m per day with about 2300-3200 sun shine hours per d year Solar energy is that energy which are getting the sun energy in form of radiation wave. It does not case kind of any pollution, it inexhaustible. It is available free of cost. Specially, in a country like India where sun shines for almost 300 day in a year, it is therefore a convenient mode of electricity lots of production. Meager amount of investment is involved in setting up a solar power plant and also it is quite easy to maintain and install. The efficiency of the system is also quite good. Long life span and less emission of pollutants are its major advantages. Using the solar energy sources are eco-friendly to the environment.

B. Wind Energy

Flow the air in the environment to the kinetic energy to produce some of call wind energy. This kinetic energy is converted into mechanical energy by the wind turbine generation system, which is used to rotate the shaft of the generator and then electricity is produced. The cost of generation of electricity is quite less. The initial investment of the system varies depending on the type of turbine used. This are produce in the environment the wind energy or infinity time which are use everyday in 24 houres.

C. Sound Energy

In physics, sound energy is a form of energy that can be heard by living beings. Sound is a mechanical wave and as such consists physically in oscillatory elastic compression and in oscillatory displacement of a fluid. Therefore, the medium acts as storage for both potential and kinetic energy. There are using the noise of energy with the help of ardino methology to convert to the noise energy in form of electrical energy.

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D. Hybrid System

Hybrid systems are basically an integration of solar panels and wind turbine, the output of this combination is used to charge batteries, this stored energy can then be transmitted to local power stations. In this system wind turbine can be used to produce electricity when wind is available and solar energy panels are used when solar radiations are available. Power can be generated by both the sections at the same time also. The combination the hybrid system are most suitable to the power generation system. In case of the hybrid of the system to required of the source to full fill the energy management. We are presenting in a graphical form of energy in hybrid system

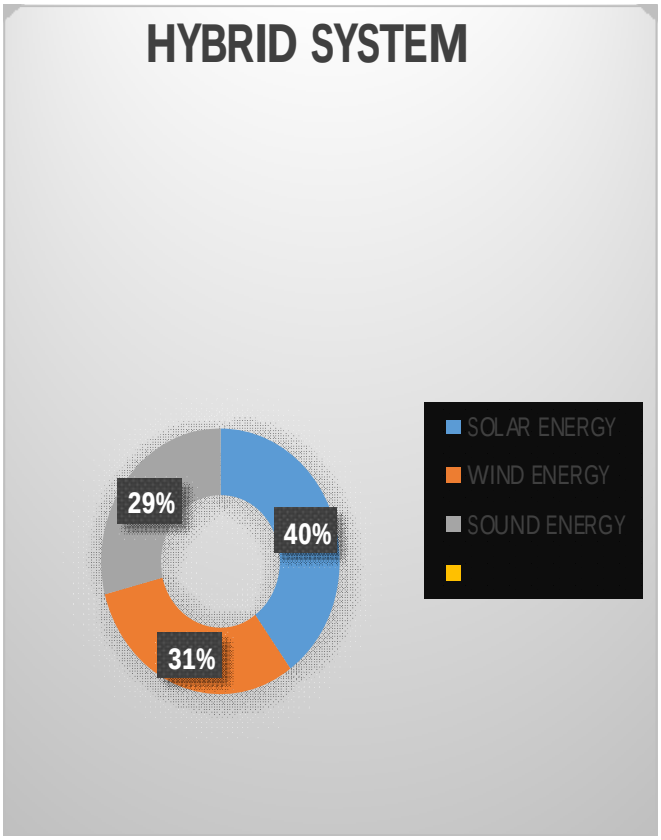

Chart.1 Hybrid system

Hybrid System Calculation

Over all the hybrid generation system to be calculate the given methods.

