



**CALIFORNIA STATE SCIENCE FAIR  
2013 PROJECT SUMMARY**

<b>Name(s)</b> <b>Cameron A. Kalantar</b>	<b>Project Number</b> <b>J0115</b>
<b>Project Title</b> <b>Wind Turbine</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The blade angles of wind turbines affect the amount of electricity generated. My research proved that the blades least tilted at an angle of 15 degrees will generate the most electricity out of the three options. <b>Methods/Materials</b> Methods: Assemble a miniature wind turbine. Create snap on blades made from various materials. Put the blades at an angle of 15 degrees for the 1st set, 45 for the 2nd and 75 for the 3rd. Remember to repeat each set 5 times. Snap in your blades to the wind mill. Attach the DC Motor copper wires to the multi meter. Set the multimeter to the right setting. Then set up a table fan. Turn on the multimeter. Turn on the fan. Once the multi meter is stabilized, record the voltage on your paper. For every test mark down the voltage. To Calculate average, Add all the trial results, Divide by five. Compare between the three angles results. Then record the answer in your science journal. Materials: 1 mini D.C Motor. 1 Digital AC/DC Multi meter. 3 full pieces of construction paper. 1 long plastic pipe. 1 connection piece. 4 screws. 1 table-top fan. 3 ft of copper wire. 1 power drill or any other tools I might need. 1 large-thin piece of wood. 4 patches of foam paper. 5 inch of duct tape. 15 sticks hot glue. 1 hot glue gun. 1 metal fastener. Green Paint. 5 large pieces of duct-tape. 1 light bulb holder <b>Results</b> My experiment results were; 15 degree angle blades came in 1st with an average of 12.80 mV. The 45 deg blades came in 2nd with an average of 9.02 mV. Lastly, 75 deg blades came in 3rd with an average of 4.66 mV. These results confirm my hypothesis and show that the angle of wind turbines# blades does affect the resulting outcome of generated electricity. <b>Conclusions/Discussion</b> After completing my project I conclude that the angles of the blades are important. The main reasons are related to aerodynamic forces of Lift and Drag. For example, when the fan was blowing on the 15 degree angled blades, the wind impact on the slightly tilted blades would slide off resulting in the blades moving in a circular motion. These aerodynamic forces apply to many real situations. Some key examples are airplanes or jets. Since the wings of an air plane are the correct angle, it is able to lift off and stay in the air.	
<b>Summary Statement</b> Blade angles of a wind turbine affect the amount of generated electricity	
<b>Help Received</b> Mom helped me buy materials, Dad explained about DC motors and teacher taught me about Wind Turbines	