



By Tim Pullen

Solar Photovoltaics

Solar photovoltaics convert energy from sunlight into electricity using a semiconductor material such as silicon. When light hits the semiconductor, the energy in the light is absorbed, 'exciting' the electrons in the semiconductor so that they break free from their atoms. This allows the electrons to flow through the semiconductor material (in a similar manner to a normal electrical circuit) producing electricity.



Groups of solar cells can be added together to provide increasing levels of power. This can range from small, kilowatt-sized solar panels for use in domestic households, to larger arrays, which function as separate solar power plants feeding power directly into the electricity grid.



Obviously solar energy is only produced during the day and it also varies in output due to cloud cover. Solar PV systems are usually grid connected to allow energy produced while the sun shines to be "stored" for later use.

The installed and grid connected cost of a solar PV system will be around £4,500 to £5,000 per kWp and 1kWp will produce about 750kWh per year. Therefore a typical house will need about 6.5kWp at a cost of £32,000. A wind turbine will cost about £10,000 for a 2kW rate machine which will produce about 5000kWh per year. The solar system will last about 40 years and the wind turbine 20 years, so the price difference is not as great as it might seem.

The principle issue is that PV can be fitted in many more locations than a wind turbine (planning consent problems, upsetting the neighbours, surrounding trees or buildings, not having enough wind!).

It has been said that PV's are a great, maintenance free, way of producing electricity but their cost is still high enough to mean they are not for everyone.



Can I sell surplus electricity?

The answer is yes and this is where the idea gets interesting. The Energy Act 2008, coming into effect in 2010, introduces "feed-in tariffs". A Government set rate at which to sell energy to the grid. This is likely to be far higher than current rates – up to 41.3p/kWh – and make the whole idea of micro-generation more attractive.