Hybrid Power Generation System By Wind And Solar Energy

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Abstract- *As the race for global industrialization increasing, the developing technology made humans to depend on energy, so as the energy crisis begins, in this modern era, electricity become a most essential need of human beings, from household to industrial work. So, the purpose of this Paper is to generate electricity without using non-renewable resources and pollution. Since, renewable standalone energy generation system has disadvantages, which need to be overcome by hybrid systems. Wind and solar energy have being popular ones owing to abundant,ease of availability and convertibility to the electric energy.Here, wind turbine is used for convert the wind energy into Electrical energy, also solar plats for light energy to Electric energy.This paper covers realization of hybrid energy system for multiple applications, which runs under a designed circuitry to utilize the solar and wind power. for the Dc to AC conversion Inverter is also used here.*

Keywords- Wind Turbine, Solar Plats, DC to AC Inverter.

I. INTRODUCTION

Hybrid Renewable Energy Systems (HRES) are becoming popular as stand-alone power systems for providing electricity in remote areas due to advances in renewable energy technologies and subsequent rise in prices of petroleum products. A hybrid energy system, or hybrid power, usually consists of two or more renewable energy sources used together to provide increased system efficiency as well as greater balance in energy supply. Most of us already know how a solar/wind power generating system works, all these generating systems have some or the other drawbacks (considering standalone system), like Solar panels are too costly and the production cost of power by using them is generally higher than the conventional process, it is not available in the night or cloudy days. Similarly Wind turbines can't operate in high or low wind speeds. Solar hybrid power systems are hybrid power systems that combine solar power from a photovoltaic system with another power generating energy source. This would create more output from the wind turbine during the winter, whereas during the summer, the solar panels would produce their peak output.

II. SYSTEM COMPONENT

Solar Panel: Solar panels are photovoltaic which generates electrical energy using sun light radiations. Depending on the position and intensity of the sun radiation the amount of electrical DC energy will produced. For the proposed system specifications and design, a 12V, 150 watt off grid solar panel is used.

Fig.1 Solar Panel

Wind Turbine: Wind Turbine is mechanical system/machine which generates electrical energy from renewable wind energy source. Depending on the speed of the wind the amount of electrical AC energy will produced. For the, a 500 watt, having 3 blades of 1 meter radius, wind turbine generator will be needed.

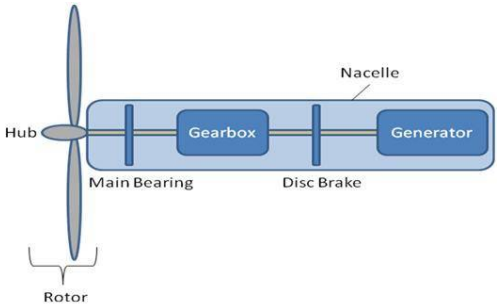

Fig.2 Wind Turbine

Batteries: The energy generated from the proposed project is needed to be store. So, two batteries is needed. One is attached to wind turbine for which a 120AmpH battery will be required, which will be fair enough full fill the storage capacity for targeted value. The second battery is 80AmpH is preferred for storing solar energy. But, as per application/ storage and demand battery capacity can be variable.

Inverter: Inverter is a electronic system, converters direct current into alternating current, i.e. DC into AC. The stored electrical energy in the batteries is DC in nature. And it cannot utilize for various kinds of load. So, for delivering AC supply to the load inverter system is required. Digital inverter is microcontroller based which increase the build-up cost of the system also, is uses MOSFET technology providing more efficiency.

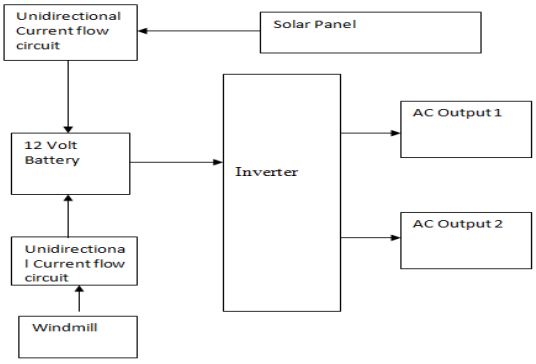

Fig. 3Wind –Solar Hybrid Power Generation System

III. WORKING OF HYBRID PLANT

The solar panel takes light Energy from the Sun light. Due to photovoltaic cell the Electrons move and panel generate DC supply. This DC supply goes to 12 volt DC Battery to store it. Same way

