

DIRECTIONS: Read both articles. Identify the facts they have in common, and explain how they are interpreted and used by each author to support his or her claims.

Get the Facts about Solar Panel Efficiency

Solar panels are an efficient way to power your home, though because of the way that their efficiency is expressed, that might not seem abundantly clear. The efficiency rating of a solar panel measures what percentage of sunlight striking the panel is actually turned into usable electricity; the higher the efficiency rating, the less panels you need. An 11 to 15% efficiency rating – about average for a solar panel – doesn't sound very high, but there is so much sunlight hitting the panels that a typical roof can easily accommodate enough panels to supply the power required in a typical home. Scientists have been able to make solar panels that are 40% efficient in a laboratory, but they haven't yet been able to make these prototypes commercially viable.

Higher efficiency panels aren't better panels; high efficiency just means that you need fewer panels. But if you have a normal amount of roof space it's more important to focus on the annual expected kilowatt production of your panels than it is on how much space they will occupy.

There are also other factors, besides the efficiency of the panel itself, that come to bear on how much energy a solar panel can generate. These include:

- Panel orientation. In the ideal scenario your panels will face south.
- Roof and panel pitch. The angle of your roof affects how many hours of sunlight will hit your panels. Some panels are mounted on solar tracking systems to automatically follow the sun as it moves across the sky during the day.
- Temperature. Solar panels don't like to be overheated, so they need to be installed with a few inches for air flow between the panel and the roof. You can get solar panels that are specifically designed for hot climates, since hotter temperatures can make your panels less efficient.
- Shade. Too much shade can greatly reduce the amount of energy your solar panels produce.

Why I Won't Go Solar

Photovoltaic (PV) cells, commonly called solar cells, convert light (photons) directly into electricity (voltage), hence their name. The process by which this occurs is called the PV effect, and was discovered in 1954 by scientists at Bell Telephone who noticed that silicon (an element found in sand) created an electric charge when exposed to sunlight. This discovery opened up an entirely new—and vastly overblown—field of technology.

When light strikes an ionized semiconductor material on a solar panel, it causes outer electrons to break from their atomic bonds. Because of the semiconductor structure, the electrons are forced in a single direction, producing an electrical current. But solar cells are far from 100% efficient; in fact, their efficiency is closer to 11 to 15%, a pretty paltry figure. There are several reasons for this:

- Some of the light spectrum is reflected, rather than being absorbed by the semiconductor material;
- The infrared light beams are too weak to create electricity; and
- Some ultraviolet light creates heat energy instead of electricity.

The fact is that most of the sunlight hitting a solar panel will never be converted into energy, and the reality that scientists have only been able to get as much as 40% efficiency out of a solar panel in ideal, laboratory conditions suggest that 40% efficiency may be the limit. Solar enthusiasts will insist that the efficiency of any individual panel is really not that important, as long as you have the space for enough panels, but do we really need every roof in America to be tiled with solar panels? Until science can come up with a way to make these things less conspicuous, I'll pass, and maintain that solar energy is not a viable energy solution for a modern world with aesthetic sensibilities.

Name _____

1. Facts that both authors use:

1. _____
2. _____
3. _____

2. How does the author of “Get the Facts about Solar Panel Efficiency” interpret the facts and use it to support his claim?

3. How does the author of “Why I Won’t Go Solar” interpret the facts and use it to support his claim?

ANSWERS

1. Solar panels are only about 11 – 15% efficient; scientists have been able to achieve 40% efficiency in a lab; the efficiency of the panels isn't that important as long as you have enough room on your roof to put enough panels to power your house.
2. This author uses the facts to make a case for solar energy.
3. This author uses the facts to make a case against solar energy