PT =(NW * Pw +Ns * POWER GENERTED IN WIND)

Where,

Total power generated= Pt

Power generated by wind turbines= Pw

Power generated by solar panels= Ps

No. of wind turbine = Ns

No of solar panels used= Nw

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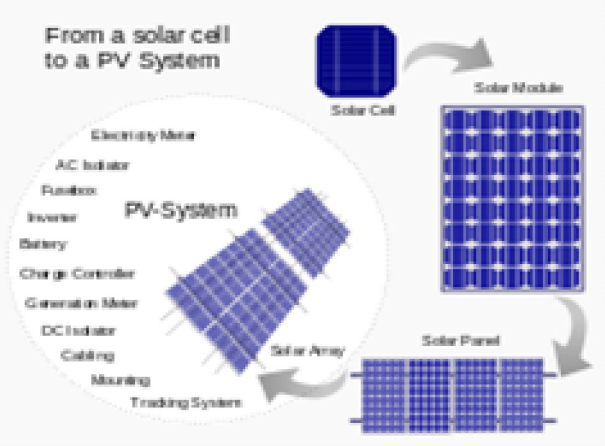
II. COMPONENTS USED

A. Solar Pannel

A solar cell is used to convert solar energy into electric energy, it is also known as photovoltaic cell. It is a p-n junction diode which consist of two different layers of a semiconductor material called as n and p region, n region is heavily doped and is thin while is lightly doped and is thick. The radiation falling on the surface of p-n junction diode can pass through the n side. Most of the depletion region is contained in the p region which is lightly doped. The extent to which the n region can be penetrated. decided by the wavelength of the falling radiation. Electron–hole pairs are generated in the n and p region, due to the difference in potential the electrons move to the n region and holes towards the energy system. To make a solar panel multiple solar cells are connected in series and parallel combinations, they are connected in such a way that the output obtained is additive in nature.



B. ARDUINO

Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards or Breadboards (shields) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers. The microcontrollers are typically programmed using a dialect of features from the programming languages C and C++. In addition to using traditional compiler toolchains, the Arduino project provides an integrated development environment (IDE) based on the Processing language project.

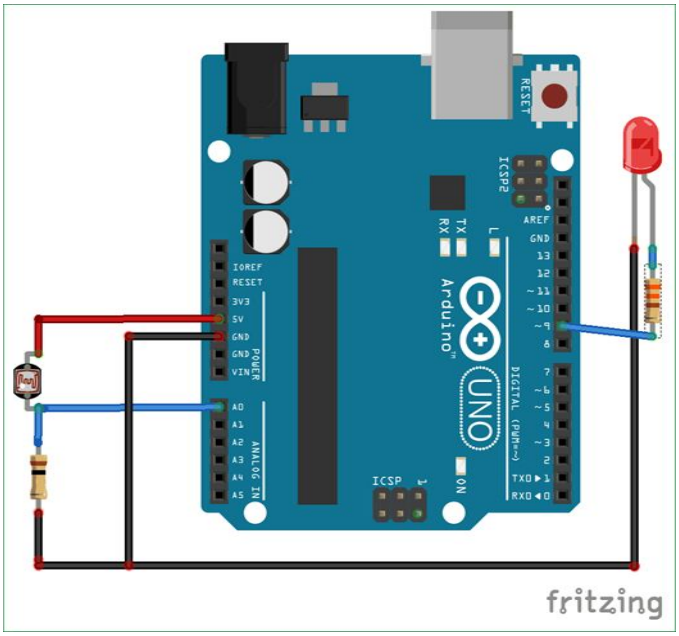


FIG. ARDUINO ATMEGA32

1) Features Of ARDUINO

a) BA Microcontroller:ATmega328
b) Operating Voltage: 5V
c) Input Voltage (recommended): 7-12V
d) Input Voltage (limits): 6-20V
e) Digital I/O Pins: 14 (of which 6 provide PWM output)
f) Analog Input Pins: 6
g) DC Current per I/O Pin: 40 mA
h) DC Current for 3.3V Pin: 50 mA
i) Flash Memory: 32 KB of which 0.5 KB used by bootloader
j) SRAM: 2 KB (ATmega328)
k) EEPROM: 1 KB (ATmega328)
l) Clock Speed: 16 MHz

