



**CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY**

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Project Title Power It Up! A Study of Solar Power vs. Angle and Time	
Abstract Objectives/Goals Given that Bakersfield California is located at a latitude of 35.37 degrees, I believe a Solar Panel will have optimal electrical output during the hours of 12:00pm through 4:00pm when it is set outdoors in the sunlight at approximately a 50 degree angle in the Winter months and approximately a 20 degree angle in the Summer months. This is calculated by adding 15 degrees to your current locations latitude for Winter months ($35 + 15 = 50$ Degrees) , because the Sun is lower in the sky during Winter months and by subtracting 15 degrees from your current locations latitude for the Summer months ($35 - 15 = 20$ Degrees) , because the sun is higher in the sky during Summer months.	
Methods/Materials I conducted this experiment from October 16, 2015 through November 14, 2015 from 8:00am to 5:00pm . The Solar Panel was located in the same fixed location for all 30 days during the entire time of the experiment. The Solar panel was attached to a stand with an affixed protractor. The Solar Panel stand and Protractor were constructed specifically for this experiment. The variables that changed during this experiment was the angle of the Solar Panel and the time of the day. The electrical output was tested with a voltmeter. The Solar Panel angle was tested at angles from 0 (zero) to 90 (ninety) degrees in 5 (five) degree increments.	
Results From the analyzed data it has been shown that my experimental results support my hypothesis. The experimental data has shown that when the solar panel was set at a 50 degree angle between 12:00pm through 2:00pm during Winter months, the solar panel consistently generated the highest amounts of electricity.	
Conclusions/Discussion From this experiment I conclude that given a certain fixed location and latitude, the angle of a solar panel and the time of the day has a direct effect on the optimal amount of electricity produced by the solar panel. This experiment has shown that the optimal amount of electricity can be produced by adjusting the angle of a Solar Panel to your locations latitude plus or minus 15 degrees for Winter and Summer months.	
Summary Statement This experiment was conducted to determine at which angle and time of day would a fixed Solar panel located at a specific latitude need to be set at in order to produce the optimal amount of electricity during a given time of the year	
Help Received I received help from my Father (Mr. Sharil Yonan) who assisted me with purchasing the needed items for this experiment. My Father also assisted me in building the solar panel stand that was used to adjust and test the various angles. My Father also assisted at some times to help record the data.	