CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
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Project Number
J0223

Project Title
Go Solar

Abstract

Objectives/Goals
Solar energy has always been an extreme fascination of mine. Even as a child, I#ve always wanted to find alternative ways to doing things. Last year in 7th grade, I built an Aquaponics system, and this year I wanted to extend the use of alternative sources of energy, and build solar panels that would solely power my Aquaponics system. My main objective was to build the solar panels, and then test whether connecting them in series of parallel would produce energy more efficiently to power the system.

Methods/Materials
I first used a soldering method to solder solar cells together, and silicone to glue the cells down onto a piece of Peg Board. I also cut Plexiglass using a table saw and glued it onto the frame I built for the panel using clear silicone. After all of the soldering, screwing, and gluing, I connected the panels together with wires. I stripped wires, soldered + and - wires onto Bus Wires of the panel, and screwed them into terminal boards. For series, I connected both panels into a + to - formation , and in parallel I joined both + and - wires together into a second terminal board. Finally, I connected the wires to the battery and recorded DC Volts and Amps.

Results
After connecting the solar panels into series and parallel, parallel turned out to work more efficiently. In series, both panels produced 18 Volts which combined to make 36. Since I was using a 12-Volt battery, 36 Volts was far too much for the battery to handle. Yet, in parallel, since both panels come together instead of flowing into one another, the voltage stayed at 18 volts, and the amperage tripled from 2 Amps, to 5.5 Amps. Also, the solar panels were able to power the system during the day, but the battery was not able to power the heater at night because of the heater's high demand of 300 Watts.

Conclusions/Discussion
According to my results, my hypothesis was proven correct. Parallel powered the Aquaponics system much more efficiently because it kept the voltage at a reasonable amount, and nearly tripled the amount of Amperage. Though the heater was not able to last the whole night hooked up to the battery, the system as a whole was able to run properly. Overall, there were many things that I would do differently such as making sure that no condensation occurs inside the Plexiglass from the sun, but the results helped me better understand what my specific panels and Aquaponics system need electricity wise.

Summary Statement
My project is the powering of my Aquaponics system using solar energy from PV-cell panels that I built.

Help Received
Father helped wire the panels together and hook them up to the Aquaponics system; Father also gave tips on how to solder properly.