

<b>Lesson 8</b>	Solar Photovoltaic (PV) Uses and Applications		
<b>Level</b>	Key Stage 3	<b>Time required</b>	30 minutes
<b>National Curriculum Links</b>			
Science, PSHE (view scheme of work for full details of links)			
<b>Aims</b>			
<ul style="list-style-type: none"> <li>The students will be asked to consider why PV technology is useful and where it may be applied. They will investigate the advantages and disadvantages of photovoltaic power</li> <li>They will investigate the advantages and disadvantages of photovoltaic power</li> </ul>			
<b>Resources required</b>			
Pen, paper, drawing materials			
<b>Web search keywords</b>			
Solar panel, photovoltaics, PV, solar power, sun electricity			

## Introduction

In the previous lesson we investigated photovoltaic electricity generation. Today we will be investigating applications of this technology, and its advantages and disadvantages.

## Task 1

Divide the students into groups and ask them to create a list of applications for solar PV (e.g. calculators, mobile phone chargers, road traffic safety signs, battery chargers, radios, torches, navigation buoys at sea, space exploration)

Ask the students to consider the advantages and disadvantages of photovoltaic power.

## Advantages of Solar PV

- If a surplus of electricity is produced it can be sold back to the electrical grid
- Electricity can be used to charge a battery which can be discharged even when there is no sunshine (e.g. rural road safety signs)
- Silent in operation
- Low maintenance – most PV systems have no moving parts
- Particularly efficient in equatorial zones with large amounts of sunshine
- Government incentives are available to help cut initial costs
- Can allow independence from the electrical supply grid

## Disadvantages of Solar PV

- The panels are expensive due to complex manufacturing processes
- Efficiency – ideally in the Northern Hemisphere panel need to face south. If the panels face in another direction or are under shade, they will be less efficient
- Areas receiving lower amounts of sunlight due to their location, the season, will benefit less from PV energy
- Shorter daylight hours in winter means less electricity production
- Overcast weather may reduce the energy output
- If the energy produced is required at times when there are low light levels, it needs to be stored in a battery. Batteries are often expensive, bulky and contain toxic chemicals.
- The amount of energy required to manufacture a PV panel needs to be considered. It is possible that more energy is used during the manufacture of a panel than the panel could produce in its life time. Panels used in space exploration may well fall into this category but it is still a viable energy source for that application

## Task 2

Ask the groups to come up with a design for a solar powered appliance. Ask them to draw their design and annotate it.