



CALIFORNIA STATE SCIENCE FAIR 2012 PROJECT SUMMARY

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Project Title Power Sandwich: Combine and Store Renewable and Reusable Energy	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals We can generate and combine Solar power, Wind power and hydro power through energy re-use and store the energy in a rechargeable lithium ion battery. Energy stored in the battery can then be used from simple uses like charging a cell phone, car battery or an entire house. The benefit would be that we can increase the total amount of renewable energy usage and have this energy available for use throughout the year, irrespective of weather conditions.</p> <p>Methods/Materials Our method included charging a 3.7 polymer lithium ion battery using three independent sources -a) Solar power - using a 3 W Photovoltaic solar panel, connected to the lithium battery thru a lipo board that enables battery and charge management; b) Hydropower - we connected a mini hydro generator to a garden house, dishwasher and washing machine to generate power and store in the battery, thru a lipo board; c) Wind power - we had two different wind turbines that we used to generate power using external air and also using an external fan motor to generate power since there was not enough wind. After completing the three independent experiments, we then connected each of the experiments using the lipo boards output in a series and one lithium battery. We generated electricity and measured the flow of current from each of the sources - solar, hydro and wind to the lipo board. Then tested flow of current from the lipo board to the battery. We also connected a model house with lights to turn the lights on and tested flow of current directly from the each of the power source or from the lithium battery (when the source is turned off).</p> <p>Results We were able to successfully generate power; a) Solar Power - Generated 4 W of solar power over a week in winter where average temperature was 57 F; b) Wind power - generated 7 W c) Hydropower - generated 11 W from three different sources of water in the house. We were able to generate a total of 22 W and store it in a lithium ion battery. We were also able to demonstrate that we could combine all the three power sources, charge one battery and turn the lights of a model house directly from the power source or from the battery.</p> <p>Conclusions/Discussion Thru this experiment, we proved that we could combine multiple renewable energy sources and store it a battery for several usages throughout the year, even if the weather is bad. ..Yes We Can!</p>	
Summary Statement Combine and store - renewable energy and through energy re use - Save fossil fuels and protect the environment	
Help Received Father helped with soldering, ordering parts and education on measuring voltage and calculating power	