

## Interconnection Of Renewable Energy Sources To Grid System

Ashwini Palkar, Sonali Ahiwale, Nikita Shinde, Amol Godase,  
Shivkumar Londhe

<sup>12345</sup> Dept. of Electrical Engineering, S.M. S. M. P. I. T. R, Akluj, Solapur, Maharashtra.

**Abstract:** Increasing electricity demand reveals the challenges presented by limited resources and environment impacts. As an alternative to the conventional plants, renewable resources such as wind power and PVs account for an increasing percentages of electricity generation in recent years. Although renewable resources have many advantages, their intermittent nature must be addressed before large scale application. Unlike wind power, which has higher power output at night and in early morning, solar power only exists during daytime. The hybrid system combines several energy systems together, so it can supply high reliable electricity. Also it increases the reliability and reduces the dependence on one single source. This hybrid solar and wind system is suitable for industries and also domestic areas. The demand for electricity is increasing day by day, which cannot be fulfilled by non-renewable energy sources alone. Renewable energy sources such as solar and wind are environment friendly. It ensures the optimum utilization of resources and hence improves the efficiency as compared with their individual mode of generation. The best application for these types of systems is in remote places, such as rural villages. The importance of hybrid system has grown as they appear to be the right solution for a clean and distributed energy production.

**Keywords:** solar energy, wind energy, hybrid power system.

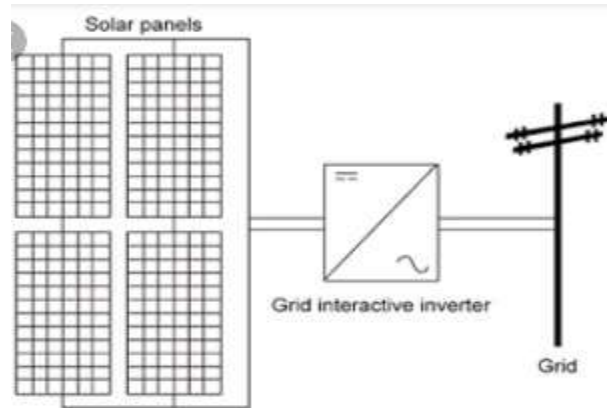
### I. Introduction

There are many remote places, especially in developing countries, where Grid supply has not reached yet but still with more availability of solar-wind hybrid systems. A combination of different renewable energy sources, like wind generator, fuel cell and PV-system, with conventional energy source, like a diesel generator, is known as hybrid power system. Hybrid systems can provide a continuity in the supply level of electricity service, such as village electrification, offering also the possibility to be upgraded through Grid connection in the future. The project which is to investigate for the best design layout to size the system elements appropriately; to design different models and simulate for the different power management strategies which are defined for the system of the HPSs, it consists of renewable energy sources PV-arrays (solar cell) and wind generator, conventional backup energy source and energy storage bank to sustainably and efficiently satisfy the energy demand of remote site. Solar and wind energy are non-detectable, site dependent, non-polluting, and potential sources of alternative energy options. For both systems, variations in meteorological conditions are important. The performance of solar and wind energy systems are strongly dependent on the climatic conditions at the location. The power generated by a PV system is highly dependent on weather conditions. For example, during cloudy periods and at night, a PV system would not generate any power. Combination of wind mills and PV cell systems are much more popular for unique system for power generation applications, due to advances in renewable energy technologies and subsequent rise in prices of petroleum products. The Economic aspect of these technologies shows sufficient promise to include them in developing power generation capacity for developing countries. Research and development efforts in solar, wind, and other renewable energy technologies are required to continue improving their performance, establishing techniques for accurately predicting their output and reliably integrating them with other conventional generating sources.

