

Study On Renewable Energy Systems for Rural Electrification

Mr. Amit Nanaji Akkewar¹ and Dr. Amol Barve²

Research Scholar, Electrical Engineering, LNCT University, Bhopal, India¹

Guide, Electrical Engineering, LNCT University, Bhopal, India²

Abstract: *In recent years, as the cost of renewable energy generating technology has decreased, there has been an increase in research devoted to the appropriate scale of renewable off-grid systems. Many of these studies use daily load profiles to predict electricity consumption, which are occasionally supplemented with seasonal or random components. Such techniques often neglect the existing possible case-specific association between renewable energy supply and energy demand, particularly the load's inherent variability in terms of extreme values or ramp rates. The Cost of Energy and Net Present Cost of a Lithium-Ion battery-based system are determined to be 30% and 35% lower than those of a Lead Acid battery-based system, respectively. The research is further expanded to include sensitivity analysis for a variety of input factors, including discount rate, photovoltaic cost, battery cost, fuel cost, wind speed, and design flow rate. To define the final energy dynamic and estimate -effective arrangement for the examined region, several groups of wind turbines, PV solar systems, and biomass generators are simulated, modelled, and optimised. The HOMER computer programme was used to assess the techno-economic viability of the proposed projects, taking into account the Net Present Cost (NPC) and the Levelized Cost of Energy (LCOE) as cost factors.*

Keywords: Renewable, Energy, Rural, Electrification, PV/Biomass, Energy Cost

