An Introduction to Renewable and Low Carbon Energy Technology for Homes in Hampshire & Isle of Wight
Introduction

Energy plays an indispensable role in modern society. We all depend on a constant and reliable supply of energy for our homes, businesses and for transport. The majority of the UK’s electricity comes from burning fossil fuels (e.g. coal, oil and gas), which is a major contributor to climate change. In the future, the amount and proportion of renewable energy generated is set to rise, largely because of scarce supplies of gas and oil and also because of government policy and programmes to support renewable energy generation.

What is renewable energy?
Renewable energy can be used to produce electricity, generate heat and transport goods and people. It comes from sources that are essentially inexhaustible. They include sun, wind, flowing water and heat of the Earth; or replaceable fuels such as plants. It generally produces few or no greenhouse gases.

The exception, however, is biomass where the carbon dioxide emitted is balanced by the amount of carbon absorbed from the atmosphere while the organic material is produced. If biomass is being used sustainably, there are no net carbon emissions over the time frame of a cycle of biomass production. Biomass is therefore generally considered to be carbon neutral.

Using renewable energy at home
Renewable technologies should generally only be considered after carrying out all basic energy efficiency improvements – it is cheaper to reduce demand than to increase supply.

The table shows the options you could consider. They range from making some minor behavioural changes to installing your own renewable energy system.

Not all technologies will be suitable for your circumstances and you should consult a relevant specialist to ascertain which renewable energy system best fits your needs.

Furthermore, planning permission will often be required. We strongly advise contacting your local authority regarding planning issues before you have a system installed as obtaining retrospective planning permission can be difficult and costly.

This booklet outlines the range of renewable energy technologies that are available, how and where they can be used and how they work.
Green Electricity

The majority of the electricity supplying the national grid is currently produced by burning fossil fuels (e.g. gas, coal and oil) with just 3.5 percent coming from renewable energy such as wind and hydro. Electricity produced from renewable sources is known as Green electricity and is frequently given specific brand names by the energy companies.

Due to Government legislation known as the Renewables Obligation, a small part of the electricity you purchase will already come from renewable sources, however, green funds and green tariffs are additional voluntary activities undertaken by various electricity suppliers.

Green tariffs

When you choose a green tariff, your supplier is obliged to source some or all of the electricity you consume, from existing renewable energy sources (such as a wind farm).

Green funds

This involves you paying a premium to contribute to a fund that will be used to support new renewable energy developments. Under this option, your involvement will help to alter the mix of energy sources in future toward renewable sources.

By choosing to purchase more or all of your electricity from green sources you will be contributing to new renewable energy generation and will send a message to the energy companies that renewable energy is fast becoming the preferred consumer option.

How do I choose?

Ask several questions of your potential green electricity supplier, including:

- Is the green energy you would be buying part of that which the energy supplier is legally required to purchase?
- If contributing to a green fund, will it be used for renewable developments only to meet their legislative requirements, or is it voluntary to support additional renewable energy generation?
- How is it verified? Is it labelled on your electricity bill? Will there be a more positive impact if their supply is sourced from renewable technology additional to that legally required?

Low Carbon Buildings Programme (LCBP)

The LCBP provides grants to reduce the cost of installing microgeneration measures to households. The programme will demonstrate how energy efficiency and microgeneration can work hand in hand to create low carbon buildings.

Complete a Home Energy Check to assess which energy efficiency measures you need to have installed in the home, such as insulation, in order to first reduce your energy requirements. Call your Energy Advice Centre free on 0800 512 012 for more information.

You can then apply for a grant to have installed a certified micro-generation product. Start saving on your energy bills and lower your environmental impact.
Solar water heating systems use heat energy from the sun to work alongside your conventional water heater. The technology is well developed and an effective means of using solar energy in the UK.

Benefits

- Can provide almost all of your hot water during the summer months and about 50% year round.
- Reduces your impact on the environment - the average domestic system reduces carbon dioxide emissions by around 400kg per year, depending on the fuel replaced.

Different types of system

There are two main types of commercially available system, a competent professional installer should assess your situation and discuss with you the best configuration to meet your needs.

- Flat plate collectors: in many flat plate collectors, an absorber plate with a specially developed black coating maximises the collection of solar energy and is usually covered by a glass sheet. Flat plate collectors are typically 30 percent efficient and cheaper to install.
- Evacuated tube collectors: enclose each pipe and its associated plate in an evacuated glass tube. The vacuum in the tube almost eliminates convection losses. They occupy a smaller area and have an efficiency of approximately 40 per cent, more expensive than flat plate collectors.

