



Renewable Energy



What is it?

Renewable energy broadly encompasses a diverse range of energy sources which have the common attribute of being replenished at the same rate as they are used. Renewable energy sources include solar, wind, wave, tidal, hydroelectric, geothermal and biomass and unlike fossil fuels they are "carbon neutral"; that is they

produce little or no net carbon dioxide (CO₂).

Until recently, the UK has been slow to embrace renewable energy sources due to our indigenous supplies of coal, gas and oil. However, we already import half our coal and some gas. By 2010 the UK will be a net importer of oil. By 2020 we could be dependent on imported energy for 75% of our energy needs.

Although the UK is near the bottom of the European league in the current deployment of renewable energy this belies the wealth of our resources. For instance, we have the largest wind and wave resources in Europe and if we could exploit the tidal energy of the Severn estuary this might provide 8% of our national electricity needs. For the first time, in 2008 global capital investment in renewable energy was greater than investment in all fossil fuels combined (source: United Nations Environment Programme).

Sources of Renewable Energy



Solar power street light

Most types of renewable energy are produced directly or indirectly from the sun. As such they are secure, inexhaustible and generally cause little or no pollution.

There are three methods of harnessing direct solar energy

Passive solar design reduces the heating and artificial light requirements of new developments by incorporating design features that maximize the heating action of the sun through the use of glass and the orientation of the building. **Solar thermal** systems typically use roof mounted solar collectors to extract the heat of the sun which is used to heat domestic hot water. **Photovoltaics** (PV) use cells made of silicon to convert sunlight into electricity. Solar thermal and PV systems can be retro fitted to existing dwellings.



Inside a wood chip boiler

Biomass energy is a diverse and versatile form of renewable energy. It involves use of plant and animal material (derived from solar energy) to provide heat, electricity and transport fuels.

Whilst combustion of biomass material releases CO₂, only the same amount of CO₂ is released as was removed from the atmosphere whilst the plant material was growing, providing any biomass harvested is subsequently replanted.

Heat pumps utilise solar energy stored in the ground, water or air and work like a fridge in reverse, extracting heat from where it's cold to where it's warm. The heat pump raises the extracted heat to a useful temperature with a compressor. This requires a source of electricity so heat pumps are not truly renewable but do provide very efficient heating with every unit of electricity resulting in three to four units of heat.

Wind is caused by uneven warming of the earth's surface and air movements from warm areas to cooler ones. The energy contained in the wind can be harnessed by blades which rotate a turbine to generate electricity.



Waves are created by the movement of the wind over a large body of water. Wave power devices have been created that either sit on the water surface or are embedded in the cliff face.

The tides of the sea are a result of the gravitational pull of the moon and to a lesser extent the sun. There are several methods of intercepting tidal power and converting it to electricity. A tidal barrage captures water at high tide and releases it gradually as the tide goes out. Such initiatives involve massive engineering works and huge costs and as a result there are only a few examples worldwide. Other options include marine tidal turbines which resemble underwater wind turbines and ducted devices which sit on the sea floor in the tidal stream.



Water Power, Stour Valley

Hydroelectric power is produced by moving water turning turbines. Most large schemes involve the creation of reservoirs and dams which allow the release of water in a controlled fashion when electricity is required. Smaller projects use the natural run of the river and have less control of when the power is produced.

Geothermal energy taps into the heat generated in the Earth's core. In certain geological structures reservoirs of water trapped deep underground become heated and this heat can be accessed by drilling bore holes into the reservoir. The steam produced can be used to drive turbines and produce electricity or the hot water can be used in district heating schemes such as the project heating Southampton's town centre.

Support for renewables

UK energy demand is made up of three roughly equal segments: heat, electricity and transport fuels. Currently about 6% of our electricity is sourced from renewable sources and this should rise to

10% by 2010 and 20% by 2020 under a support mechanism called the Renewables Obligation. This requires electricity suppliers to source an increasing percentage of their electricity supply each year from renewable sources.

A similar mechanism for transport fuels (Renewable Transport Fuels Obligation) requires 3.25% of all fuel sold on UK forecourts to come from renewable sources by 2010. A Feed-in Tariff to financially support renewable electricity production at the smaller scale up to 5MW will be introduced in April 2010 and a Renewable Heat Incentive is planned for introduction in April 2011.

The European Union has recently agreed a legally binding target of 20% of all energy used in Europe to be from renewable sources by 2020. The UK has accepted a 15% target, whilst most other European countries have higher targets. The UK target will be very challenging as we currently produce only 2% of our total energy requirements (heat, electricity and transport) from renewables.

Pro and cons of renewable energy

Although renewable sources are unlikely to supply our entire energy needs they have many distinct advantages that make them an essential part of the future energy mix. However, achieving their potential will involve several key challenges.



House in Bridport with solar PV and solar water heating
(Photo: Jim Shearman)



Pros

- ✓ Low carbon energy sources which produce less pollution than fossil fuels
- ✓ Provide local jobs particularly in rural areas
- ✓ Locally sourced energy therefore enhance security of supply
- ✓ Will strengthen energy dispersal network
- ✓ Make people think about energy

