



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Hayden R. Bromberg	Project Number J0103
Project Title Blowin' in the Wind: The Answer to Renewable Energy	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of my project was to test combinations of different blade quantities, angles, and shapes on a wind turbine to determine the one that produces the greatest amount of energy.</p> <p>Methods/Materials In the controlled environment of a sound stage, I used a studio fan to generate the wind to spin my non-yawing turbine. I tested three different blade shapes (constructed from balsa wood) in four quantities apiece, each at three different angles to the wind. I used a hand-held anemometer to measure the wind speed (at 10 and 15 mph) and a multimeter to record electrical output.</p> <p>Results The most productive configuration was six triangular blades angled at 22.5° to the 15 mph wind, but because many configurations failed to withstand the higher wind speed, I focused my analysis on the 10 mph results. In analyzing that raw data, I found that neither blade shape nor quantity seemed to have much effect on the output and that most of the difference came as a result of changing the blade angle.</p> <p>Conclusions/Discussion I believe my testing adds valuable insight into the field of harnessing the power of the wind for the benefit of mankind, despite some imperfections such as the thin blade material, imprecise angle measurement and insecure blade mounting. Taking into account the relative area of the three blades I tested, I conclude that my rectangular blade (i.e., the smallest one) is the most efficient in generating electrical power per unit of blade material.</p>	
Summary Statement The purpose of my project is to contribute to the body of research on wind turbines to help ensure that our planet is green once again by generating as much energy as possible from renewable and environmentally friendly sources.	
Help Received My mom helped me shop for the necessary materials. My dad helped me build the turbine and conduct the experiment. I used a sound stage and wind machine at Hollywood Center Studios.	