



CALIFORNIA STATE SCIENCE FAIR 2007 PROJECT SUMMARY

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Project Title CO(2) in da house! Greenhouse, That Is. Will CO(2) Affect How Much Electricity a Photovoltaic Cell Produces?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Our goal was to find out whether CO₂ affected how much electricity a photovoltaic cell produced. We hypothesized that when surrounded by CO₂, the cell would produce more electricity. Inspired by the greenhouse effect theory on global warming, we thought that light trapped between the layer of CO₂ and the solar cell would make more frequent contact with the cell, knocking off more electrons, and producing more electricity.</p> <p>Methods/Materials We had a 5 gallon water container with screw top, a photovoltaic cell, a volt meter, a thermometer, a relative humidity meter, a stop watch, CO₂ cartridges and injector, a light bulb/socket, and a bike pump. In the first line of tests, we placed the photovoltaic cell/volt meter into the container and took our first control readings. Then we injected CO₂ from the cartridge in through the opening and sealed the container and took readings over a three minute period. For the next set of tests, we injected the CO₂ through a hole we punctured in the lid of the container, turned on the light, and took our readings for three minutes. We also did similar tests where we turned the container upright and some where we tested purely for a pressure effect using a bike pump.</p> <p>Results The photovoltaic cell produced 0.5 volts more than the control readings when there was CO₂ in the container. We heard the container depressurize when the lid was taken off after we had positive results. So then, we did another set of tests to isolate and measure the pressure factor. When tested without the lid, the volt meter showed only a 0.25 increase when the CO₂ was added. When we used the bike pump without injecting any CO₂, we got a reading of 0.25 increase of voltage as well. We did not have consistent results, but a pattern did seem to be obvious.</p> <p>Conclusions/Discussion The results did support our hypothesis. We learned as we went along that there were more variables that might be affecting the photovoltaic cell's production of electricity than we originally thought. We concluded that CO₂ does affect how much electricity a photovoltaic cell produces and so does pressure. We also observed that temperature and relative humidity did not seem to affect the production of electricity. If the light actually did get trapped between the photovoltaic cell and the CO₂ as we had expected, this experiment would be following the model of the green house effect theory thus helping prove it true.</p>	
Summary Statement In this project, we found that both CO ₂ and pressure cause a photovoltaic cell to produce more electricity.	
Help Received Both sets of parents helped financially for our materials. Rob Lovelace, my father, supervised the experiments for safety. Rick Sharp, our former 6th grade teacher, helped us think of additional ways to test our hypothesis after our first line of tests.	