

Wind-Solar Hybrid Power System

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Abstract—The main purpose of energy production is to fulfill the power requirements of the society along with necessary safety and reliability. The prime objective of energy generation is to satisfy customer needs economically with emphasis on safety, reliability and quality. Many conventional methods energy generation depend upon renewable and exhaustive resources like coal, oil, nuclear fuels etc. With growing environmental awareness to preserve conventional resources for future generations, escalating fuel prices, safety as in case of nuclear plants; conventional power sector has felt a setback. Ever increasing requirement of energy has led to power generation techniques stressing on reduced emissions, efficient energy uses of exhaustive sources along with safety. In the same context, technology to harness power from newer renewable energy resources has paved the way for a greener tomorrow. Worldwide interest extracting energy from Renewable Sources increasing day by day mainly because Global population has concerns over vision air quality global warming cetera electrification of rural areas developing country like India is a factor favors because these sources have minimal impact on Environment ecology and human health. Most of the people in India reside in villages and many villages are so remotely located they are not connected to any electrical power grid. Lack of power affects quality of living of such population; for example, shortage of cold storage facilities for perishable items or medicines, lack of entertainment like TV, industrial and agricultural growth etc Now renewable resources are changing this scenario. At present renewal resources have more cost of production in terms of per unit of power generation but they possess added advantage having zero and desirable impact on our environment.

Keywords: Solar System, Aero-wind Generator.

I. INTRODUCTION

Renewable energy can meet the electrical power requirement in the difficult terrains like hills, islands, remote areas and unreachable places. Photovoltaic solar and wind system combination provides a good alternative which can take care of required power output throughout the year despite of seasonal variation of sun radiation and wind flow speed.

Solar energy: There are good places of solar energy resources on earth, average global solar radiation on the horizontal surface is about 4.5 kWh / sq.m / day and on the 300 inclined surfaces it was 5.1 kWh /sqm/day. There data indicate the bright prospects for solar thermal and photovoltaic application.

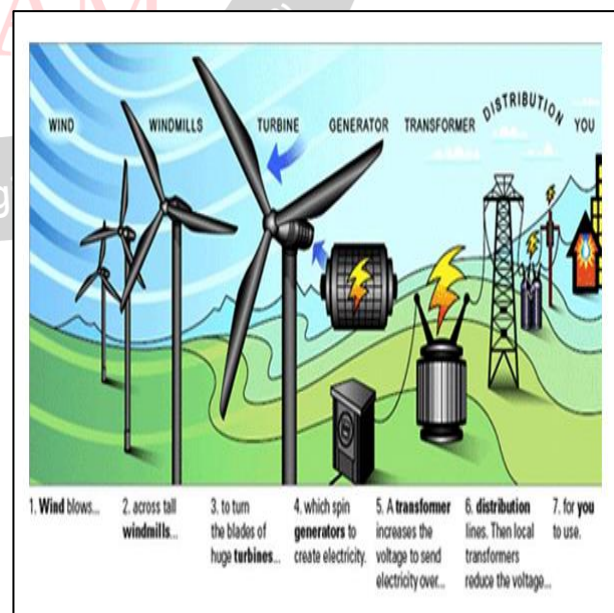


Figure 1 Wind Energy

II. ADVANTAGE OF RENEWABLE ENERGY

FEATURES OF AERO WIND GENERATOR

Exclusive auto-brake-feature that slows the system to a silent spin when the batteries are charged thus extending bearing life and reducing noise.

No pollution and easy installation, Designed to be used in combination with photovoltaic modules to balance the system energy output during times of fluctuation. The wind power plant should be installed where annual wind speed is minimum 4 meters per second. Aero generator of a capacity of more than 500 V should not be installed on the roof of a building. About 20 years life of the equipment.

