

DOES TEMPERATURE AFFECT THE AMOUNT OF ENERGY A SOLAR PANEL PRODUCES?

UCSB ScienceLine

July 1, 2013

Although the temperature doesn't affect the amount of solar energy a solar panel receives, it does affect how much power you will get out of it. To make a long and complicated story short, as the solar panels get hotter, they will produce less power from the same amount of sunlight. Normally, electrons at rest (low energy) are excited by sunlight (high energy), and the difference between their excited and rest energies is the potential difference (voltage) that you could ideally get from your solar panel. However, heat also excites electrons (when we heat something we are giving it energy), which raises the energy of the electrons at rest. ("warmer" electrons have more energy at rest than their "cold" counterparts.)

Because we produce power from the difference in the states (at rest and excited by the sun), if the electrons have more energy at rest (your solar panels are hotter), the difference between the rest energy and excited energy (from the sun) is smaller, and our solar panels will produce less energy. A simple analogy would be to consider waterslide from the top of a building (let's say 5 stories high). If you built the waterslide from the top floor to the bottom, you'd go really fast. However, if you built it from the top floor to the 3rd floor, you wouldn't be able to get going as fast. (In this analogy, your difference in potential energy from gravity is converted into speed.)

