



# CALIFORNIA STATE SCIENCE FAIR 2016 PROJECT SUMMARY

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<b>Project Title</b> <b>Efficient Solar Panel Cooling for Power</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Solar panels can diminish and produce less power when exposed to high temperatures. The objective of this experiment was to develop an efficient method of cooling down solar panels to increase their lifetime, as well as power production/efficiency.</p> <p><b>Methods/Materials</b> The experiment used three sets of solar panels, each containing three panels. The first set was a control with no modifications to cool it down. The second set was experimental and used a pump with running water to cool the panel down. The third set was also, experimental, but it used a passive aluminum heat sink to cool down the panel. The solar panels were tested for voltage and current at specific temperatures. The formula <math>V \times C / SI</math> was used to calculate efficiency, where V represented voltage, C represented current, and SI represented the sun's intensity at specific temperatures.</p> <p><b>Results</b> After the experimentation was complete, it was noted that the water cooled panel produced the most voltage, and the heat sink panel produced the most current. However, their voltages and currents were equally balanced, so their efficiencies were the same. Unlike the two experimental groups, the control panels had very low voltages and efficiencies. The water cooled panel ended up with the lowest temperature, the heat sink cooled panel ended up with an average temperature, and the control panel ended up the highest temperatures.</p> <p><b>Conclusions/Discussion</b> After determining trends in the data, it was concluded that low temperatures produce the most voltage, but not exactly higher efficiencies. Even though the two experimental groups had the same efficiencies, the panel cooled by water produced the most power. This is most likely because the controlled, weather-free environment eventually prevented the heat sink cooled panels to function properly, as there was no wind. Therefore, the most reliable, effective method of boosting solar panel efficiencies is to cool them with running water.</p>	
<b>Summary Statement</b> Solar panels degrade and produce less power when exposed to high temperatures, and this project tests an efficient way to boost their power production by cooling them down.	
<b>Help Received</b> My dad helped me design my solar panels, and my science teacher helped me research my project before experimentation.	