Kendra Frieden

Pivotal Decisions in Solar Energy

The purpose of this investigation was to determine how much more energy solar cells gain when they are rotated with the sun instead of remaining stationary. I hypothesized that if the angle between a light and a solar cell is increased, then the amount of power produced by the solar cell will significantly decrease. Indoors, the experiment involved constructing a board that attached solar cells to voltage and current meters and connecting it to a tripod. The board was then placed directly beneath a light. I began with the solar cells angled at O degrees (directly facing the light) and began angling the solar cell off of the light, using 15 degree increments, until I reached 90 degrees, recording voltage and current at each angle. Three trials were performed for each angle. Outside, I did the same experiment as indoors, except using the sun instead of the light bulb. Also, experiments were performed every hour (from 7:30 am to 1:30 pm) recording voltage and current when a solar cell was pointing directly at the sun and when the cell was pointed south and remained stationary with a 55 degree angle up from the horizon. The data collected supported the original hypothesis. For the Outdoor Hourly Measurements, the energy increased 30% when using a sun-tracking cell instead of a stationary cell. During angle measurements, the power decreased 49% (outside) and 73% (indoors) from 0 to 60 degrees. These findings lead me to conclude that rotating a solar cell to track the sun increases its power significantly.