C. Wind Turbine

A wind turbine is a device that converts kinetic energy from the wind into electrical power.
There are basically two types of turbine:

1) Vertical Axis Wind Turbine
2) Horizontal Axis Wind Turbine

The blades of a wind turbine turn between 13 and 20 revolutions per minute, depending on their technology, at a constant or variable velocity, where the velocity of the rotor varies in relation to the velocity of the wind in order to reach a greater efficiency. When the wind blows, propeller-like blades rotate to harness wind energy to spin the electric generator for electricity generation. Small wind turbine has an electricity production capacity of 10 kW while the large-scale wind turbines could generate electricity up to 5000–8000 Kw

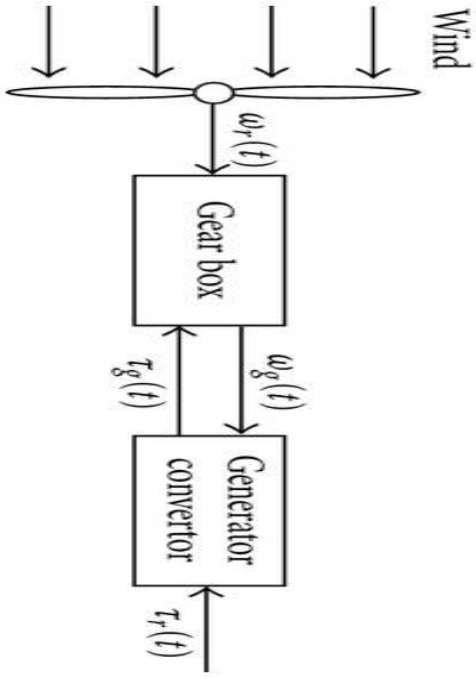


Fig. WINDTURBINE

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D. Battery

In which we are using the dry batteries for the good storage energy. The batteries are used in order to store the electricity that is produced from wind and solar energy. The capacity of battery may vary depending on the size of wind turbine or solar power plant. Battery should be having low maintenance and charge leakage should also be low. Considering all these parameters free discharge type is the best option available. And also there the incressing and desressing capacity of the battery depending upon the output fron the hybrid system. batteries will be converted into AC voltage with the help of an inverter and then it will be transferred to the loads. The inverter must be having over voltage protection, reverse polarity and short circuit protection**.**

III. WIND ENERGY

A. Generation Of Of Power Wind Energy

*Power = (density of air *area*velocity cubed)/2PW=1/2P (AW)*(V)*$_3$

WHERE,
P is power in watt(W)
.p is the air density in kilograms per cubic meter (kg/m^3)
AW IS swept area by air in square meters (m^2)
Vis the wind speed in meter per sec (m/s)

IV. EXPERIMENTAL SETUP HYBRID SYSTEM

A. Energy Conguption Mudule In Generation

Therefore,
The power is calculated as PS = (INSTANT VALUE (T)* AS*EFFICIENCY(PV))

Where,
INSTANT (t) = Isolation at time t (kw/ m2) AS = area of single PV panel (m2) Effpv = overall efficiency of the PV panels and dc/dc converters.

Overall efficiency is given by,

*B. Eff(pv)= Annual average of solar radiation * PR*

Where,
H = Annual average solar radiation on tilted panels of the cell.
PR = coefficient for losses
Performance ratio.

The combination of solar wind and sound hybrid system.We are using in this hybrid system for the power generation to fulfill the requirement for the electricity. In which we are taking new methodology to implement to the hybrid system are representing to the renewable source of energy.

The output voltage and the current of solar panel, wind turbine batteries are and load are measured very precisely and then the total outcome result are calculate.

Amount of producing power and consumed are measured. But this implementation to the road side for emergency electricity supply for required initially for design for complete the requirement of electricity. In there are also in which design for the mobiles application to control the system and control energy losses. The most part of the system today's required fulfil the automation electric vechile setup the charging box.

