Solar Power

Introduction Renewable energy sources like solar electricity is one way to save money over the long term and unlike fossil fuels produce little or no carbon dioxide (CO_2): one of the biggest causes of climate change.

Photovoltaic systems use solar panels – made up of individual PV cells – to turn daylight into electricity. A PV cell is made up of one or two layers of a semi-conducting material.

When light shines on the cell, it creates an electric field across the layers – and causes electricity to flow. And the more light the cell receives, the more electricity it can generate.

Systems capabilities vary depending on their size, from small systems to power a few lights in a house, to large, more complicated systems for larger applications such as hospitals, schools, or other buildings. Solar PV systems are often used in rural areas where electricity supply is unavailable and can also be effectively used for water pumping in remote areas.

System components include the solar PV panels (which convert daylight into electricity), battery bank (to store electricity), and power conditioning equipment (this prevents the batteries being damaged by overcharging or over-discharging, and may convert the direct current (DC) generated by the PV panels and batteries into alternating current (AC) used by many appliances).

Photovoltaic technology is well established internationally, and components and systems provide a reliable source of electricity if properly installed and maintained. Although it is a low-maintenance technology, some maintenance is nevertheless necessary, and batteries need to be replaced every 3 to 8 years (depending on battery type used).

Normally, because solar PV systems have a relatively high capital cost and low operation and maintenance costs, large electrical demands such as cooking or heating are not supplied with solar PV, but rather by an alternative power source such as gas.

PV energy should not be confused with solar thermal, another form of renewable energy, used to provide hot water.

There are three main types of PV cells:
• Monocrystalline – made from thin slices of silicon, cut from a single crystal.
• Polycrystalline – made from thin slices of silicon, cut from a block of crystals.
• Thin Film – made from a very thin layer of electricity conducting silicon atoms on a glass or metal base.

These three kinds of PV cells vary in efficiency.