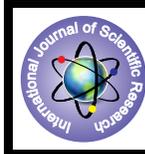


Wind Solar Hybrid Energy Conversion System- Literature Review



Engineering

KEYWORDS : Maximum Power Point Tracking (MPPT), Photovoltaic System, Hybrid Energy Conversion System, Solar energy, Wind energy, Renewable energy.

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ABSTRACT

This paper presents a technological literature review on Wind Solar hybrid energy conversion system. This hybrid solar-wind power generating system is suitable for industries and also domestic areas. It ensures the optimum utilization of resources and hence improves the efficiency as compared with their individual mode of generation.

INTRODUCTION:

Renewable energy sources i.e., energy generated from solar, wind, biomass, hydro power, geothermal and ocean resources are considered as a technological option for generating clean energy. But the energy generated from solar and wind is much less than the production by fossil fuels, however, electricity generation by utilizing PV cells and wind turbine increased rapidly in recent years. The Solar-Wind hybrid Power system that harnesses the renewable energies in Sun and Wind to generate electricity. This hybrid solar-wind power generating system is suitable for industries and also domestic areas.

LITERATURE REVIEW:

[1] **J. Godson, M. Karthick, T.Muthu krishnan, M.S.Sivagama sundari** have presented 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.

[2] **Kavitha Sirasani, S.Y. Kamdi** said that increasing of energy demand in energy market, we have to adopt and implement some specific resources. The promotion of energy production from renewable sources represents an imperative objective in present times justified by environment protection, the increase of energetic independence by supplying sources diversity and economic and social cohesion reasons.

[3] **S.J Park, B.B Kang, J.P Yoon, I.S Cha J.Y Lim** have presented Existing photovoltaic system also reacts sensitively to the weather of low changing efficiency, irradiation or temperature. And, its characteristics are different according to manufacturer of solar cell. In order to solve these existing problems, this paper was suggested the sub power generator that uses elasticity energy of spiral spring to photovoltaic system was also added.

[4] **Ghassan HALASA, Johnson A. ASUMADU** said that Jordan has high electric production cost that is directly linked with oil prices. An alternative is renewable wind and solar electric power production. The possibility was thoroughly investigated. The result is to install windmill farm in the mountainous area in the north, where wind speed proved to be viable, while the eastern desert is suitable to install solar power station. For reliable energy system, hybrid power production is essential.

[5] **Sharad Kumar, Dhananjay Kumar, Lalit Kumar and Dheeraj Lal** have provided a system and method for producing electricity for minor irrigation system using the biological energy of the muscles of animals like bullock by means of a mechanical device. The project goal was to combining the solar power and animal power to minor irrigation which will work when

even sun is not available. This goal had to be met within the constraints of a low production cost and high safety. The project has to offer a durable product with relatively good efficiency and emission free system. This is also concluded that animals are the great energy source for generating power for farmers for minor irrigation even having low speed.

[6] **Gunes GURSOY and Mustafa BAYSAL** have given optimal sizing of hybrid energy systems that incorporate solar PV, wind and battery can be realized more accurately by using varying air density and PV panel efficiency. The sizes of wind turbine and PV panel may increase quite. It can also be used demand response that is smart grid technology in order to reduce installed battery capacity in hybrid system. Results show that demand response application can reduce the battery size about 65%, thus causes the 28% reduction in capital cost of the system.

[7] **Subhadarshi Sarkar and Venkataramana Ajjarapu** In this paper, a systematic stochastic planning approach— MWRAM— was demonstrated for assessing the MW resource availability of a hybrid ECS with wind and solar resources for a given location. The study period of one year was divided into four seasons; one day in each season was further divided into 24 1-hour time segments. This “stratified” approach captures the varying nature of the resources over different times of the day as well as the year by explicitly computing the probabilistic model parameters from actual field measurement data using the MLE method.

[8] **Vivek Dixit and J.S.Bhatia** gave analysis this solar-wind hybrid system can be used by any domestic user at a place where wind speeds are not that good. It will charge the inverter battery even when there is no grid power. There is lots of space for improvement in this system like Maximum Power Point Tracking (MPPT) or other power enhancement methods. This improvement can be incorporated without any big increase in the system costing because there is only a little addition to the electronic components to the charge controller circuitry. This can prove a vital system in the field of renewable energy resources and can be seen in every household in the northern India.

[9] **G. Sridhar Babu and Y. Kanakaraju** In this paper a new multi-input Cuk-SEPIC rectifier stage for hybrid wind/solar energy systems has been presented. The features of this circuit are:

- 1) additional input filters are not necessary to filter out high frequency harmonics; 2) both renewable sources can be stepped up/down (supports wide ranges of PV and wind input);
- 3) MPPT can be realized for each source; 4) individual and simultaneous operation is supported.

[10] **Anumeha Awasthi, Kuldeep Sahay and Anuj Yadav** have given a generalized PV model which is representative of the all PV cell, module, and array has been developed with Matlab/Simulink and been verified with a PV cell and a commercial

module. The proposed model takes sunlight irradiance and cell temperature as input parameters and outputs the I-V and P-V characteristics under various conditions. This model has also been designed in the form of Simulink block libraries. Such a generalized PV model is easy to be used for the implementation on Matlab/Simulink modeling and simulation platform. Especially, in the context of the Sim Power System tool, there is now a generalized PV model which can be used for the model and analysis in the field of solar PV power conversion system.

CONCLUSION:

This Literature Survey is dedicated to a comprehensive study of Wind Solar hybrid energy conversion system. The Solar-Wind hybrid Power system that harnesses the renewable energies in Sun and Wind to generate electricity. System control relies mainly on micro controller. It ensures the optimum utilization of resources and hence improves the efficiency as compared with their individual mode of generation. Also it increases the reliability and reduces the dependence on one single source. This hybrid solar-wind power generating system is suitable for industries and also domestic areas.

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