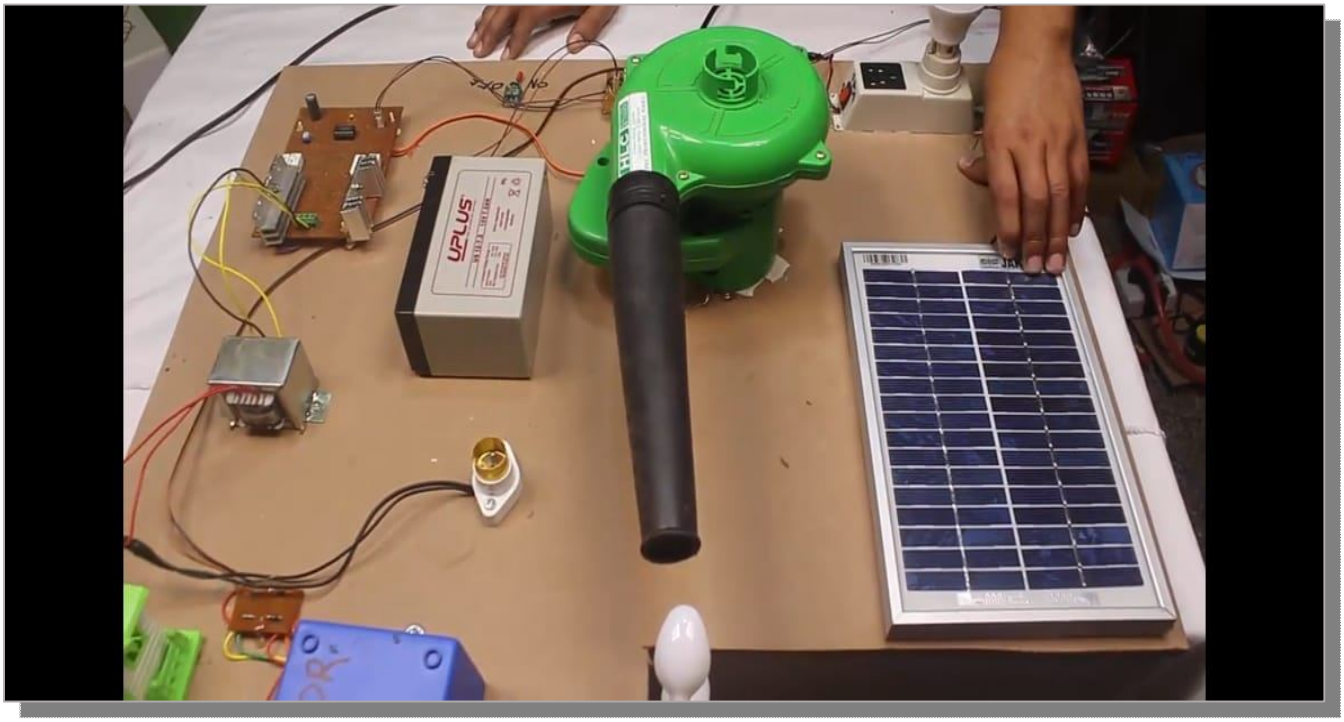

Figure 6. Experimental setup hybrid system

C. Solar-Pv Wind Hybrid Power Specification Are Given Below

PV Array power PANEEL =20 watts
Wind turbine/ generator =3W
System voltage= 12-0-12 (48 v)
Battery= 12 V
Invertor rating = (VA) 25
Output AC Wave form Sine-wave
Output AC Voltage (V nom), +/-10% = 230 V/AC
Output Ac
Frequency, Hertz, +/-0.5 % = 50 Hz.

V. APPLICATION

Hotels
Street lighting
Commercial power generation
Institution and Government offices
Large estate houses
Highways

VI. CONCLUSION

By this project many villages can be lighted. For villages which are much away from the construction site of large power generating stations such as hydro and nuclear power plant. Also to satisfied the increasing demand of electricity with clean hybrid power station by solar wind can be used.

