

A Smart Hybrid System Combining Wind and Solar Power with a Fuel Cell Along with Solar Tracking and Panel Cleaning System.

Shreyash S. Narole¹, Vipul D. Dekate², Arnav A. Pakhale³, Rohini R. Dhawale⁴,

Achal B. Jangade⁵, Dr. Aniket P. Munshi⁶

Students, Department of Electrical Engineering^{1,2,3,4,5}

Guide, Department of Electrical Engineering⁶

Yeshwantrao Chavan College of Engineering, Nagpur, India

Abstract: Access to electricity in non-electrified rural areas remains a significant challenge due to the limitations and infeasibility of extending the conventional grid. Additionally, escalating oil prices and the adverse effects of conventional energy sources on users and the environment are phasing out traditional solutions like fuel genset based systems from rural development agendas. To address this issue, this paper proposes a solution: "Hybrid Power Generation Using Solar and Wind Energy with Hydrogen Fuel Cell." Hybrid systems have demonstrated their potential as the optimal choice for delivering high-quality power. This study explores the potential of harnessing solar and wind energy in tandem with hydrogen fuel cells to create a reliable and sustainable energy solution for rural areas. By integrating renewable energy sources, the hybrid system mitigates the challenges posed by the unavailability of grid connectivity, economic constraints, and environmental concerns. In conclusion, hybrid power generation using solar and wind energy with hydrogen fuel cell technology presents a promising solution to reach non-electrified rural populations. This innovative approach addresses the limitations of conventional grid extension and fossil fuel-based systems, offering a pathway towards sustainable rural electrification, economic growth, and environmental conservation.

Keywords: Sustainable electrification, Economic growth, Environmental conservation, Escalating oil prices

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