Trade guide to renewable technologies

This guide can be used to help you as the building professional to promote and grow the services you provide to your client by incorporating renewable energy technologies in to your business.

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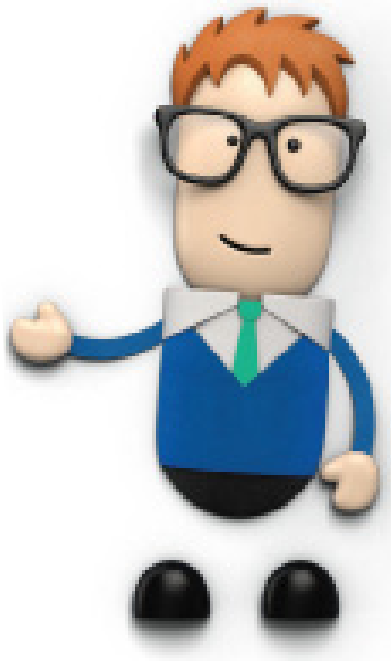
Contents

Contents Here



What's in it for me and my business?

Offering your client renewable technologies will bring many benefits to your business. Some of the key positive effects that you could see as a result of offering these additional services are set out below:

- **Developing your busines's reputation as informed and skilled in domestic renewable energy.**
- **Increased demand for your services, securing a market share in a growing area.**
- **Utilising your existing skills and knowledge to offer a wider range of services.**
- **Investing and developing your employees' skills and knowledge, keeping them interested in your business.**
- **Offering your client future proof services and projects.**
- **Being in a position to benefit from UK and Welsh Government schemes like arbed, Nest and the Green Deal.**

Many builders in the UK are already offering renewable technologies as part of their services, either via sub-contracting MCS accredited installers or by developing their business to become a renewable installer alongside their general building services. For more information how to become an accredited installer visit: www.energysavingtrust.org.uk

1. The basics

Why should my client look at renewable technologies?

Research has shown that the main barriers to buying energy efficiency measures and renewable energy technologies are disruption to the home and lack of knowledge by home owners, as well as cost. If you are completing a refurbishment project then it may be easier to secure more work with your clients now rather than as part of a separate project in the future, by explaining the opportunity they have to add to their existing plans.

This also offers you a unique opportunity to expand the value of your business and build a reputation in an area of work that will grow significantly in the future due to Government targets. Clients will also often appreciate the opportunity to save money in the long term and may be willing to pay you more for this service.

Some of the benefits to your clients include:

