



CALIFORNIA STATE SCIENCE FAIR 2011 PROJECT SUMMARY

Name(s) Joshua M. Arreola	Project Number S0303
Project Title The Future of Clean Wind Technology: Designing the Most Efficient Bladeless Wind Turbine	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The wind turbines of today, while somewhat environmentally friendly, have many key problems that make them inefficient and sometimes dangerous. My objective was to test Nikola Tesla's bladeless wind turbine design to determine if this turbine could surpass the Betz Limit of 59.3% efficiency and thus, create essentially a better and safer turbine for today's use.</p> <p>Methods/Materials I first researched the bladeless turbine's design and made it accordingly out of CD's and PVC piping. The traditional turbine was to act as the control of the experiment, and was created using Tinkertoys, PVC piping, and balsa wood blades. A wind tunnel was created to attain a controlled environment for the turbines, and the wind was created from a small box fan. Small DC motors were attached to each turbine to measure energy output in voltage and amperage. The wind power formula was then utilized in order to find the energy output of both turbines. Finally, these results were observed and compared to determine the more efficient wind turbine design.</p> <p>Results The results achieved from the experiment were somewhat inconclusive due to the lack of proper materials to conduct the experiment. While trying to test the Tesla Turbine, it wouldn't turn with the fan. In order to achieve results, I tested the bladeless turbine with an air compressor. Both turbines proved to be less than 1% efficient, with the bladeless turbine being slightly more efficient. However, these results cannot be recognized as significant due to such small efficiency percentages. In order to achieve accurate results, scale model turbines constructed from appropriate materials instead of household materials are needed.</p> <p>Conclusions/Discussion For this experiment, I have learned that using crude materials will not achieve any useable results. In order to determine if the Tesla Turbine will be able to operate at a higher efficiency than a traditional turbine, I have concluded that the next step is to use proper scale model apparatuses. This project has taught me to interpret problems like an engineer in order to find solutions. Not only does this experiment have the potential to produce a product that is energy efficient and safe for the environment, but it could also yield an entirely new outlook on clean wind technology.</p>	
Summary Statement To determine if it was possible to design a bladeless wind turbine that would operate more efficiently than a traditional turbine and solve some of the problems that traditional wind turbines face today, e.g., bird killing and noisiness.	
Help Received Mom assisted with purchasing the materials and taking pictures. Dad advised on how to use certain tools in order to construct the turbines. I received mentoring from my Chemistry teacher, Mr. Barry Lindaman, and from my friends Mr. Bradford Oliver and Dr. Richard Chapleau.	