### II. Hybrid Renewable Energy Sources

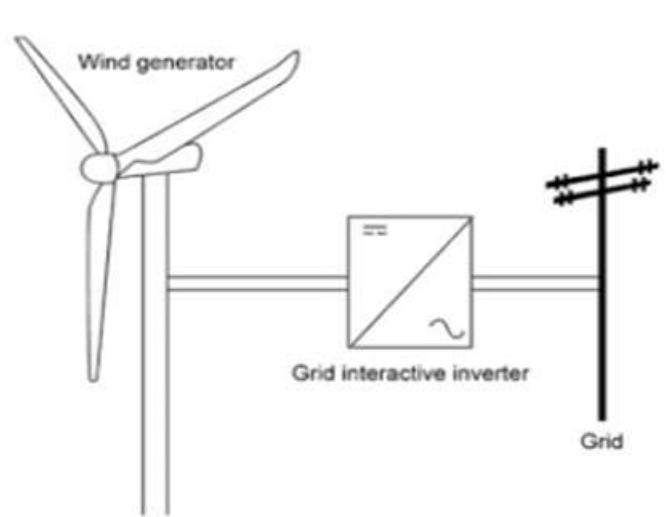
#### Solar System:

A solar cell, or cell, is an device that converts the energy of sunshine directly into electricity by the electrical phenomenon of photovoltaic effect. It's a variety of sensing element, designed as a tool whose electrical characteristics, like current, voltage, or resistance, vary once exposed to light-weight. Solar cells are measured as being electrical phenomenon regardless of whether or not the supply is daylight or artificial light-weight. The operation of a solar cell (PV) needs three basic attributes. The absorption of sunshine, generating either electron-hole pairs or excitations. The separation of charge carriers of opposite varieties. The separate extraction of those carriers to an external circuit Wind System.



**Figure:** Energy generation from solar panel

Wind turbines square measure accustomed generate electricity from kinetic power of the wind i.e. the generation of wind energy primarily depends on the wind speed. to reinforce the energy capture, the rotary engine is mounted on a tall tower. Wind is AN intermit-tent resource; but, wind turbines aren't unreliable technology. fashionable wind turbines aren't unreliable technology. fashionable wind turbines capture over ninetieth of accessible energy from wind, compared with fuel e ciency between 30- four-hundredth for a standard coal red station, which generally loses a signi cant portion of energy through heat loss and pol The major advantage of the system is that it meets the essential power needs of non-electrified remote areas, wherever grid power has not nonetheless reached.



**Fig.** wind system

Block Diagram

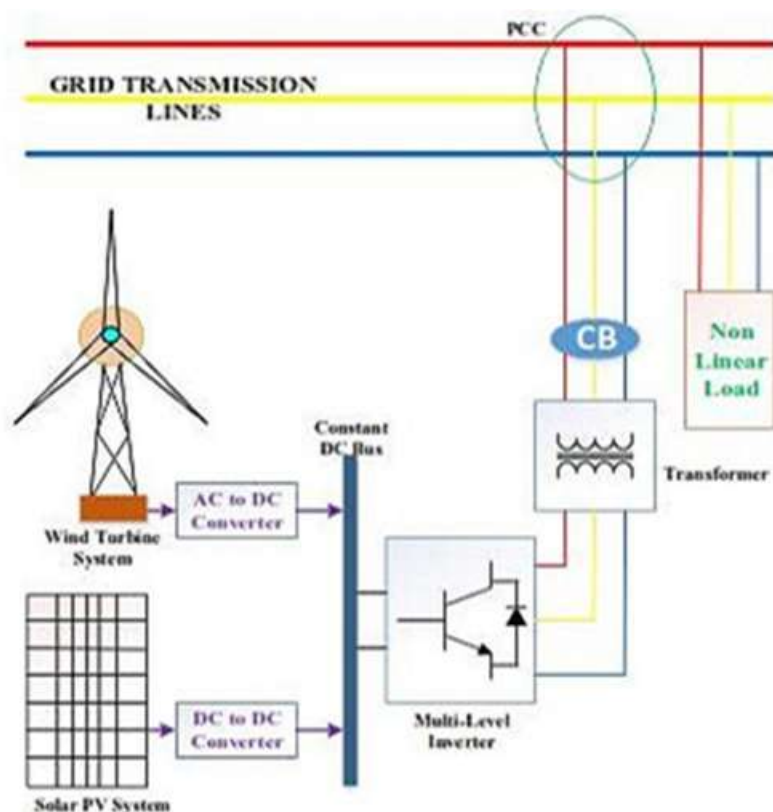


Fig. Block diagram of interconnection of renewable energy sources to grid system.