Solar water heating and your home

Solar water heating can be used in the home or for larger applications, such as swimming pools.

For domestic hot water there are three main components: solar panels, a heat transfer system, and a hot water cylinder. Solar panels - or collectors - are fitted to your roof. They collect heat from the sun's radiation. The heat transfer system uses the collected heat to heat water. A hot water cylinder stores the hot water that is heated during the day and supplies it for use later.

Generally in the UK, solar water heating is used only for water heating, not space heating. This is because in the winter months, when space heating is required, a solar water system is only capable of producing up to a maximum of 30 per cent of the hot water needs. For solar water space heating to be viable, the panel area has to be large and under-floor heating is used rather than central heating as it requires lower water temperatures.

Is my property suitable?

Preferably you will need 2-4m² of southeast to southwest facing roof receiving direct sunlight for the main part of the day. You'll also need space to locate an additional water cylinder if required.

Cost and maintenance

The typical installation cost for a domestic flat plate collector system is £3,000 - £4,500. Evacuated tube systems will cost £3,500 - £4,500. Typical savings on an annual domestic fuel bill could range from £20 to £110 per year, depending on the existing water heating system. DIY installations may be cheaper but are not currently eligible for grant funding. Check that an installer is registered with the Solar Trade Association.

Most systems have an average lifespan of around 20 years and require very little maintenance. A yearly check by the householder and a more detailed check by a professional installer every 3-5 years should be sufficient (consult your system supplier for exact maintenance requirements).
Solar photovoltaic (PV) uses energy from the sun to create electricity to run appliances and lighting. PV requires only daylight - not direct sunlight - to generate electricity.

**How it works**

Photovoltaic (PV) systems use cells to convert solar radiation into electricity. The PV cell consists of one or two layers of a semi conducting material, usually silicon. When light shines on the cell it creates an electric field across the layers, causing electricity to flow. The greater the intensity of the light, the greater the flow of electricity.

**Types of solar cell:**

Monocrystalline & Polycrystalline: most expensive, have a typical efficiencies of 12 - 15 per cent.

Amorphous silicon (thin film): cheapest, has a typical efficiency of 7 per cent.

The electrical output from a single cell is small, multiple cells are connected together and encapsulated (usually behind glass) to form a module (sometimes referred to as a "panel"). The PV module is the principle building block of a PV system and any number of modules can be connected together to give the desired electrical output.

The electricity is generated in the form of direct current (DC) which can either be used directly or converted into alternating current (AC) for household use or for exporting to national grid. Where there is no mains supply, PV systems can be used to charge batteries.

PV systems are available in a variety of shapes and colours, ranging from grey 'solar tiles' that look like roof tiles, to panels and transparent cells that you can use on conservatories and glass to provide shading as well as generating electricity.

PV systems generate no greenhouse gases, saving approximately 325kg of carbon dioxide emissions per year - adding up to about 8 tonnes over a system's lifetime - for each kilowatt peak (kWp - PV cells are referred to in terms of the amount of energy they generate in full sun light).

**Solar PV and your home**

You can use PV systems for a building with a roof or wall that faces within 90 degrees of south. If the roof surface is in shadow for parts of the day, the output of the system decreases. Solar panels are not light and the roof must be strong enough to take their weight, especially if the panel is placed on top of existing tiles. Solar PV installations and maintenance should always be carried out by a trained and experienced installer.

**Cost and maintenance**

Prices for PV systems vary, depending on the size, type and the nature of the actual building on which it is mounted. The size of the system is dictated by the amount of electricity required, therefore efficient lights and appliances are a must. For the average domestic system, costs can be around £4,000 - £9,000 per kWp installed. Most domestic systems are usually between 1.5 and 2 kWp, cover 10 - 15m² of roof area, and can provide 50% of the average family's annual electricity supply.

If you intend to have major roof repairs carried out it may be worth exploring PV tiles as they can offset the cost of roof tiles.

Grid connected systems require very little maintenance by ensuring panels are kept relatively clean and that shade from trees has not become a problem. Stand-alone systems, i.e. those not connected to the grid, need maintenance on other system components, such as batteries.
Modern wind turbines use the wind's lift forces to turn aerodynamic blades that turn a rotor which creates electricity.

