



CALIFORNIA STATE SCIENCE FAIR 2010 PROJECT SUMMARY

Name(s) Timothy R. Le	Project Number J0112
Project Title Which Wind Turbine Blade Design Will Produce the Most Power?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of my project is to determine the best aerodynamic blade design of a wind turbine that would produce the most power. I hypothesized that the feather shaped design (Design No. 4) would produce the most power (milliwatts).</p> <p>Methods/Materials Seven sets of three blades each were constructed by making a proof set and making duplicates of the blade. The blades were constructed of Model Magic because of its lightweight, fast drying, and non-cracking properties. These blades were then mounted on a wind turbine. The wind for the experiment was produced by a 45 centimeter diameter fan with the turbine 90 centimeters away. The voltage and amperage was collected at 100 samples per second for 60 second runs. The wattage was then calculated. This procedure was repeated for ten trials for the seven sets of blade designs.</p> <p>Results The average wattage produced for: Design No. 1 was 12451.86 milliwatts, Design No. 2 was 1756.21 milliwatts, Design No. 3 was 1644.82 milliwatts, Design No. 4 was 2771.62 milliwatts, Design No. 5 was 1181.83 milliwatts, Design No. 6 was 1324.47 milliwatts, and Design No. 7 was 3994.87 milliwatts. My hypothesis was correct, being that Blade Design No. 1 would produce the most wattage because of its largest surface area, and Blade Design No. 4 would produce the most wattage out of the six designs with the same surface area and weight.</p> <p>Conclusions/Discussion I concluded that my hypothesis was correct. Blade Design No. 4 (feather shaped design) was the best in power production out of all the regular surface-area blades. Blade Design No. 1 (larger surface area but same weight) proved that surface area does affect the output of a wind turbine. This science Fair project has significant real life applications for three reasons. First, along with other renewable resources, it could decrease our dependency of foreign oil. This decrease in dependency would help resolve the more than \$10 trillion deficit along with helping the economy during these times. Second, the increase of wind energy would make more jobs for other people (maintenance and construction of the turbines). Third, this decrease in dependency on oil would also slow down the rate of global warming.</p>	
Summary Statement The purpose of this experiment was to determine the best aerodynamic blade design that would create the most wattage from a wind turbine.	
Help Received Mr. Revel helped with determinig resistor for measurement circuit; Mr. Pehl helped with statistics; Mr. Salamon proofread research report; Mr. Stephen Hubbard proofread conclusion; Dad paid for equipment	