



**CALIFORNIA STATE SCIENCE FAIR  
2010 PROJECT SUMMARY**

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| <b>Name(s)</b><br><b>John E. Carrion</b>  | <b>Project Number</b><br><b>J1005</b> |
| <b>Project Title</b><br><b>A Comparison Between Angled Reflectors and Flat Reflectors on Solar Panel Voltage</b>  |                                       |
| <b>Objectives/Goals</b><br>The objective is to determine whether flat reflectors or angled reflectors produce more electricity in solar panel voltage output. Last year I tested flat reflectors, reflecting light on to a solar panel, to determine if it was an efficient way to produce electricity. That project made me wonder what would happen if I angled the reflectors instead of keeping them parallel to the face of the solar panel.   |                                       |
| <b>Abstract</b>   |                                       |
| <b>Methods/Materials</b><br>Two solar panels, a 1000 watt spot light, black foam board (control background), white poster board (white reflector), Foil, and two mirrors. I compared three different reflective surfaces shining light onto two solar panels back to back (one facing direct light, one facing the reflector) and measured the voltage output of the solar panels. I tested the panels with the light source starting at 90 degrees to the face of the solar panel, and then moved in ten degree increments, all the way down to 0 degrees (simulating the sun at the horizon).   |                                       |
| <b>Results</b><br>Overall, white reflectors worked best. The mirrors were the best at 70 degrees but dropped off at all other angles because of the law of specular reflection. Foil was more like a muffled version of the mirrors.  |                                       |
| <b>Conclusions/Discussion</b><br>My conclusion, based on this two year project, is that white reflectors are the overall best reflector due to diffused reflection, regardless of whether they are flat or angled. Mirrors were the best at 70 degrees so if you could get the mirror to track the movement of the sun that would be ideal. This project proves that reflectors reflecting light onto a solar panel mounted back to back with another solar panel is an efficient way of using light to produce electricity. For places where space for solar panels are limited you could still have a good supply of energy being produced. |                                       |
| <b>Summary Statement</b><br>My project proves that angled white reflectors produce electricity more consistently and more efficiently than any other reflector at any angle.  |                                       |
| <b>Help Received</b><br>My dad helped build my display board and lended a hand when two hands were not enough.  |                                       |