

UNIT 6 PHOTOVOLTAIC ENERGY – Part 3

Watch the following video about PV panels.

<https://www.youtube.com/watch?v=FIXQIATFELI>

Decide whether the statements are true or false.

1. The sun's energy can be converted into electricity in different ways.
true
2. Recent advancements in technology have reduced the efficiency of PV panels.
false
3. Photons are very small 'packets' of energy that make up light.
true
4. A cell contains several panels.
false
5. The positive and the negative layer of a cell create an electric field.
true
6. When a lot of panels are connected, they are called a solar array.
true
7. A solar array on the roof of a warehouse can supply electricity to two or three homes.
false
8. PV panels have a lot of advantages, such as no emissions and no noise.
true

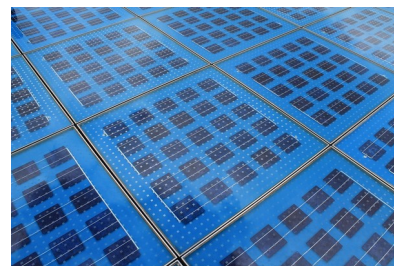
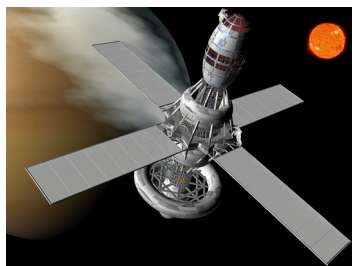
What is the word or phrase defined? Use the list.

solar array
absorbed

semi-conductor
electrons

electric current
photon

1. A ... is a number of solar panels connected into one system. (solar array)
2. A material that allows electricity to move through it easily when its temperature increases is called ... (semi-conductor)
3. The smallest unit of light is a ... (photon)
4. The movement of electricity through a wire is an ... (electric current)
5. When photons strike a solar panel, only a part of them will be taken in, or in other words, ... (absorbed)
6. When photons strike a PV cell, their energy frees some ... in the semi-conductor. (electrons)



Read the text below.

Photovoltaic Cells: Converting Photons into Electrons

The solar cells that you see on calculators and satellites are also called photovoltaic (PV) cells, which as the name implies (photo meaning "light" and voltaic meaning "electricity"), convert sunlight directly into electricity. A module is a group of cells connected electrically and packaged into a frame (more commonly known as a solar panel), which can then be grouped into larger solar arrays, like the one operating at Nellis Air Force Base in Nevada.

Photovoltaic cells are made of special materials called semiconductors such as silicon, which is currently used most commonly. Basically, when light strikes the cell, a certain portion of it is absorbed within the semiconductor material. This means that the energy of the absorbed light is transferred to the semiconductor. The energy knocks electrons loose, allowing them to flow freely.

PV cells also all have one or more electric field that acts to force electrons freed by light absorption to flow in a certain direction. This flow of electrons is a current, and by placing metal contacts on the top and bottom of the PV cell, we can draw that current off for external use, say, to power a calculator. This current, together with the cell's voltage (which is a result of its built-in electric field or fields), defines the power (or wattage) that the solar cell can produce.

<http://science.howstuffworks.com/environmental/energy/solar-cell1.htm>

Decide whether the statements are true or false according to the text.

1. A PV module is the same as a solar panel. true
2. A lot of PV modules grouped together are called a solar array. true
3. At the moment, silicon is not a popular semi-conductor. false
4. The semi-conductor gets the energy of all the light that strikes the solar cell. false
5. The energy of the light frees the electrons in the semi-conductor. true
6. The electric field of the PV cell sends the electrons in a certain direction. true
7. If we put a metal thing on one side of the PV cell, we can use the electrons running in it. false

Complete the sentences with words from the text.

The sunlight ... the PV cell.

(strikes)

1. The ... of the PV cell absorbs part of the sunlight, and takes its energy. (semi-conductor)
2. The energy knocks ... free in the semi-conductor. (electrons)
3. The freed electrons flow in one direction, creating an electric (current)
4. The metal ... on the two sides of the PV cell lead the electric current to different devices. (contacts)



Put the steps of electricity generation into the correct order.

1. The sunlight strikes the PV cell.
2. The semi-conductor of the PV cell absorbs part of the sunlight, and takes its energy.
3. The energy knocks electrons free in the semi-conductor.
4. The freed electrons flow in one direction, creating an electric current.
5. The metal contacts on the two sides of the PV cell lead the electric current to different devices.

Match the words with their meanings.

- | | |
|-------------------------------|-------------------------------------------------------------------------------|
| 1. grid | network of power lines that take electricity from the power station to people |
| 2. building-mounted | installed, put on a building |
| 3. (public) utility companies | electricity, water and gas companies |
| 4. ranch | farm |
| 5. via | through |
| 6. small-scale | including only a few things or people, limited in size |

Forum topic:

The video describes where and how to install solar panels if you want to use solar energy in your home. Watch the video, and tell us which option would be the best for your home and why. Take the following things into account:

- size and orientation of your roof
- costs
- weather conditions in your area

https://www.youtube.com/watch?v=Ge_IWfuLbPU