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Abstract:

In this progressing technological advancement world, hybrid systems for power generation is one of the most promising fields for any researcher. In this context, photovoltaic-biomass hybrid systems with off-grid applications have become extremely popular with both Governments and individual users in rural areas of any part of the world. This system has gained popularity because of low cost, sustainability and very effective outcome with the use of natural resources at the rural areas. In this paper a proposed hybrid system which contains photovoltaics (PV) and biomass along with an additional storage has been considered to find the different aspects from an end user point of view. It also discusses the feasibility of the proposed model for an off-grid power system located in the remote areas of Ashuganj, Bangladesh. In order to analyse the pollutant emissions and calculate the cost parameters of the proposed system, RETScreen simulation software was deployed. This research also carries out a brief financial analysis considering the annual income of the end user and the payback periods for the installed system. It endeavours to provide complete information about different parameters which also includes the environmental impacts involved in establishing the proposed system. The conventional system in the pilot area is a kerosene-based system, hence in this research, a comparison between the proposed and the conventional system has been analysed using simulated results. The simple payback of the project was estimated to be 6.9 years and this model will be able to reduce the CO₂ emissions by approximately 3.81 tonnes per year. The results have significantly supported the proposed system to be more reliable, environmentally-friendly and less costly than the conventional kerosene-based system. © 2020 by the authors.