FEATURES OF SOLAR POWER GENERATOR

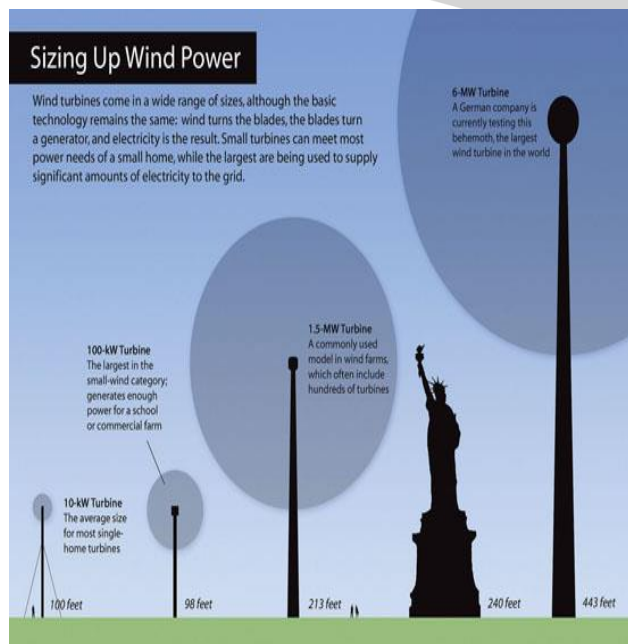


Figure 2 Sizing up wind power

Solar PV modules having a lifespan of 10 years from the date of installation. The place for installing the solar system should be free from high rise buildings, electrical transmission lines within a radius of about 100 meters.

Microprocessor - based internal regulator with peak power tracking, safety protection, electronics control voltage and rotor RPM.

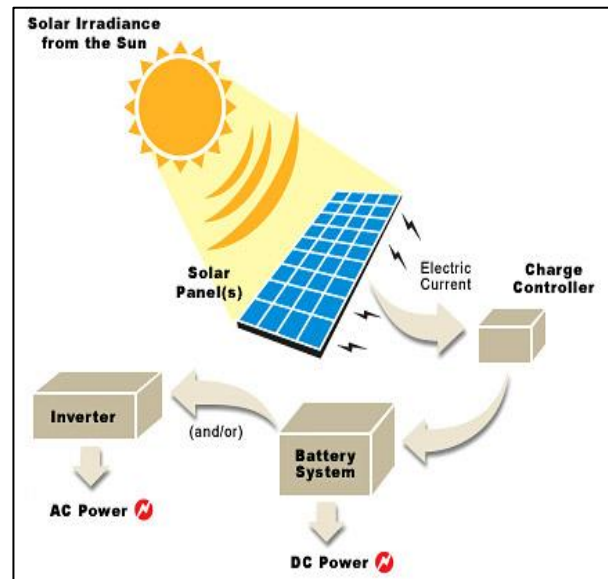


Figure 3 Solar Power

III. THE HYBRID SYSTEM

The hybrid system includes:

- **PV-Array:** Generally a number of PV panels are connected in series or parallel with a proper orientation. It gives out a dc output extracted out of thermal energy of the incident radiation. The efficiency of the system is low at about 14% only.

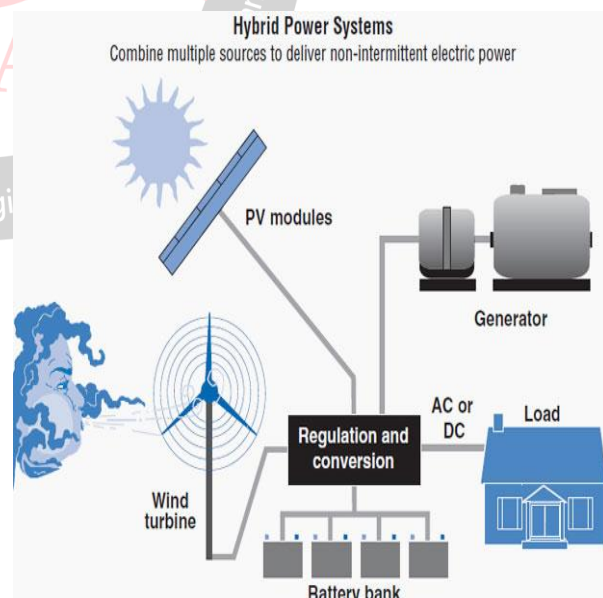


Figure 4 Hybrid Power Systems

- **Wind turbine:** It can be installed on top of a hill or a pillar/tower or a column. It converts the kinetic energy of the flowing