**Wind energy**

In the UK we have 40% of Europe's total wind energy. But it's still largely untapped and only 0.5% of our electricity requirements are currently generated by wind power.

Wind power is proportional to the cube of the wind's speed, so relatively minor increases in speed result in large changes in potential output. Individual turbines vary in size and power output from a few hundred watts to two or three megawatts (as a guide, a typical domestic system would be 1 - 6 kilowatts, depending on the location and size of the home). Uses range from very small turbines supplying energy for battery charging systems (e.g. on boats or in homes), to turbines grouped on wind farms supplying electricity to the grid.

**Small scale wind and your home**

Wind speed increases with height so it's best to have the turbine high on a mast or tower. Generally speaking the ideal siting is a smooth-top hill with a flat, clear exposure, free from excessive turbulence and obstructions such as large trees, houses or other buildings.

Knowledge of local wind speed is critical to designing a wind energy system and predicting output. One source of local windspeed data is the NOABL database, available on the British Wind Energy Association website. However, the data is over-optimistic at 1.5 m/s higher on average than that actually experienced and, for many households, only approximately 60% of existing wind is converted into electricity, so compensate for this when planning an installation. One way to measure your own speeds is with an anemometer, available online from £120. Planning issues such as visual impact, noise and conservation issues need to be considered.

**Stand-alone or grid-connected system?**

Small-scale wind power is particularly suitable for remote off-grid locations where conventional methods of supply are expensive or impractical. Most small wind turbines generate direct current (DC) electricity. Off-grid systems require battery storage and an inverter to convert DC electricity to AC (alternating current - mains electricity). You also need a controller to divert power to another useful source (e.g. space and/or water heaters) when the battery is fully charged. It's common to combine this system with a diesel generator for use during periods of low wind speeds. A combined wind and diesel system gives greater efficiency and flexibility than a diesel only system. It allows the generator to be used at optimum load for short periods of time to charge batteries when there is little wind, rather than by constant use at varying loads.

Wind systems can also be installed where there is a grid connection. A special inverter and controller converts DC electricity to AC at a quality and standard acceptable to the grid. No battery storage is required. Any unused or excess electricity can be exported to the grid and sold to the local electricity supply company.

**Cost and maintenance**

Small/micro wind systems range in cost from a few hundred pounds for a small battery charging system, to several thousand pounds for a larger system capable of meeting electricity needs for an entire household or business. A turbine rated at 600 W - 1.5 kW might cost between £1,500- 3,000, whilst turbines rated at 2.5 kW to 20 kW can cost between £6,500 and £20,000.

The rooftop turbine market is still in the early stages of development, manufacturers estimate that once mass production starts, an average 1-1.5 kW model will cost around £3,000 per kW capacity installed. A 1.5 - 6kW capacity turbine will cost £4,000 - £18,000. An average house uses an estimated 4,700 kilowatt hours (kWh) of electricity per year. The output of a 1.5kW wind turbine is variable, and is dependent on specific technology installed and local environmental circumstances.

Turbines can have a life of up to 20 years but require service checks every few years to ensure they work efficiently. For battery storage systems, typical battery life is around 6-10 years, depending on the type, so batteries may have to be replaced at some point in the system's life.
Although we may not know it heat pumps are very familiar to us - fridges and air conditioners are two examples.

Ground source heat pumps (GSHP) transfer heat from the ground into a building to provide space heating and, in some cases, to pre-heat domestic hot water. For every unit of electricity used to pump the heat, 3-4 units of heat are produced. As well as ground source heat pumps, air source and water source heat pumps are also available.

How does it work?
There are three important elements to a GSHP:
1) The ground loop. This is comprised of lengths of pipe buried in the ground, either in a borehole or a horizontal trench. The pipe is usually a closed circuit and is filled with a mixture of water and antifreeze, which is pumped round the pipe absorbing heat from the ground.
2) A heat pump. This has three main parts:
   ● The evaporator - (e.g. the squiggly thing in the cold part of your fridge) takes the heat from the water in the ground loop;
   ● The compressor - (this is what makes the noise in a fridge) moves the refrigerant round the heat pump and compresses the gaseous refrigerant to the temperature needed for the heat distribution circuit;
   ● The condenser - (the hot part at the back of your fridge) gives up heat to a hot water tank which feeds the distribution system.
3) Heat distribution system. Consisting of under floor heating or radiators and in some cases water storage for hot water supply.

