



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

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Project Title What's Better: Vertical or Horizontal Axis Wind Turbines?	
Abstract Objectives/Goals Energy independence and environmental concerns have grown the interest in wind turbines exponentially. The purpose of this experiment was to determine which variation of the wind turbine design, vertical or horizontal is more effective in durability, power output, and cost to build. My hypothesis was that the horizontal axis turbine would be more effective. Methods/Materials Readily available parts were purchased for both turbines. I built and tested a vertical axis turbine using a rain barrel cut in half and offset on an axis. This design used a treadmill motor. I built the horizontal axis turbine using metal parts and prefabricated blades. This design uses an alternator. I used wind speed and a multimeter to study both designs, tracking wind speeds and corresponding power output. Results My hypothesis was that the horizontal design would perform greater but would be more expensive to build. The experiment results supported my hypothesis and showed the horizontal turbine produced much higher power outputs. Using mathematical ratios even swapping motors, the horizontal axis performed better. Conclusions/Discussion My Data tracking and calculations showed that even given the increase in costs, when durability and power output are considered, the horizontal design remains superior.	
Summary Statement This is a comparison of vertical and horizontal axis turbines built and engineered by the student.	
Help Received The blades were purchased from Missouri Wind and Solar. My parents supervised power tool usage.	