### III. Advantages Of Wind And Solar Hybrid Solar System

The major advantage of the system is that it meets the fundamental power necessities of non-electrified remote areas, wherever grid power has not nevertheless reached. The power generated from each wind and star parts is keep in a very battery bank to be used whenever needed. A hybrid renewable energy system utilizes 2 or additional energy production ways, usually solar and wind power. The major advantage of star / wind hybrid system is that once star and wind generation productions ar used along, the reliability of the system is enhanced. Additionally, the size of battery storage can be reduced slightly as there is less reliance on one method of power production. Wind speeds ar typically low in periods (summer, eventually) when the sun resources are at their best. On the opposite hand, the wind is often stronger in seasons when there are less sun resources. Even throughout constant day, in many regions worldwide or in some periods of the year, there are different and opposite patterns in terms of wind and solar resources. And those totally different patterns will build the hybrid systems the most effective possibility. An hybrid wind-solar electrical system demands associate higher initial investment than single giantr systems: large wind and star PV systems ar cheaper than smaller systems. But the hybrid answer is that the most suitable choice onceever there's a major improvement in terms of output and performance - that happens when the sun and therefore the wind resources have opposite cycles and intensities throughout constant day or in some seasons.

### IV. Conclusion

Two-way communications ar the basic infrastructure that allows the accommodation of distributed renewable energygeneration. during this paper, we tend to reviewed communication technologies accessible for the grid integration of renewable energy resources. The conception of wind and star integration is been mentioned, which supplies higher output, scale back the losses and provides higher watching ,control and operation is achieved with facilitate ofpower physics devices like converters and conjointly with communication technologies. Distinct characteristics in integration of renewable energy resources create new challenges to the communication systems, that benefit additional analysis.

### V. Future Scope

There are many challenges and issue associated with integration of renewable energy sources to the Grid. RES available in the nature is intermittent thus grid interconnection become a challenging task. So it is very

attractive job to make the system of Grid so that the problem which arises due to on Grid system can be removed.

### **References**

- [1]. F. Valenciaga and P. F. Puleston, "Supervisor Control for a Stand-Alone Hybrid Generation System Using Wind and Photovoltaic Energy," *IEEE Transactions on Energy Conversion*, vol. 20, no. 2, pp. 398-405, June 2005.
- [2]. W.D.Kellogg, M. H. Nehrir, G.Venkataramanan, And V. Gerez, "Generation Unit filler and value Analysis For complete Wind, electrical phenomenon, And Hybrid Wind/Pv Systems," *IEEE Transactions on Energy Conversion*, vol.13, No. 1, Pp. 70-77, 1998.
- [3]. Smruti Ranjan Pradhan "Design of Off-Grid Homer with solar-wind-biomass Energy", *Int.Journal of Engineering analysis and Applications* ISSN: 2248-9622, Vol.[6] N.
- [4]. Pandiarajan and Ranganath Muthu, "Mathematical Modeling Of Photo-voltaic Module With Simulink", *International Conference On Electrical Energy Systems (ICEES 2011)*, 3-5 Jan 2011.
- [5]. Yogesh Tiwari and Chitesh Dubey "To design solar (photovoltaic) -Wind hybrid power generation system", *International Journal of Emerging Trends & technology in computer science (IJETTCS)*, Volume 1, Issue 4, November Mahmud Abdul Matin Bhuiyan, Anik Deb and Arun Nasir "Optimum Planning of Hybrid Energy System using HOMER for Rural Electrification" *International Journal of Computer Applications* (0975 - 8887) Volume 66 ( No.13, March 2013).
- [6]. Joshi Manisha Vitthal "Analysis of single phase Grid connected Solar Photo-voltaic System", Department of Electrical Engineering Pune.
- [7]. Rohit G. Ramteke and Dr. U. V. Patil, "Design and Comparative study of Filters for multilevel structure construction of electrical converter for Grid Interface", *IEEE International Conference on Power, Automation and Communication (INPAC-2014)*, Government school of Engineering, Amravati on 06th-08th October-2014. ISSN 978-1-4799-7169-5/14.