Wind Energy: The Power of Pulleys

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The purpose of my experiment was to find the most efficient pulley system for generating wind energy. This project is important because in today's world wind energy is becoming more common. The results from my testing could be beneficial to people who are looking to use wind energy as a source of power. To get my results I tested three pulleys ratios, 2.5:1, 2:1, and 1:1. The pulley system acted as a gearbox, which converts the low rpm rotor to a higher rpm to power the DC motor. Each pulley system was tested on a wind turbine at 5, 10, 15, and 20 mph winds. The 5-10 mph wind speeds were tested using an industrial fan as the wind source. The 15-20 mph wind speeds were tested using natural wind outside. The results were measured using a watt meter that recorded watts, amps, and volts. After testing each pulley system, I discovered the 2.5:1 pulley system was the most efficient. The first system, 1:1, started up in low wind speeds, but needed a 20 mph wind to produce enough voltage to power the battery and create watts and amps. The second system, 2:1, had more turning resistance, but needed only 12 mph of wind to generate enough voltage. The third system, 2.5:1, created even more turning resistance, but when started built up momentum and produced the required voltage at 10 mph wind speeds. Even though the 2.5:1 pulley system requires a higher starting wind speed, it is the most efficient system.

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