National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Techno Economic Assessment and Sizing Analysis of PV, Fuel cell and battery Microgrid using HOMER Pro
Speaker	: rasmiranjan Swain (522ee1006)
Supervisor	: Prof. Indrajit Sarkar
Venue	: Seminar Room (EE-205)
Date and Time	: 17 Jul 2025 (5:15 PM)
Abstract	: This work focuses on the cost of energy (CoE) sensitivity analysis of PV and fuel cell based microgrid with battery energy storage system (BESS) to power a small residential apartment with average load demand of 15 kWh/day. Cost data for multiple microgrid components are incorporated into the simulation model enabling thorough evaluation of different system configurations. Various technical and economic parameters, such as fuel price fluctuations, PV and fuel cell efficiencies, and battery autonomy, are considered to assess their impact on system feasibility based on the Homer load following dispatch strategy. The proposed approach results in reduction of 4.29% in the total net present cost (NPC) and 5.1% in the levelized cost of energy, demonstrating improved economic viability. The study aims to provide insights to sizing and economic analysis of microgrid for reliable and cost-effective power providers in off-grid applications. Future efforts will concentrate on integrating advanced metaheuristic optimization algorithms, implementing smart energy management logic for optimal resource distribution, and experimentally validating the approach for more economical system sizing.