The working of Hybrid Renewable Energy Systems

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Abstract:

Sustainability-wise, a single criterion is insufficient to establish the best Hybrid Renewable Energy System (HRES). This paper presents a multi-criteria method for low-income HRES selection. The investigation compares energy demand with or without EET (EET). The HRES is optimized using hybrid optimization of various renewable energy (HOMER), or the multi-criteria analysis uses CRITIC and TOPSIS (TOPSIS). PV/GEN/BAT is the best HRES in energy demand scenarios. A 44.6 percent decline in energy demand utilizing EET reduces net current expenses by 51.38 percent, energy prices down 11.90 %, CO_2 emissions at 96.61 percent, and renewable fraction by 193.94 percent. Multi-criteria HRES selection impacts the best acceptable alternative selection and ranking. MCDM may help decision-makers to choose the best HRES.

Keywords:

Energy Efficiency, Hybrid Renewable Energy System, Homer, Topsis, Low-Income Household.