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MAJOR PROJECT

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BIOGRAPHIES

The author is currently doing his bachelors Degree in electrical engineering from Greater Noida Institute of Technology Under AKTU.

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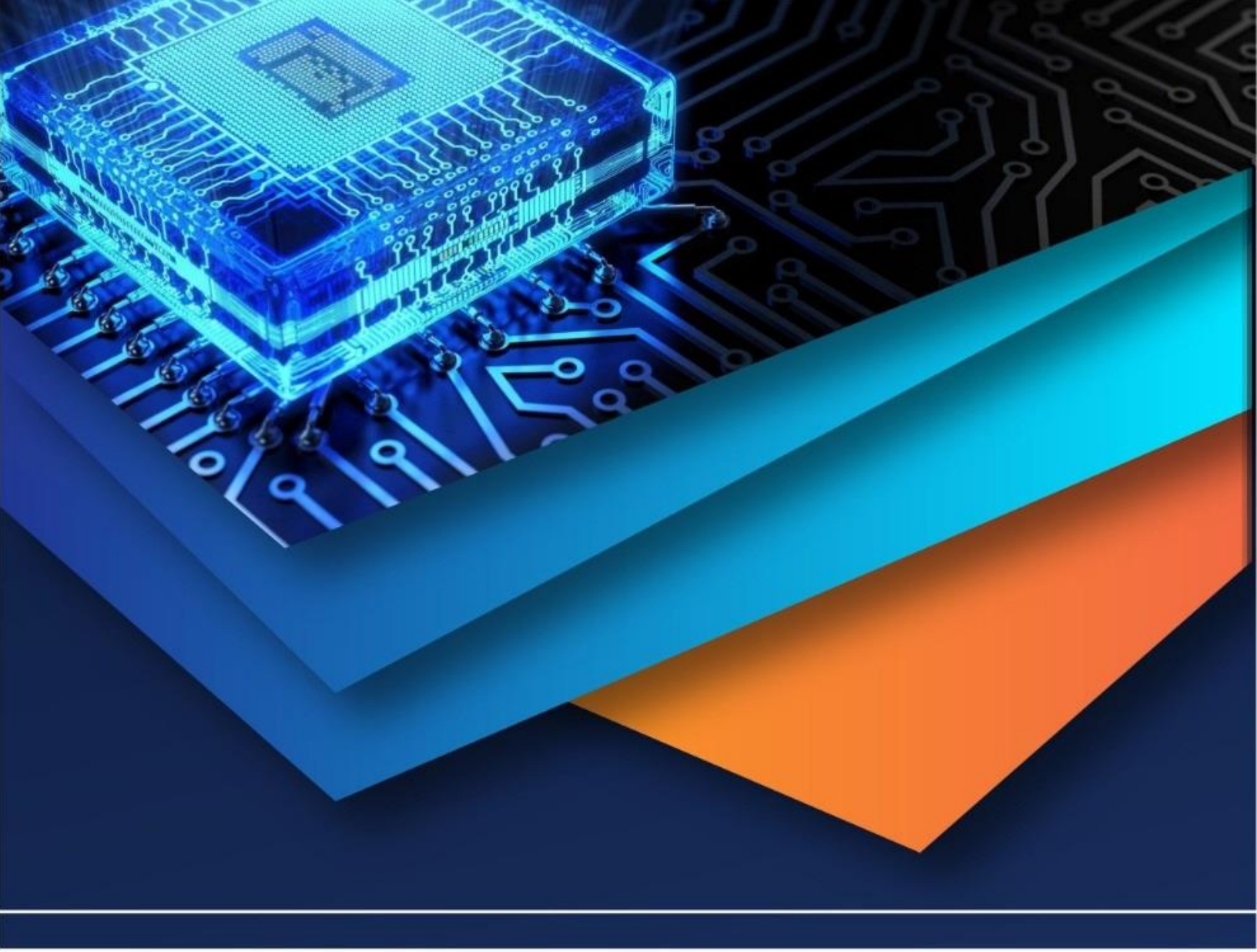

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