What options are available?
The ground loop can be:
1) borehole;
2) straight horizontal - trench costs less than a borehole, but needs more land area;
3) spiral horizontal (or ‘slinky coil’) - needs a trench of about 10m length to provide about 1kW of heating load.

How much does it cost?
A typical 8kW system costs £6,400-£9,600 plus the price of connection to the distribution system. This can vary with property and location.

Running costs
The efficiency of a GSHP system is measured by the coefficient of performance (CoP). This is the ratio of units of heat output for each unit of electricity used to drive the compressor and pump for the ground loop. Typical CoP’s range from 2.5 to 4. The higher end of this range is for underfloor heating, because it works at a lower temperature (30-35°C) than radiators. Based on current fuel prices, assuming a CoP of 3-4, a GSHP can be a cheaper form of space heating than oil, LPG and electric storage heaters. It is however more expensive than mains gas. If grid electricity is used for the compressor and pump, then an economy 7 tariff usually gives the lowest running costs.

Ground source heat pumps and your home
What to keep in mind when considering a ground source heat pump.
● The type of heat distribution system. GSHPs can be combined with radiators but under-floor heating is better as it works at a lower temperature.
● Is there space available for a trench or borehole to accommodate a ground loop?
● Is the ground suitable for digging a trench or borehole?
● What fuel is being replaced? If it’s electricity, oil, LPG or any other conventional fossil fuel the payback will be more favourable. Heat pumps are a good option where gas is unavailable.
● Want to be 100% renewable? Buy green electricity, or install solar PV or some other form of renewable electricity generating system to power the compressor and pump.
● Is a back-up heating system required?
● Is there also a cooling requirement?
● Is the system for a new building development? Combining the installation with other building works can reduce costs.
● Can you incorporate insulation measures? Wall, floor and loft insulation will lower your heat demand.
Biomass is organic matter of recent origin but doesn’t include fossil fuels. The CO₂ released when energy is generated from biomass is balanced by that absorbed during the fuel’s production. We call this a carbon neutral process. It is often called ‘bioenergy’ or ‘biofuels’ and is produced directly from plants or indirectly from industrial, commercial, domestic or agricultural products.

Biofuels fall into two main categories:
- Woody biomass includes forest products, untreated wood products, energy crops, short rotation coppice (SRC), e.g. willow. For small-scale domestic applications of biomass the fuel usually takes the form of wood pellets, wood chips and wood logs.
- Non-woody biomass includes animal waste, industrial and biodegradable municipal products from food processing and high energy crops, e.g. rape, sugar cane, maize.

**Biomass and your home**

There are two main ways of using biomass to heat a domestic property:
- Stand-alone stoves providing space heating for a room. These can be fuelled by logs or pellets but only pellets are suitable for automatic feed. Generally they are 6-12 kW in output. Stoves can be 80% efficient and normally used for background heating and adding aesthetic value. Most provide space heater only but the higher output versions can be fitted with an integral back boiler to provide domestic hot water and central heating through radiators.
- Boilers connected to central heating and hot water systems. These are suitable for pellets, logs or chips, and are generally larger than 15 kW. There are many domestic boilers available. Log boilers must be loaded by hand and may be unsuitable for some situations. Automatic pellet and wood-chip systems can be more expensive. Many boilers will dual-fire both wood chips and pellets, although the wood chip boilers need larger hoppers to provide the same time interval between refuelling. Boilers can be designed with an integral hot water energy storage or accumulator tank that stores water up to 90°C, enabling the supply of heat to be further decoupled from the combustion of the fuel. This is particularly helpful with log boilers where systems operate at full load and the matching of demand with load is performed by the accumulator.

**Is my house suitable?**

You should consider the following issues if you’re thinking about a biomass boiler or stove. An accredited installer will be able to provide more detailed advice.
- Fuel: It’s important to have storage space for the fuel, appropriate access to the boiler for loading and a local fuel supplier.
- Flue: The vent material must be specifically designed for wood fuel appliances and there must be sufficient air movement for proper operation of the stove. Chimneys can be fitted with a lined flue.
- Regulations: The installation must comply with all safety and building regulations (see Part J of the Building Regulations).
- Smokeless zone: Wood can only be burnt on exempted appliances, under the Clean Air Act. This mainly applies to domestic appliances.

