

# Optimal sizing and performance investigation of a solar-wind-battery-DG based hybrid Microgrid system applicable to the remote school of Bangladesh

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## Abstract

The demand for electricity is increasing all over the world. In Bangladesh, there are many rural areas where the grid connection has not reached yet. In this paper, a performance evaluation was done with a solar-wind hybrid renewable energy system with diesel backup for a school located in a remote area, Baje Fulchari village in Gaibandha district, Bangladesh. For the proposed site, the load demand was considered 10.468 kWh/day for a normal working day (taken from a field survey) having peak demand of 3.3 kW. HOMER software was used for the simulation. The solar radiation and wind speed data were collected from NASA Surface meteorology and Solar Energy database. The NPC for the most economical system configuration is found USD 6,191 with a COE of 0.125 \$/ kWh. Compared to the conventional power plants the proposed system can reduce the COE and GHG emission of about 29.85% and 69% respectively. The system evaluated in this work might be implemented in a school or any other location of similar load profile anywhere in the world having the same geographical and meteorological conditions.

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