CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)
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Project Number
J0224

Project Title
Solar: Weather or Not

Abstract

Objectives/Goals
This experiment examined whether or not weather conditions such as smog or fog affect the overall performance of a solar cell. The hypothesis stated that the weather conditions will have an effect on the solar cell because these weather conditions block out light that the solar cell can use, resulting in a decreased energy output.

Methods/Materials
This experiment tested how much energy was generated by a solar cell and how much UV light there was in each individual weather condition after two minutes and thirty seconds of the weather condition being present. The solar cell and UV Light Meter would be wrapped in plastic wrap before each test to ensure that no damage would be done to the solar cell or UV light meter. After the two minutes and thirty seconds, the data would be collected and the weather simulation would be reset. There were ten trials where I set an incense holder into the aquarium and deposited two incense sticks into the holder. Next, the two incense sticks were burned in a controlled environment. This simulated smog. There were ten trials where I measured 26 g of dry ice and deposited it into 300 mL of water, which simulated fog. As well, there were another ten trials where I tested the solar cell and UV Light Meter without any weather condition present, simulating clear weather.

Results
When the weather was clear, on average, the solar cell produced 39.85 AC volts of energy and the UV light meter read 50 µW per square centimeter. When smog was present, on average, 37.95 AC volts and 44 µW per square centimeter were generated. The fog scenario yielded, on average, 37.65 AC volts and 35.1 µW per square centimeter. Though both the smog and the fog had similar energy outputs via the solar cell, there were much less UV Rays passing through the environment in the fog weather condition rather than in the smog.

Conclusions/Discussion
Overall, the data the experiment yielded supported the hypothesis, as the weather conditions clearly affected the energy output of the solar cell, while the fog scenario created less energy. Even though solar cells can be a reliable source of energy, one should consider how effective a solar cell can be if they are in an environment that will affect its output. In San Francisco, where there is a lot of fog, you may want to reconsider solar because it can impact its efficiency.

Summary Statement
This project is about how weather conditions such as fog and smog affect the performance of a solar cell.

Help Received
Mother and Father helped type report and collect materials, Ms. Fisher helped collect materials and supervised testing.