**A HYBRID SOLAR-WIND POWER GENERATION SYSTEM**

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**ABSTARCT**

 There is increasing demand for the use of alternative renewable energy sources to achieve clean and low-cost electric energy for loads. Wind and solar energies are some of the renewable energy sources which are mostly available in the world. In this study, a hybrid power station has been designed using solar and wind energies.

 Hybrid power system can be used to reduce energy storage requirements. The influence of the Deficiency of Power Supply Probability (DPSP), Relative Excess Power Generated (REPG), Energy to Load Ratio (ELR), fraction of PV and wind energy and coverage of PV and wind energy against the system size and performance were analyzed. The technical feasibility of PV-wind hybrid system in given range of load demand was evaluated. The methodology of Life Cycle Cost (LCC) for economic evaluation of stand-alone photovoltaic system, stand-alone wind system and PV-wind hybrid system have been developed and simulated using the model. The comparative cost analysis of grid line extension energy source with PV-wind hybrid system was studied in detail. The optimum combination of solar PV-wind hybrid system lies between 0.70 and 0.75 of solar energy to load ratio and the corresponding LCC is minimum. The PV-wind hybrid system returns the lowest unit cost values to maintain the same level of DPSP as compared to standalone solar and wind systems. For all load demands the levelised energy cost for PV-wind hybrid system is always lower than that of standalone solar PV or wind system. The PV-wind hybrid option is techno-economically viable for rural electrification.