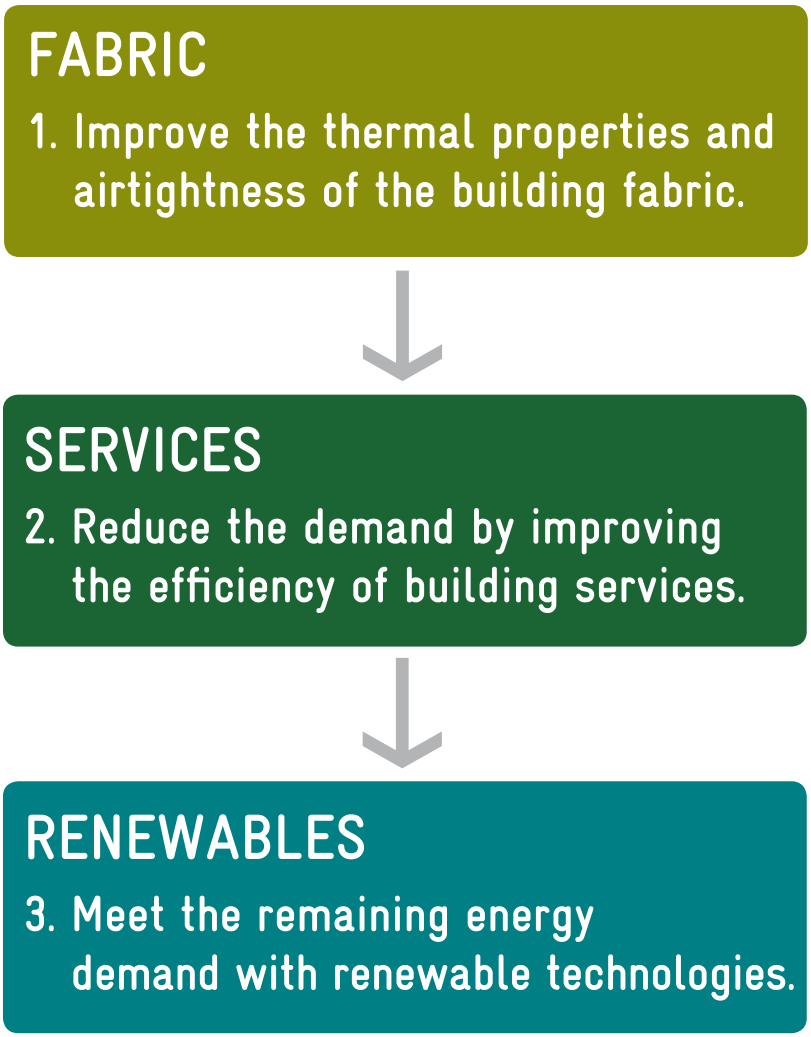
- Improved comfort and warmth in the home.
- Reduced fuel bills and more disposable income.
- Wasting less energy.
- Protection from continually rising fuel prices.
- 'Doing their bit' to help reduce carbon emissions and protect the environment.
- Investing in their property for the future.
- Increasing the market value of their home.
- Sound investment and a guaranteed income from government tariff schemes.

So whether you are pricing or carrying out roofing, central heating, re-plastering or a complete refurbishment, any upgrade work offers an opportunity to make improvements to comfort, reduce bills and contribute to tackling climate change with minimum cost and effort from your client. The key is to talk through the options with your client as early as possible in the process.

This guide is full of impartial advice and guidance from the Energy Saving Trust and can be used to help simulate discussions between you and your client.

Energy and building projects

To ensure your clients get the best out of any renewable technologies, a simple approach based on the energy hierarchy should be adopted in this order:



Knowing the lingo

Kilowatt-hour is a unit of energy and is commonly used by electricity companies to show how much electricity has been consumed. Kilowatt-hour is abbreviated to kWh.

If you have used 2 kilowatts of electricity for 5 hours then you will have consumed 10 kWh (2kW x 5hrs = 10kWh).

Kilowatts peak (KWp) refers to the electrical power generated by a panel in full sunlight.

So what are renewables and low carbon technologies?

Renewable technologies can be split into two types

- Zero carbon in operation (powered by 100% renewable energy)
- Those that are considered to be low carbon in operation (powered at least in part by fossil fuels).

Renewable energy is derived from naturally occurring and naturally replenished energy and cannot be exhausted. These include solar, wind, hydro and biomass – all of which are ultimately driven by solar energy.

Low carbon sources either:

- Use fossil sources to generate heat or electricity far more efficiently than conventional alternatives and thus produce fewer carbon emissions (e.g. heat pumps, district heating and CHP); or
- Use renewable energy as a principle source but also require a proportion of fossil energy input (e.g. transport of biomass, solar thermal hot water with a mains-powered pump).

