

# A Review paper on Solar and wind hybrid energy system for home application

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Date of Submission: 25-02-2023

Date of Acceptance: 05-03-2023

## ABSTRACT

Renewable energy is best solution for fulfill electricity demand but the conversion of system and load demand to be supplied are fluctuating and therefore it is even more difficult to predict the load and supply together. In this research project we had tried to develop criterion to improve the system size with lower cost and lower Cost of Energy (COE) by using Genetic Algorithm (GA) permutation and combination technique. Firstly make a simulation models to predict sizing and expenditure on hybrid renewable energy systems by using surface climate data (solar irradiance, wind speed etc.) of the particular area and the demand of electricity to particular facility. Once model is developed then it used to simulate and optimize the size of the hybrid renewable energy system which is best suited. The developed model also applied on hybrid system in validation case studies. The results from optimization are also validates on HOMER.

**Key words:** Hybrid system, Simulation, Optimization, Cost of Energy (COE)

## I. INTRODUCTION

The fact that renewable energy sources are also distributed sources offers an opportunity to save on the capital investment for the transportation and distribution of electricity. As India has a large amount of the resources needed for current renewable energy technology application, it has great potential for implementation of this kind. The proposed hybrid renewable energy system for project consists of PV array, wind turbine and emergency power supply. The continuity supply of renewable

energy resources is sufficient and the performance of the whole hybrid renewable energy system is good due to the simulation. When considering the electrification of a rural area it is important to design system which is reliable and requires little maintenance as in these areas frequent repairs and replacements might not be easy. Using a singular form of renewable energy, such as solar PV, to supply a rural area is possible, however no electricity will be generated when sunlight is not available and therefore no electricity will be supplied during that time. If more than one independent source is employed for energy generation, for example a combination PV panels and wind turbines, the energy demand generation can be split between these two sources and therefore the system depends less on one intermittent energy source. This improves energy supply security. To make the system further reliable, energy storage must be added to the emergency power supply system to store energy in times of excess generation and supply energy in times of a lack of generation. Hybrid Renewable Energy Systems, using a combination of energy sources and storage or grid connected are preferred in the area of rural electrification.

## OBJECTIVE

The specific objectives of this are listed as follows

1. Reduce pollution
2. To design a model of Hybrid power generation system.
3. To generate minimum 20Watt and upto 50watt power generation .
4. To design environmental friendly equipment.

5. To carry out experimental response of combined system and individual system.

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## II. PROBLEM STATEMENT

□ Solar and Wind energy is abundant in nature, but they are fluctuated, so a single source of energy are cannot produce that much amount of electricity which fulfill our electricity demand.

□ Hybrid system fulfills the demand but it is challenge to select proper combination of hybrid energy system.

□ Hybrid energy system refers to those applications in which multiple energy conversion devices are used together to supply an energy requirement. These systems are often used in isolated applications and normally include at least one renewable energy source in the configuration.

□ Hybrid energy systems are used as an alternative to conventional systems or typically based on a single source of renewable energy source.

□ It is challenge to design system which fulfills electricity demand whole year with lower Cost of Energy (COE) and lower initial capital cost.

## III. LITERATURE REVIEW

Sandeep Kumar and Vijay Kumar Garg said that this papers deals with the detailed of a hybrid model of a solar / wind in Simulink, which is using battery as its storage system. The simulation includes all realistic components of the system, in this system power delivered by the combine system component is compared with each other and various conclusions are drawn. A comparative study of hybrid model solar /wind system has been made. This paper describe of solar-wind hybrid system for supplying electricity to power grid. Work principle and specific working condition are presented in this Paper.

Ashish S. In goleand Prof. Bhushan S. Rakhonde said that now a day's electricity is most needed facility for the human being. All the conventional energy resources are depleting day by day. So we have to shift from conventional to non-conventional energy resources. In this the combination of two energy resources is takes place i.e. wind and solar energy. This process reviles the sustainable energy resources without damaging the nature. We can give uninterrupted power by using hybrid energy system. Basically this system involves the integration of two energy system that will give continuous power. Solar panels are used for converting solar energy and wind turbines are used for converting wind energy into electricity.

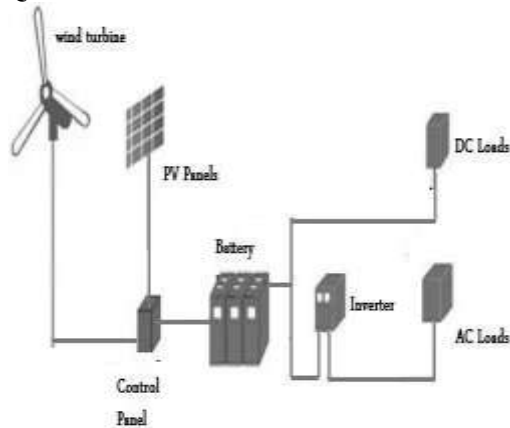
This electrical power can utilize for various purpose. Generation of electricity will be takes place at affordable cost. This paper deals with the generation of electricity by using two sources combine which leads to generate electricity with affordable cost without damaging the nature balance.

N.Sivaramakrishna#1, Ch.Kasi Ramakrishna Reddy All the natural wastage energies are used for production of Electricity. Thus, the Electrical Power or Electricity is available with a minimum cost and pollution free to anywhere in the world at all times. This paper will reveal a novel step in generation of electricity and availability of natural resources without disturbing the ecological balance. This paper describes a novel and developing Electrical Power Generation mechanism by integrating photovoltaic Solar Energy, solar Energy with Nano-antenna, Wind Energy and nonconventional energy sources. Thus we can have an uninterrupted powersupply irrespective of the weather condition without any sort of environmental pollution. Furthermore this process makes possible the electricity generation at least production cost. Utilizing lightning energy for electricity generation reveals a advanced step. The equipment consists of combination of PV solar-cell array & Nano-antenna array, a mast mounted wind generator, storage batteries (lead-acid), an inverter used to convert DC power to AC power, electrical lighting loads and electrical heating loads, several fuse and junction boxes and associated wiring, and test instruments for measuring voltages, power factors, currents and harmonic contamination data throughout the system. This hybrid solar-wind power generating system is suitable for Industries and also domestic areas.

## PART

- Wind turbine
- Charge controller
- Battery bank
- Inverter
- Solar panel

## EQUIPMENT DESIGN



## IV. CONCLUSION

In the present work a Solar PV Wind Hybrid Energy System was implemented. A portion of the energy requirement for a private house, farm house, a small company, an educational institution or an apartment house depending on the need at the site where used has been supplied with the electricity generated from the wind and solar power. It reduces the dependence on one single source and has increased the reliability. Hence we could improve the efficiency of the system as compared with their individual mode of generation.

This integration of renewable energy source will be highly effective in all places, especially in commercial areas where need of electricity is more. It causes no effect on nature i.e. pollution free, at the same time not prone to any kind of accident due to lightning. It is also useful to minimize power supply load i.e. cut short power charge. By using this system, we can save electricity charge because very less maintenance charge to this equipment is required. The designing of this equipment is done in such a way that it is very compact and acts as user friendly. When it is manufactured in a large scale, cost of this integrated natural resources power generation system is affordable. Moreover there is no power failure or load shedding situation at any times. Therefore, it is the most reliable renewable power or electricity resources with less expenditure. This research is at an intermediate stage and may take years to bring to fruition and into the market. The advances made by our research team have shown that some of the early barriers of this alternative PV concept have been crossed and this concept has the potential to be a disruptive and enabling technology. We encourage the scientific community to consider this

technology along with others when contemplating efforts and resources for solar energy.

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