



Colorado Science and Engineering Fair

2025 Individual Project Abstract Form

Please print 2 copies of the completed form. Sign both copies, keep 1 for your notebook and submit 1 copy to your Regional Fair Director with your other paperwork.

Title of Project: Battery vs. Solar vs. Solar/Battery Charge Controller

Finalist's Name: Colt Sekich

School and City: Cardinal Community Academy, Keenesburg CO

Sponsor's Name: Sarah Johnson

Category: Energy

Division: Junior (grades 6 - 8)

Abstract (250 words or less):

My name is Colt Sekich, I have a science fair project where I tested three different things. Battery vs a solar panel vs the battery and the solar panel with a charge controller together. The charge controller job is to maintain an amount of When I began the project, I predicted that the solar panel and the battery together would have the most voltage being put into the light. The reason I predicted this is because its taking both the battery's energy and the solar panels energy into one light. In my first test I did a test on just the solar array (solar panel).early on I brought the project outside in the middle of the day in direct sunlight and was putting as high as 20.5v into a 12v rated bulb. The light was way to bright. The next test was putting it in daylight which was not direct sunlight. During that test it put a little lower of voltage than the previous test, it put 18.5v into the bulb which was too bright. After that I thought that I also had to have this project indoors with an equivalent amount of voltage to natural sunlight. So i tested several different bulbs to get as close as I can to natural sunlight. So my first bulb that I tested was a 60w incandescent bulb which had produced 3.5v which was too low. The 2nd bulb I tested was a 200w incandescent bulb which put out only 6v which caused the light to burn dim. 3rd bulb that I had tested was an 18w led flood bulb which produced as low as 9v which the light was still very dim. My last bulb that I had tried was a 30w led bulb with 5000 Kelvin. The light produced just the right amount of voltage which produced a wrapping 12.5v. My 3rd step was testing the battery itself. The battery I had tested was an 12v lead acid battery. I had tested the battery over a 5 hour period. During the five hour period the battery lost some energy over time and I recorded a voltage amount of 8.5v which caused the light to burn dim. After that I had tested the solar array and the battery with the charge controller over a five hour period and because of the charge controller it maintained a 12.5v. I recorded and saved my data with just a simple graph for just the solar, just the battery, and the solar panel and the battery with the charge controller together. So I did eventually run to a couple problems and mistakes during this project but they were a little easy for me to fix. To add on these problems were while I was building it. My steps I had for building circuit one (solar or battery) was I had got an 24/24 in. piece of wood and mounted my material on to that. I then wired the solar panel to a three positional switch. I then wired the 3 positional switch to a volt gauge and from the volt gauge to the light. My first problem I had on this 4th step was the solar panels negative and the batteries negative was tied together putting a voltage amount of 24.5v. The light burned bright but not long. So we switched the 3 positional switch with a double pull 3 positional switch which fixed the problem and divided the solar negative and the batteries negative. That then corrected it back down to 12.5v. The first step for circuit two which was the solar panel and the battery with the charge controller together was to first wire the solar panel to the solar/battery switch. We then wired the battery/solar switch to the charge controller. Wired the charge controller to the main battery switch. We did this because of the way the charge controller is made and programmed if the charge the controller wasn't there the battery would have just ran dead. We then wired a main disconnect switch from the solar charge controller to the battery. We wired from the charge controller straight to the volt gauge and then to the light. To somewhat conclude to this project my prediction was wrong there was no highest voltage this project which was fascinating to me. The results could probably change if maybe I used a different type of solar panel and bigger battery.

I hereby certify that the above statements are correct and the information provided in the Abstract is the result of one year's research. I also attest that the above properly reflects my own work.

Finalist's Signature:

Date:

In addition, all students must complete the ISEF Student Checklist (1A), Research Plan, Approval Form (1B), and Checklist for Adult Sponsor (1), and any other ISEF forms required for this type of project. See the International Rules and Guidelines for form requirements. Return COPIES of all of these forms to your Regional Fair Director with you Finalist Verification/Permission Form. **A signed copy of this form must be included in your notebook.**