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(57) Abstract :

**EFFICIENT WIND TURBINE BLADES WITH ADAPTIVE TWIST MECHANISM ABSTRACT** This invention presents a breakthrough in wind turbine efficiency by integrating adaptable twist mechanisms into blade design. Unlike conventional blades with fixed configurations, this innovation employs adjustable twist segments along the blade's length. Actuated by real-time wind data from a dedicated sensor, these segments optimize the blade's angle of twist based on wind speed, direction, and turbulence. A sophisticated control system uses computational simulations to determine ideal twist configurations, enhancing energy capture and load distribution. The result is heightened wind turbine performance, maximizing energy conversion while minimizing structural stress. By dynamically adjusting to varying wind conditions, this adaptive twist mechanism significantly advances wind energy technology.

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