

Develop an Energy Storage Strategy for Emerging Wind Farms in India Over IoT

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Abstract: Energy is a fundamental component of daily life, essential for performing various tasks. Currently, non-renewable energy sources such as oil, coal, and gas dominate energy consumption. However, these resources are unsustainable and significantly contribute to global warming, posing serious environmental hazards. In contrast, renewable energy sources, including solar, wind, tidal, and biogas, offer sustainable and abundant alternatives to meet energy needs. Among these, wind energy stands out as the purest form of renewable energy, extensively utilized for electricity production due to its minimal environmental impact. Wind energy harnesses the kinetic energy of atmospheric air, converting it into mechanical energy through wind turbines. Both Vertical Axis Wind Turbines (VAWT) and Horizontal Axis Wind Turbines (HAWT) are employed for this conversion. Countries worldwide, including India, recognize the importance of wind energy and adopt it as a primary renewable energy source, primarily due to its cost-effectiveness compared to other renewable options. This research focuses on the design and development of a multi-axis windmill integrated with the Internet of Things (IoT) to enhance efficiency and monitoring capabilities. The proposed system incorporates components such as the Atmega 328 microcontroller, LCD, voltage sensor, IoT module, load, battery, inverter, DC motor, gear ball bearing, and control board. The successful implementation of this system demonstrates the feasibility of an advanced wind energy solution, contributing to a more sustainable and environmentally friendly energy landscape.

Keywords: Renewable Energy, Wind Energy, Non-Renewable Energy, Vertical Axis Wind Turbine (VAWT)