

# The Design and Development of Hybrid Power Generation Utilizing Wind and Solar Energy is the Main Emphasis of the Study

Ajay Kumar Verma , Aryan Verma, Prabhat Kumar, Rohit Raj, Raj Kumar Choudhary,  
Ronit Kumar Saw & Rahul Kumar Das

Department of Mechanical Engineering  
K. K. Polytechnic, Govindpur, Dhanbad, India

**Abstract:** *This In our journal, we carefully examined a number of design characteristics, including the number of sunlight-capturing panels, the wind turbine height, number of windmills, and rotor diameter, in order to create the best possible model for a combination of solar-wind energy plant. Our goal was to ensure steady energy generation at the lowest possible cost. Our results clearly demonstrated a complementary relationship: in summer, when solar radiation was abundant and wind energy was low, solar arrays were the main source of energy, while in winter, when wind speeds were higher and solar radiation was lower, wind turbines were the main source of energy. In order to provide consistent energy output throughout the year, this study emphasizes the enormous potential of utilizing both wind and solar power synergies in an optimal hybrid system. Furthermore, our project's main goal was to determine whether it would be feasible to place different kinds of vertical wind turbines—including ones with shrouded blades—on roofs in order to increase turbine efficiency. One significant benefit of vertical axis wind turbines is that they can be installed at ground level, making maintenance simple. Furthermore, because they are omni directional, they do not require exact alignment with the direction of the wind in order to produce electricity. Our primary goal is to use CATIA V5 to build a self-starting vertical axis wind turbine in order to further the development of sustainable energy solutions.*

**Keywords:** power generation, vertical axis wind mill, renewable energy source, and Catia V5