**Costs**

Capital costs depend on the type and size of system you choose. But installation and commissioning costs tend to be fairly fixed. Stand alone room heaters generally cost £1500 - £3000 installed. The cost for boilers varies depending on the fuel choice; a typical 20kW (average size required for a three-bedroom semi-detached house) pellet boiler would cost around £5000 installed, including the cost of the flue and commissioning. A manual log feed system of the same size would be slightly cheaper.

Running costs: Unlike other forms of renewable energy, biomass systems require you to pay for the fuel. Fuel costs generally depend on the distance from your supplier. As a general rule the running costs will be more favourable if you live in an area that doesn’t have a gas supply.

**Local benefits**

Producing energy from biomass has both environmental and economic advantages. It is most cost-effective when a local fuel source is used, which results in local investment and employment. Furthermore, biomass can contribute to waste management by harnessing energy from products that are often disposed of at landfill sites.
Hydro-power systems convert potential energy stored in water held at height to kinetic energy (or the energy used in movement) to turn a turbine to produce electricity.

A micro hydro plant is below 100kW. Improvements in small turbine and generator technology mean that micro hydro schemes are an attractive means of producing electricity. Useful power may be produced from even a small stream. The likely range is from a few hundred watts (possibly for use with batteries) for domestic schemes, to a minimum 25kW for commercial schemes.

**Small scale hydro and your home**
Hydro power requires the source to be relatively close to where the power will be used, or to a suitable grid connection. Hydro systems can be connected to the main electricity grid or as a part of a stand-alone (off-grid) power system. In a grid-connected system, any electricity generated but not used can be sold to electricity companies.

In an off-grid hydro system, electricity can be supplied directly to the devices powered or through a battery bank and inverter set up. A back-up power system may be needed to compensate for seasonal variations in water flow.

The capital cost is high but the prospect of not having electricity bills or making money by selling energy back to a power supplier may tempt you! Provided the resource is there, community hydro projects can also be a viable proposition. Potentially, there are great benefits in clubbing together to increase buying power or sharing expertise - although the work involved should not be underestimated.

**System sizing**
Energy available in a body of water depends on the water's flow rate (per second) and the height (or head) that the water falls. The scheme's actual output will depend on how efficiently it converts the power of the water into electrical power (maximum efficiencies of over 90% are possible but for small systems 50% is more realistic). Hydro electric systems are generally divided into two categories, low and high head.

Reliable and efficient equipment - and sound advice - is available from a large number of experienced UK suppliers and consultants.

**Will it meet my energy needs?**
This depends, of course, on your energy needs and the resource available. For houses with no mains connection but with access to a micro-hydro site, a good hydro system can generate a steady, more reliable electricity supply than other renewable technologies at a lower cost. Total system costs can be high but often less than the cost of a grid connection and with no electricity bills to follow. It should be noted that in off-grid applications the power is used for lighting and electrical appliances. However space and water heating can be supplied when available power exceeds demand.

**Costs**
Hydro costs are very site specific and are related to energy output. For low head systems (not including the civil works - so assuming there was an existing pond or weir), costs may be in the region of £4,000 per kW installed up to about 10kW and would drop per kW for larger schemes.
For medium heads, there is a fixed cost of about £10,000 and then about £2,500 per kW up to around 10kW - so a typical 5kW domestic scheme might cost £20-£25,000. Unit costs drop for larger schemes.

**Environmental impact**
Turbines can have visual impact and produce some noise, but these can be mitigated relatively easily. The main issue is to maintain the river's ecology by restricting the proportion of the total flow diverted through the turbine.

You will need to talk to the relevant planning authorities to ensure the site and designs are acceptable and identify any other permissions required.
## Typical Costs and Savings

Costs and Performance of Renewable Energy Systems, relative to conventional gas-fired boiler systems and central heating, and grid supplied electricity.

