## عنوان مقاله:

Techno-economic Optimization of a Stand-alone Photovoltaic-battery Renewable Energy System for Low Load Factor Situation- a Comparison between Optimization Algorithms


## محل انتشار:

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## خلاصه مقاله:

For remote places having less-strong wind, single resources based renewable energy system (RES) with battery storage can sustainably and economically generate electrical energy. There is hardly any literature on optimal sizing of such RES for very low load demand situation. The objective of this study is to techno-economically optimize the system design of a Photovoltaic (PV)-battery storage RES for an institutional academic block in Silchar, India having maximum demand less than only 30 kW. The sizing process of various subsystems of the RES is first discussed. Then the RES is techno-economically optimized under 100% reliability to power supply condition, i.e. 0% unmeet energy (UE) and least excess energy. In this, performances of three different optimization algorithms- genetic algorithm (GA) and two meta-heuristics, namely Firefly Algorithm (FA) and Grey Wolf Optimizer (GWO) algorithms are investigated and compared. The optimal configuration under least levelized cost of energy (COE) is further examined. Results demonstrate that GWO is the best optimization tool for optimizing the cost of energy (COE) in comparison with the other optimization algorithms. It has been shown that a single optimization method might not always guarantee that the objective function has converged successfully in fulfilling all the requirements of least excess energy, autonomy days, and least COE. The present research provides a useful reference for the design optimization of single resource based RES for low load demand situation.



## کلمات کلیدی:

Photovoltaic Renewable Energy System,Levelized Cost of Energy,Reliability,Meta-heuristic Algorithms,Cost Optimization,Load Factor,Autonomy Days,