air/wind into the electrical power meant for the use by end consumers

- **Aero-wind generator:** It is having an electric generator directly coupled to the propeller shaft, which on rotation rotates the rotor of an electrical generator and provides dc output.

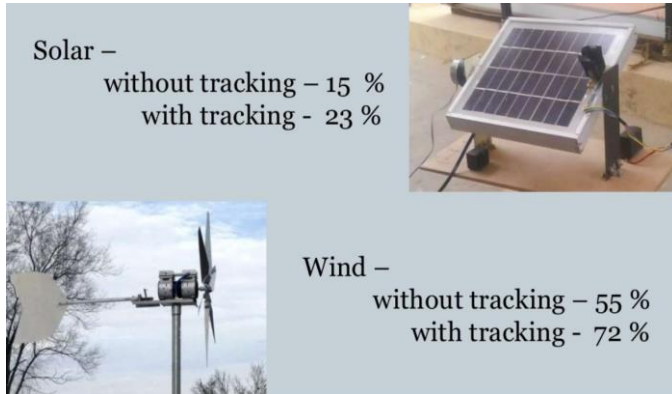


Figure 5 Increase in efficiency of wind and solar

IV. ADVANTAGES/SALIENT FEATURE OF HYBRID SYSTEM

- Saves the cost of expensive mains cable
- Enhances public safety and helps in building a safer working environment in areas where conventional power is difficult in assessing.
- Easy in operation, service and maintenance
- Eco-friendly and clean source of power.
- Less pollution and no recurring fuel costs.
- Highly reliable and consistent good quality power supply with steady voltage and frequency.
- Long life span for SPV modules and modular design.
- Lower total system cost, contribution of solar and cost effective electric power output with steady voltage and frequency.
- Environmental pollution is controlled thus improving health. Laying of expensive grid line, transmission and distribution losses can be eliminated. can generate DC power as long as sun and wind available.

IV. APPLICATIONS

- mobile phone towers, hotels.
- Ideal for Cell Phone Recipient Stations.
- Harm Houses, Guest Houses, Hospitals, Hotels, Laboratories and R & I) Centers.
- Petnote and Rural Village Electrification.
- Kenidential Colonies and Apartments

Street lighting.

- Transmission and communication towers and many more applications
- High output make ideal for virtually any remote battery charging applications.

V. CONCLUSION

1. Hybrid (solar— wind) energy system has less impact on environment and ecology and is best suited for inaccessible areas and hilly terrain's where wind availability is continuous. Hybrid system comprising of wind plant solar system can contribute to power generation sector developing countries and will enhance the quality life of citizens of these
2. Nations division of hybrid system may not be significant in any country's economy they cancer well two inaccessible areas and less privileged people the importance is going to grow along with the time.
3. Rapid scientific & technological breakthroughs will expand the economic range of renewable energy applications in next 10-15 years, making more important and economically viable choice of the power generation technique of the power sector in future.

REFERENCES

- [1] Non - conventional sources of energy- B H Khan, McGraw Hill, Delhi
- [2] P. Dalwadi, V. Shrinet, C. R. Mehta and P. Shah, "Optimization of solar-wind hybrid system for distributed generation," 2011 Nirma University International Conference, Ahmedabad, Gujarat, 2011, pp. 1-4. site.uottawa.ca/~rhabash/HybridSystem.pdf 14
- [3] Solar energy hand book. William. C. Dickenson
- [4] wikipedia.org/wiki/Solar_cell_efficiency