

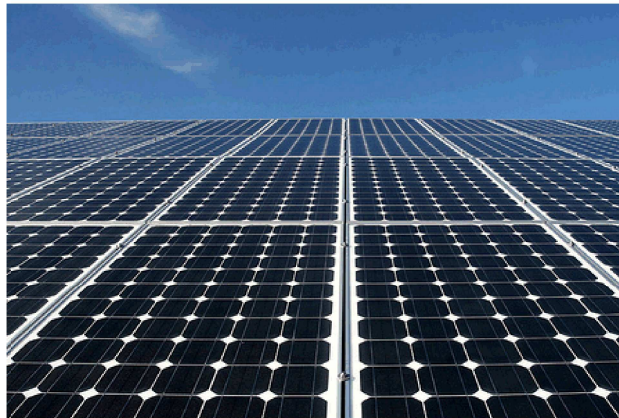
PHOTOVOLTAIC ENERGY

1. VOCABULARY. Join the following words with their corresponding definitions:

A. Photon	1. It is a <u>subatomic particle</u> that carries a negative <u>electric charge</u> . It has <u>no known substructure</u> and is believed to be a <u>point particle</u> . They participate in <u>gravitational</u> , <u>electromagnetic</u> and <u>weak interactions</u> .
B. Layer	2. Capable of producing a voltage when exposed to radiant energy, especially light.
C. Sollar cell	3. An <u>elementary particle</u> , the <u>quantum</u> of the <u>electromagnetic field</u> and the basic unit of <u>light</u> and all other forms of <u>electromagnetic radiation</u> .
D. Wire	4. A region of space characterized by the existence of a force generated by electric charge.
E. Electric Field	5. The <u>deposition</u> of molecules on a <u>substrate</u> or base (<u>glass</u> , <u>ceramic</u> , <u>semiconductor</u> or <u>plastic/bioplastic</u>) . Involving electricity, it may be negative or positive.
F. Photovoltaic Panel	6. A usually pliable metallic strand or rod made in many lengths and diameters, sometimes clad and often electrically insulated, used chiefly for structural support or to conduct electricity.
G. Silicon	7. It is an environmentally friendly packaged interconnected assembly of photovoltaic cells, also known as <u>solar cells</u> . It is usually made with a <u>glass</u> covering and a frame and backing made of <u>metal</u> , <u>plastic</u> or <u>fiberglass</u> .
H. Photovoltaic	8. A metalloid element that occurs in both gray crystalline and brown noncrystalline forms. It is the second most abundant element in the Earth's crust and can be found only in silica and silicates. It is used in glass, semiconductors, concrete, and ceramics.
I. Electron	9. A device that converts <u>sunlight</u> directly into <u>electricity</u> by the photovoltaic effect.

2. READING

Use the words in exercise 1 to complete the following text:



Sunlight is made up of tiny packets of energy called (1) Every minute this kind of energy reaches the earth to meet the world energy demand for the whole year. (2) consist of many solar cells. These are made of materials like (3), one of the most common elements on Earth. The individual cell is designed with a positive and a negative (4)..... To create an (5)..... just like in a battery. These photons are absorbed in the cell and energy causes the (6)..... to become through. The electrons move to the bottom of the cell and exit through the connecting (7)..... This flow of electrons is what we call electricity.

By combining (8)..... and (9)..... panels, we can produce just the right amount of electricity to perform a specific job, no matter how large or small.

3. LISTENING

Now you are going to watch a video about how solar cells work (<http://www.youtube.com/watch?v=0eg1yJGjHb>).

Check your answers in exercise 2.

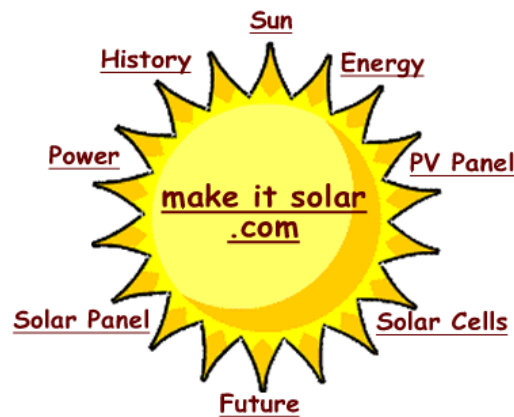
4. SPEAKING

After having learnt about PHOTOVOLTAIC POWER discuss and answer these questions:

- a. What other kinds of energy can be obtained from the solar energy?
- b. What is the energy obtained from solar power used for?
- c. Solar energy can be converted to electricity in two ways. Can you name them.
- d. What are the main advantages of solar power?
- e. What are the main disadvantages of solar power?

5. READING.

Read and check your answers in exercise 4:



Solar energy can be converted to **thermal (or heat) energy** and used to:

- Heat water – for use in homes, buildings, or swimming pools.
- Heat spaces – inside greenhouses, homes, and other buildings.

Solar energy can be converted to electricity in two ways:

- **Photovoltaic** (PV devices) or “solar cells” – change sunlight directly into electricity. PV systems are often used in remote locations that are not connected to the electric grid. They are also used to power watches, calculators, and lighted road signs.
- **Solar Power Plants** - indirectly generate electricity when the heat from solar thermal collectors is used to heat a fluid which produces steam that is used to power generator.

The major disadvantages of solar energy are:

- The amount of sunlight that arrives at the earth's surface is not constant. It depends on location, time of day, time of year, and weather conditions.
- Because the sun doesn't deliver that much energy to any one place at any one time, a large surface area is required to collect the energy at a useful rate.

The main advantages of solar energy are:

Solar energy is free, and its supplies are unlimited. Using solar energy produces no air or water pollution but does have some indirect impacts on the environment. For example, manufacturing the photovoltaic cells used to convert sunlight into electricity, consumes silicon and produces some waste products. In addition, large solar thermal farms can also harm desert ecosystems if not properly managed.

GLOSSARY:

- | | | | |
|-------------|-----------------|--------------------|------------------------|
| 1. Photon: | 2. Layer: | 3. Electric field: | 4. Wire: |
| 5. Flow: | 6. Solar cells: | 7. Electric grid: | 8. Thermal collectors: |
| 9. Deliver: | 10. Surface: | 11. Harm: | 12. Rate: |