SOLAR TECHNOLOGY

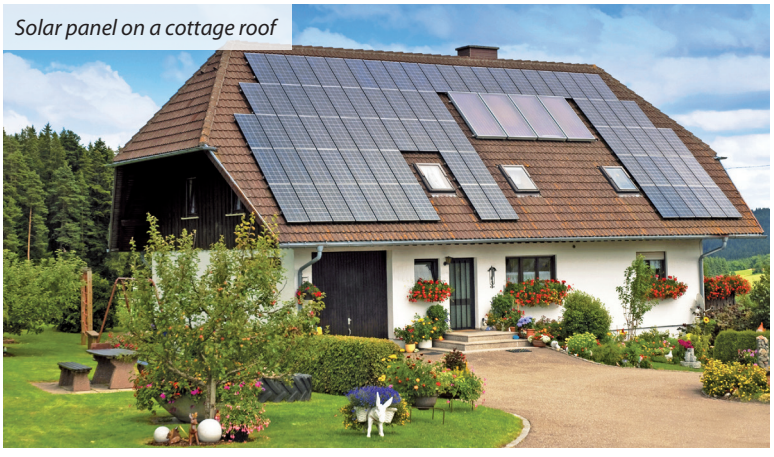
Pearl River Tower, Guangzhou (China) is one of the world's most energy-efficient skyscrapers. It uses wind energy and solar technology.

Solar panels are known to be effective in trapping and collecting the heat of the sun. In countries in the Middle East for example, you can see panels on the roof of many, if not most, houses utilising the hot temperature that lasts for a nine-month season. Such panels are becoming a common sight across Europe and this form of energy is highly recommended for new sustainable self-build houses and office buildings.
But how do panels trap the sun rays, and how can these be converted into energy? What are the available systems, and how can this energy be used in the home?
There are two types of solar panel systems, and they are based on different technological systems.

- **Solar Thermal Systems**
  These systems contain water flowing through the **panel**, which is heated up by the exposure to the sun, through contact with **thermal collectors**, and so provide only hot water. They require a water **storage tank**, at least as big as a conventional boiler.
  This system is very practical and relatively inexpensive, and if the area in which it is used has a certain level of exposure to the sun, it can be effective in terms of paying for the initial installation. This system has many advantages over a regular source of energy for water heating. It reduces the dependency upon imported fuels, it expands the range of energy options and saves resources, diminishing air pollution and providing savings for the householder.
- **Solar Photovoltaic (Solar PV) systems**
  The second system utilises solar or photovoltaic cells. These are banks of small cells that use **semiconductors** that react with sunlight. This photovoltaic effect directly generates electricity, which can then be diverted into the system for immediate use. Storing this energy can be a problem. We are familiar with this system through the introduction of solar-powered calculators to the mass market more than thirty years ago. This remains a successful use of this technology as it is low-cost. A recent innovation on British streets and motorways has been the installation of roadside emergency telephones, powered with a single small photovoltaic panel. More important uses of this system include the powering of orbiting satellites. Lately, innovative companies are developing systems for charging personal devices (smartphones, tablets, laptops) for free by using the sun's energy.
  However, Solar PV system has limited potential at the present time for the individual householder. Cost and effective storage are the two main problems.

bank: *fila, serie*
to divert: *dirottare*
to flow: *scorrere*
for free: *gratuitamente*
householder: proprietario
range: *gamma*
self-build: *fai da te*
sight: *visione, vista*
to store: *immagazzinare*
tank: *cisterna*
to trap: *intrappolare*

Solar panel on a cottage roof



1 Refer back to the text and match the beginning of each sentence to its ending.

a. Solar panels…
b. These devices…
c. Solar thermal panels…
d. Thermal panels…
e. Solar Photovoltaic (Solar PV) systems…
f. The energy generated by PV cells…
g. The problem about PV system is…

1. … how to store the energy produced.
2. … use the property of semiconductors to react with sunlight.
3. … can be classified into two types.
4. … are filled up with water which gets hot when exposed to the sun.
5. … are a good way to save energy in sustainable houses.
6. … are efficient and convenient, especially in areas with a reasonable amount of exposure to the sun!
7. … is conveyed to the system and can be used immediately.

2 Answer the following questions.

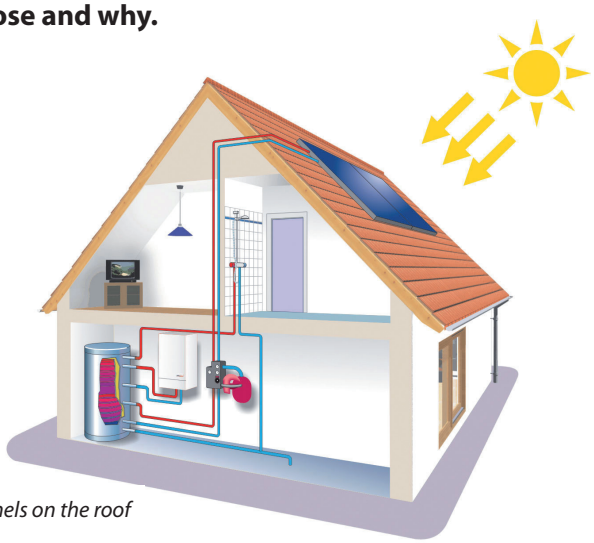
1. In which geographical areas is the use of solar panels more common and cost-effective?
2. What is this form of energy highly recommended for?
3. Which are the two most common types of technologies used for solar panels?
4. What are thermal panels mostly used for and what sort of other equipment is needed?
5. What are the advantages of thermal panels?
6. Do Solar Photovoltaic systems contain water to be heated?
7. Can the energy produced by Solar Photovoltaic systems only be used for heating water?
8. When and how was the system first introduced?
9. Can you list some applications of PV cells?
10. What are the drawbacks of Solar Photovoltaic systems?

3 Listen to John Martinez, Professor of Energetic Engineering at Stanford University in California, talking about solar energy. Choose the correct options and correct the false ones.

What are the pros and cons of solar energy?

	T	F
1. Solar energy will never end.	☐	☐
2. Solar energy can be used in remote parts of the world.	☐	☐
3. Solar energy is not suitable to power space satellite.	☐	☐
4. Solar panels can be installed on most roofs.	☐	☐
5. A home solar system does not produce a surplus of energy.	☐	☐
6. The cost of panel installation and energy storage is very low.	☐	☐
7. Pollution may influence solar cells' effectiveness.	☐	☐
8. Solar power energy is the best if compared to other energy sources.	☐	☐

4 Write a short text about the possibility of installing solar panels on the roof of your house. Explain what kind of panels you would choose and why.



Solar panels on the roof