



# CALIFORNIA STATE SCIENCE FAIR 2016 PROJECT SUMMARY

<b>Name(s)</b> <b>Rohit Ravi</b>	<b>Project Number</b> <b>J0216</b>
<b>Project Title</b> <b>Solar Tracker: An Optimal Method to Generate the Highest Energy</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this experiment is to determine which angle of incidence and which reflective material would generate the highest energy output from the solar panel. The second objective is to design and a build a dual axis solar tracker to move the solar panel for both earth's tilt and spin.</p> <p><b>Methods/Materials</b> A multimeter was used to measure the energy output of the solar panel in all the tests. As a first test, the experiment was conducted with a solar panel at different angles from the vertical. Next, the energy was measured with different reflective materials placed in front of the solar panel. The third test was done with a solar panel facing the sun at 11 a.m. and with the direction of what it would have been at 2 p.m. and vice versa. Due to the different positions of the sun relative to the earth throughout the day and year, a dual axis solar tracker was built. This solar tracker was coded through the Arduino platform and moves through the servo when one Light Dependent Resistor detects more light than the other.</p> <p><b>Results</b> Based on my experiment, I observed the following results: 1) At 30 degrees, the highest energy (averaged 1.91 watts) was absorbed and reduced gradually at other angles. 2) The highest energy was noted when the solar panel was perpendicular to the sun's rays at 11 a.m. and 2 p.m. 3) The dual axis solar tracker successfully changed the solar panel's direction for both earth's tilt and spin. 4) The aluminized Mylar reflector (averaged 2.34 watts) reflected the highest amount of light energy.</p> <p><b>Conclusions/Discussion</b> The observations supported all the hypothesis. Thirty degrees in Northern California during January was the angle perpendicular to the sun's rays allowing it to absorb the most direct energy. At 11 a.m. and 2 p.m., the solar panel produced the highest energy when it faced the sun directly. A dual axis prototype solar tracker built helped the panel to stay perpendicular to the sun's rays at all times. The aluminized Mylar reflector reflecting up to 99% of light caused the high energy generation. Compared to other energy sources, solar energy is a free, clean energy available abundant throughout the globe.</p>	
<b>Summary Statement</b> I designed and built a solar tracker which is capable of moving a solar panel to stay perpendicular to the sun's rays at all times. In addition, I found the aluminized Mylar reflector reflected the most sunlight.	
<b>Help Received</b> My dad, Ravi Ammamuthu, helped me by drilling holes in the plywood board, soldering the jumper wires to the solar panel, and buying the components for the solar tracker.	