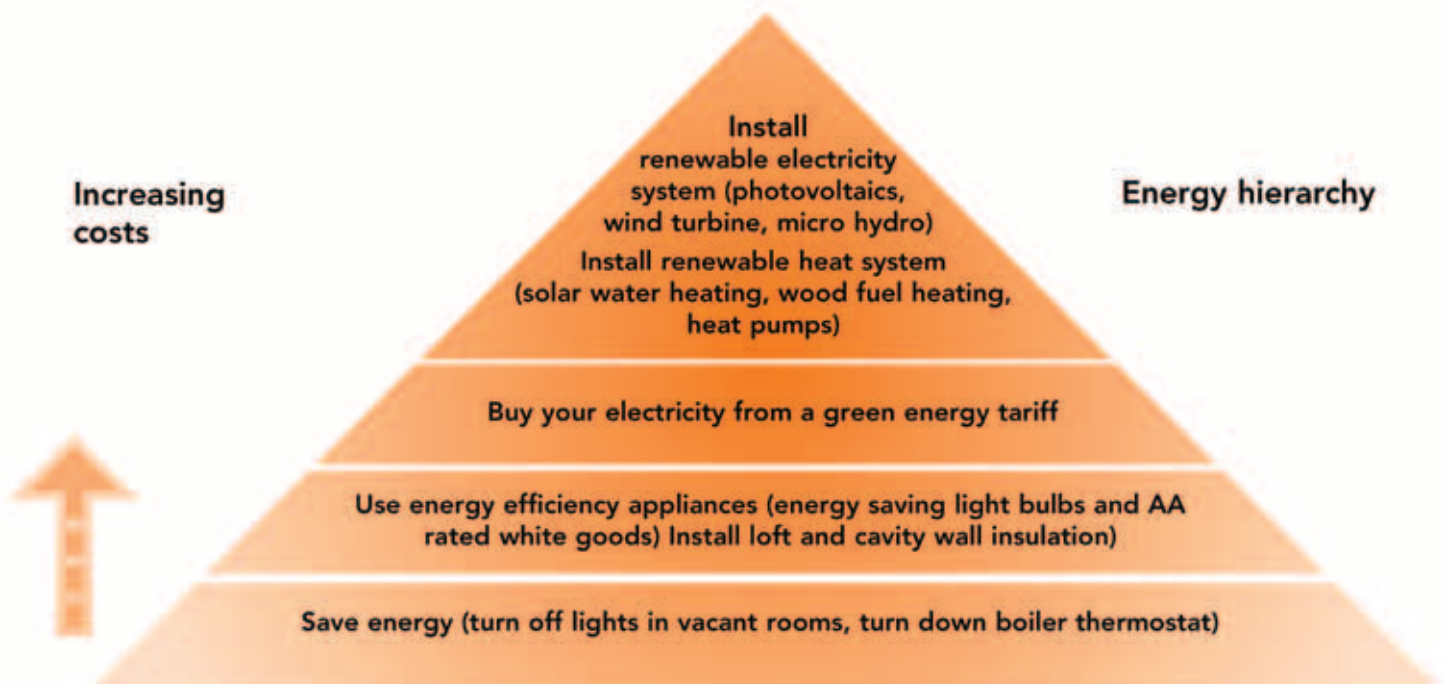
Cons

- ✗ Many renewables such as wind and solar are intermittent
- ✗ Can be visually intrusive and fail to get planning
- ✗ Non competitive in the short term without incentives
- ✗ Require changes in infrastructure
- ✗ Often viewed as new technology

Energy hierarchy

There are grants available through the Government's Low Carbon Building Programme until March 2011 to install micro renewable energy systems in your home. In addition a new Feed-in Tariff for renewable electricity will be introduced in April 2010, designed to reduce the payback period for micro renewables. However, before you consider renewables, remember that you should first try to use less energy

through behavioural changes (i.e. turning the light off when you leave a room) and buying energy efficient products (e.g. AA rated fridges and energy saving light bulbs). Many of these no and low cost measures will save you far more energy, money and carbon than a more expensive investment in micro renewables.



Source: Energy Saving Trust



Opportunities for renewable energy in Dorset

In 2005 The Bournemouth, Dorset and Poole Renewable Energy Strategy was produced and endorsed by all the local authorities in Dorset as well as 30 local organisations and businesses. A complimentary Bournemouth, Dorset and Poole Energy Efficiency Strategy and Action Plan has recently been published (October 2009). Both strategies are being implemented by the Dorset Energy Group, a partnership made up of an executive and six working groups focusing on planning policy, bioenergy, community, business, public and domestic sustainable energy.

Renewable development in Dorset

A report by Revision 2010 produced for the Government Office South West in 2005 (www.oursouthwest.com/revision2010) suggested that Dorset might be able to achieve 64-84 MW of renewable electricity generating capacity by 2010, making up 8.4 to 9.9% of Dorset's electricity demand. There is currently approximately 12 MW



20 kW wind turbine, Dorset

installed, mainly made up from 8.3 MW of landfill gas and 3MW of anaerobic digestion from sewage sludge at Wessex Water sewage treatment sites. In addition there are a number of small scale installations across the County. However a farm based anaerobic digestion plant near Blandford Forum became operational in 2008 which can generate up 340 kW

of electricity from biogas, sufficient to meet the annual electricity requirements of approximately 400 houses. Over the last 3 years Dorset County Council has carried out 52 renewable energy installations on schools and other public buildings plus a number of community and village halls. In total this represents a further 800 kW of renewable energy capacity in Dorset.

More information

Grants

Low Carbon Buildings Programme	0800 9150990	www.lowcarbonbuildings.org.uk
Community Sustainable Energy Programme	0845 3 671 671 0800 915 0990	www.communitysustainable.org.uk www.lowcarbonbuildings.org.uk/info/permitted/

Renewable energy advice for householders:

SW Energy Saving Trust Advice Centre	0800 512012	www.energysavingtrust.org.uk
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Renewable energy advice for businesses in Dorset:

Business Link	0845 600 9966	www.businesslink.gov.uk/southwest
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Renewable energy in Dorset and advice for community groups:

Renewable Energy Development Officer, Dorset County Council	01305 228530	p.west@dorsetcc.gov.uk www.dorsetforyou.com/climatechange
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