From the Wind mill, Wind turbine converts the Mechanical energy of rotating blades of the turbine into Electrical energy. This is a AC power from the wind turbine. First convert it into DC and send to Battery system as same way as above stated. this 12 volt DC supply of Batteries fed to Single phase Inverter which convert that DC supply into 230 volt variable AC. So, in this way we can obtain more energy from this Hybrid power plant for utilization. It is clean energy source and cost effective also.

convert it into 9V, 1Ampere. Here LM7805 Voltage regulator connected next of the Transformer which gives 5 volt regulated voltage supply to ATMEGA328 Microcontroller. 4*3 Keypad is a numeric pad to gives the input to microcontroller. Swipe card detector is use for digital payment process. it gives the information to microcontroller. RFID works on inventory management, Asset tracking, ID budging. The Display is connected to the controller for showing necessary data for humans. after that through the output relay by the appropriate voltage and current ration, the supply are give to Electric Vehicle to charge it.

IV. CONCLUSION

This paper shows how to implement the Electric Solar- Wind Hybrid power plant to generate the clean and cheap cost energy from the non-conventional energy resources that is solar energy and wind energy.

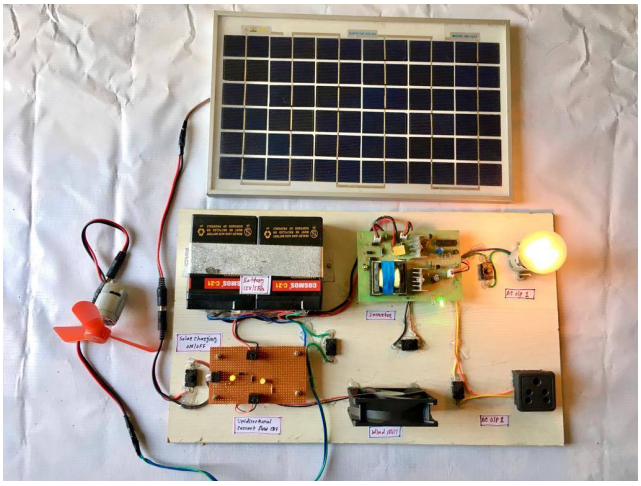

Fig.4 Model of Hybrid Power Plant

This Hybrid system can be make more efficient and powerful in future by using advanced technologies also.

REFERENCES

[1] T.S. Balaji Damodhar and A. Sethil Kumar, “Design of high step up modified for hybrid solar/wind energy system,” Middle-East Journal of Scientific Research 23 (6) pp. 1041-1046, ISSN 1990-9233, 2015.
[2] Walaa Elshafee Malik Elamin, “Hybrid wind solar electric power system,” report, University of Khartoum, Index-084085, July 2013.
[3] Sandeep Kumar and Vijay Garg, “Hybrid system of PV solar/wind & fuel cell,” IJAREEIE, Vol. 2, Issue 8, ISSN 2320-3765, August 2013.
[4] Rakeshkumar B. Shah, “Wind solar hybrid energy conversion system- leterature review,” International Journal of Scientific Research, Vol. 4, Issue 6, ISSN 2277-8179, June 2015.
[5] Ugur FESLI, Raif BAYIR, Mahmut OZER, “Design & Implementation of Domestic Solar-Wind Hybrid Energy

System", Zonguldak Karaelmas University, Department of Electrical and Electronics Engineering, Zonguldak, Turkey.

[6] Nazih Moubayed, Ali El-Ali, Rachid Outbib, "Control of an Hybrid Solar-Wind System with Acid Battery for Storage", Wseas Transactions on Power System, Labortory of Science in Information and System (LSI), Axi-Marseille University, France

[7] K Mousa, H AlZu'bi, A Diabat,Design of a hybrid solar-wind power plant using optimization,2010 Second International Conference on Engineering System Management and Applications.

[8] S sing, m. Sing ,A review on optimization techniques for sizing of solar-wind hybrid energy systems,International Journal of Green Energy Volume 13, 2016 - Issue 15.

[9] Pritesh P. Shirsath , Anant Pise ,Solar-Wind Hybrid Energy Generation System, Ajit Shinde,International Journal of Engineering Research and General Science Volume 4, Issue 2, March-April, 2016.

[10] J. P. Castillo, C. D. Mafiolis, E. C. Escobar, A. G. Barrientos and R. V. Segura, Design, Construction and Implementation of a Low Cost Solar-Wind Hybrid Energy System, IEEE Latin America Transactions (Volume: 13, Issue: 10, Oct. 2015)