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| **Abstract:** |  |
| **Renewable energy based hybrid energy system have been considered as an efficient mechanism to generate electrical power. The basic idea of hybridizing the energy sources is that the base load is to be supplied by principal energy source and the peak load supplied by other irregular sources. The Bangladesh Government decided to provide electricity throughout the country by 2021. According to government policy the BREB (Bangladesh Rural Electrification Board ) is work for ensuring electricity in the rural area of Bangladesh. But in some rural forest area like kaliakair upazilla in gazipur district it is very difficult to provide electrification all the time during the month of April to September because of heavy rainfall and storm. The purpose of this study is to suggest the optimal hybrid energy system for generation of electricity from a combination of energy sources to fulfill the energy demands of the Kaliakair Upazilla in Gazipur District of Bangladesh. The design of hybrid energy system based on PV system, CAES and grid are considered in this study. The study area is the vannara, Kaliakair Upazilla in Gazipur District of Bangladesh.. The study is based on simulation and optimization of renewable energy system using Hybrid Optimization Model for Electric Renewable (HOMER). The hybrid model has been designed to provide optimized system configuration based on hybrid energy component costs, technical specifications and energy demand. The proposed hybrid energy system is environmental friendly which mitigates the CO2 emission and other greenhouse gas emissions.** | |