<table>
<thead>
<tr>
<th>System</th>
<th>Generates heat</th>
<th>Generates electricity</th>
<th>Approx. installation cost</th>
<th>Maintenance costs</th>
<th>Running costs</th>
<th>Size/Capacity</th>
<th>Average output</th>
<th>% of your annual fuel usage supplied</th>
<th>Payback period</th>
<th>Average annual savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar Thermal Flat plates</td>
<td>Yes</td>
<td></td>
<td>£1,750</td>
<td>Medium</td>
<td>Very Low</td>
<td>2.5m²</td>
<td>1125kWh</td>
<td>60</td>
<td>~ 10 yrs</td>
<td>£60</td>
</tr>
<tr>
<td>Solar Thermal Evacuated tubes</td>
<td>Yes</td>
<td></td>
<td>£2,000</td>
<td>Medium</td>
<td>Very Low</td>
<td>2m²</td>
<td>1100kWh</td>
<td>70</td>
<td>~ 10 yrs</td>
<td>£60</td>
</tr>
<tr>
<td>Solar PV</td>
<td>Yes</td>
<td></td>
<td>£10,000</td>
<td>Low</td>
<td>Very Low</td>
<td>2kW</td>
<td>1800kWh</td>
<td>60</td>
<td>&gt;50 yrs</td>
<td>£80</td>
</tr>
<tr>
<td>Wind Turbines (small)</td>
<td>Yes</td>
<td></td>
<td>£2,000</td>
<td>Medium</td>
<td>Low</td>
<td>400W</td>
<td>50-100kWh</td>
<td>20</td>
<td>10 - 25 yrs</td>
<td>£180</td>
</tr>
<tr>
<td>Ground Source Heat Pumps</td>
<td>Yes</td>
<td></td>
<td>£10,000</td>
<td>Medium</td>
<td>Medium</td>
<td>8kW</td>
<td>Variable to demand</td>
<td>100</td>
<td>10 - 25 yrs</td>
<td>£75</td>
</tr>
<tr>
<td>Biomass</td>
<td>Yes</td>
<td></td>
<td>£6,000</td>
<td>High</td>
<td>High</td>
<td>6kW</td>
<td>Variable to demand</td>
<td>100</td>
<td>5 - 10 yrs</td>
<td>£650-750</td>
</tr>
</tbody>
</table>

Range of costs and savings for systems vary according to system installed and fuel replaced. Replacing electricity or coal saves more than replacing mains gas. Savings are based on three bedroom semi-detached houses. Costs are guidelines for the average installation. Payback periods are based on continuous output and are subject to individual product specification and environmental circumstances.
Further Information

Where can I get more information?
The Energy Efficiency Advice Centre (EEAC) network provides householders with free and impartial advice on energy efficiency in the home.

To contact your nearest EEAC call 0800 512 012 or visit www.est.org.uk/myhome

Other useful contacts
Low Carbon Buildings Programme  www.lowcarbonbuildings.org.uk  Tel 0800 915 0990
The National Energy Foundation  www.greenenergy.org.uk  Tel 0800 138 0889
Low Impact Living Initiative  www.lowimpact.org  Tel 01296 714184
Centre for Alternative Technology  www.cat.org.uk  Tel 01654 705950
Building Research Establishment  www.bre.co.uk  Tel 01923 664500

Green electricity
Green Electricity Marketplace  www.greenelectricity.org
Energy Watch – watchdog  www.energywatch.org.uk  Tel 08459 06 07 08
OFGEM - regulator  www.ofgem.gov.uk  Tel 020 7901 7000

Solar thermal
Sussex Solar  Tel 01293 438950
Solar Trade Association  www.solartradeassociation.org.uk  Tel 01908 442290

Solar PV
British Photovoltaic Association  www.pv-uk.org.uk  Tel 01908 442291

Wind turbines
The British Wind Energy Association  www.bwea.com  Tel 020 7689 1960

Ground source heat pumps
Ground Source Heat Pump Club  www.gshp.org.uk  Tel 01908 665555
The UK Heat Pump Network  www.heatpumpnet.org.uk  Tel 0800 585 794
The International Energy Agency Heatpump Centre  www.heatpumpcentre.org

Biomass
Logpile project  www.logpile.co.uk  Tel 01908 665555
Renewable Power Association  www.r-p-a.org.uk/home.fcm  Tel 020 7747 1830

Small scale hydro
British Hydro Power Association  www.british-hydro.org  Tel 01202 880333

Renewable Obligation Certificates (ROC)
Electricity generated by renewable technology may be eligible for a Renewable Obligation Certificate (ROC). These are currently trading at approximately £40 - £50 per ROC where 1 ROC = 1MWh. There are some electricity companies that may trade in these as part of your supply agreement.
This booklet was produced by the West Sussex and Solent Energy Efficiency Advice Centres. Information, images and illustrations provided courtesy of the Energy Saving Trust.