

SOLAR PV



WHAT IS SOLAR PV?

Sun provides an abundant source of energy, and this can be converted into electrical energy by using Photovoltaic cells (solar PV). Solar panels or photovoltaic cells use semiconductors to generate electrical current on exposure to sunlight.

HOW IT WORKS

Solar PV systems are a collection of solar panels. Semiconductor material available on the solar cells made of silicon (monocrystalline, polycrystalline, amorphous or cadmium telluride), or some cells (made of copper indium gallium selenide/sulphide) between the layers of glass attracts sunlight and generates power.

This electricity then leaves solar panels in the form of direct current (DC) and passes through the inverter which converts it as alternative current (AC) so that it can be used. These inverters may be integrated within the photovoltaic system or, more frequently, placed distant from it.

Kilowatts peak is the unit used to measure the power of PV cells (kWp). It is the pace at which it produces energy when the sun is shining directly on it.

BENEFITS

Photovoltaic cells generate more electricity when they receive more sunlight. Based on appropriate building type it can be installed as roof mounted or if there aren't ideal conditions then they can be installed on the ground.

As best practice, to generate more electricity and attract sunlight, solar panels are installed on south facing roofs for maximum exposure of sun with an inclination of 35°–40° optimum angle horizontally. PV cells can be installed on flat roofs, typical pitched roofs, frames, or as free-standing modules on an appropriate support.

CONSIDERATIONS

1. Current building consumption (Energy use)
2. Current condition of roof, if it's suitable for installation
3. Use online tools to estimate power generation
4. Any obstructions on the path of sunlight
5. Quotes from different suppliers to check difference in efficiency (Obtain a technical survey)
6. How long do they last? What about waste generation?
7. Should battery storage for excess use be a consideration here?

AN EXAMPLE SAVINGS CALCULATION

(Based on electricity prices in 2020)

To generate energy and compensate a 15kW consumption potential, installing a 20kWp solar capacity on a 176 sq.m roof space can save 16914kWh of electricity per annum with a potential cost saving of £2862 at current rate of electricity. If energy prices rise to 50p/kwh e there could be savings of £8457

	Cost Savings (£/year)	kWh Savings	CO2e savings (tCO2e/year)	Capital Cost (£)	Payback Period (years)
Solar PV current prices	£2862	16924	3.3	£20000	7.0
Possible future price at 50p	£8457	16924	3.3	£20000	2.4

READ MORE: Improving Energy Efficiency at Glebe Farm