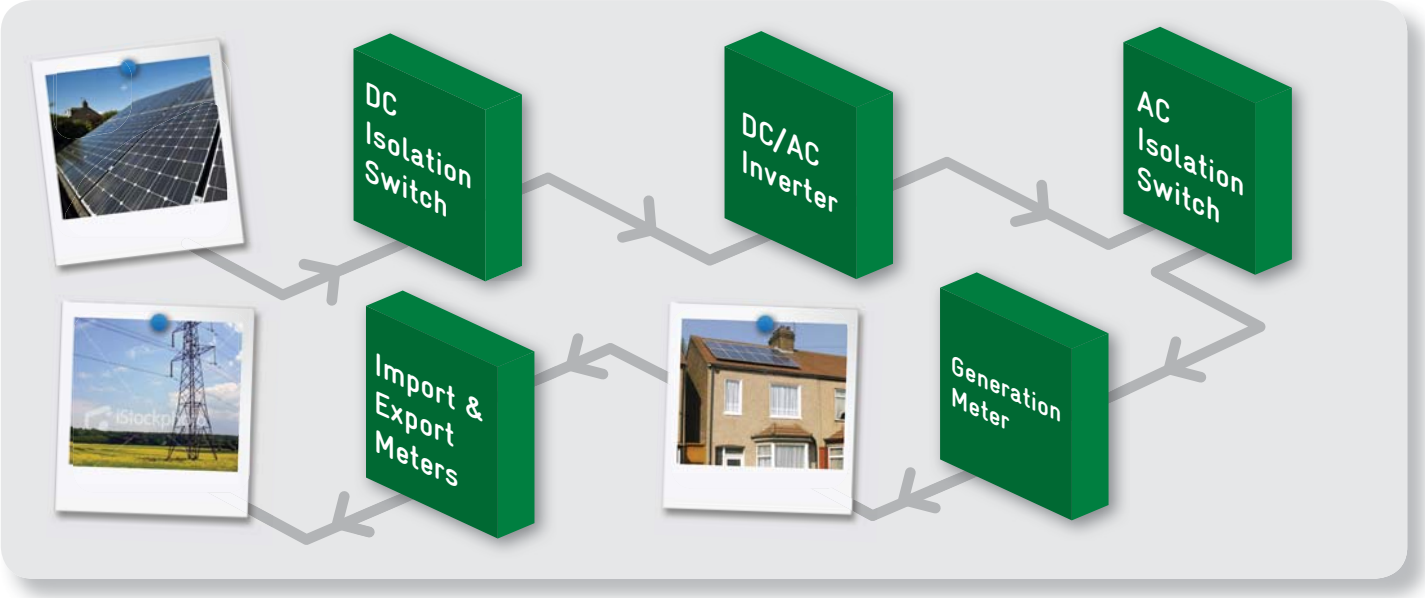
In some scenarios, low carbon sources may be more cost effective than zero carbon sources. The suitability of technologies is site-specific and may be dependent on factors such as location, orientation, topography, the size of the development, energy demand profile and the availability of mains gas.

2. The Technologies

Solar photovoltaic systems (solar PV)
Generate electricity from solar energy

Solar PV systems use solar panels made up of individual solar PV cells to turn daylight into electricity. A PV cell is made up of one or two layers of a semi-conducting material, usually silicon. When light shines on the cell it creates an electric field which causes electricity to flow. The more light the cell receives the more electricity it can generate. This generation creates a usable amount of direct current (DC).

This is usually converted to alternating current (AC) for household use or for export to the National Grid. A typical domestic system consists of several modules - an AC/DC inverter, a fuse box, an isolator and an import/export meter.



Typical domestic PV system savings	£ per year
Generation Tariff	£770
Export Tariff	£30
Reduction in current electricity bills	£120
Total savings and income generated	£920

Here is an example of how much a typical domestic solar PV electricity system with a 2.2kWp installation (around 17m2) could earn and save each year through the Feed-in Tariff.

1. Estimating how much your client could save

Feed-in Tariffs became available in Great Britain on 1 April 2010. Under this scheme, energy suppliers have to make regular payments to householders and communities who generate their own electricity. For more information see page 26.

2. How do I know if PV will be suitable for my client's project?

The dwelling is suitable for solar PV by the following questions:

- Does the dwelling have a south facing roof or wall? Preferably with a 20° to 60° incline/pitch. For a PV system to work it needs an unobstructed roof or wall surface that faces between east and west through south.
- Is the roof shaded by other buildings or trees? The PV system will get less solar energy than it needs if it is in the shade for long periods of the day and will end up creating less electricity.
- Is the roof strong enough? The roof structure will need to be able to take the heavy weight of PV panels unless you are installing solar tiles.

3. Benefits to my client

- Free electricity in daylight (although most PV systems are unlikely to meet all electricity demand).
- Income for every unit of electricity produced.
- Income for exported electricity when you are not using it.
- Reduced electricity bills (i.e. reduced need to buy electricity).

4. Meeting the dwellings electricity needs

Most householders are likely to use a PV system to complement and feed into their mains supply, reducing the amount of grid electricity that they use and pay for. When the PV system is generating more electricity than is being used in the dwelling, the excess will flow back automatically to the local grid. When the system is generating less than needed, the traditional mains supply is used.

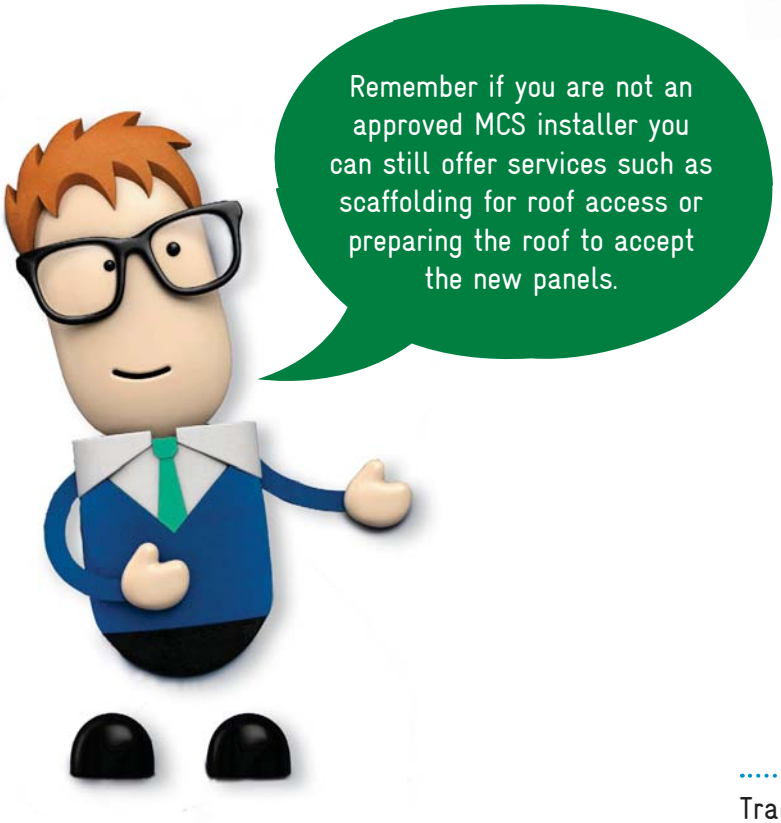
5. How many panels for how much power?

The size of the PV array will depend on how much power is needed for the home, the type of PV cells used, the roof space available and the budget. Typical systems cover 10 to 20 square metres and have an output of between 1.5 and 3.5kWp (kilowatt peak) of electrical power (solar PV panels are referred to in terms of the amount of electricity they generate in full sunlight). A typical system could generate around half of the amount of electricity used by the average household for lighting and appliances.

6. How much will it cost?

As a general guideline, a typical 2.2kWp system will cost between £8,000 and £11,000.

Panels that are integrated into a roof are more expensive than those that sit on top, while solar tiles cost more than conventional panels. If the roof is in need of major repair then solar tiles could potentially replace worn tiles and offset the cost of a brand new roof.



7. Planning permission

Changes to permitted development rights for domestic renewable technologies mean that most PV installations don't require planning permission, as long as they don't protrude more than 200mm from the building. Exceptions apply for listed buildings, buildings in conservation areas and world heritage sites.

8. Building Regulations

Building Regulations will apply to PV installations in a domestic situation as nearly all domestic electrical work is notifiable under Part P of the Building Rregulations and a solar PV installation is nearly always notifiable electrical work. Notification can be carried out either by your installer after the work has been carried out if they are recognised as a competent person under Part P (look for membership of a competent persons scheme such as NICEIC, NAPIT, ELECSA), or by submitting an application to your local building control body (e.g. Local Authority Building Control Department) for approval.

PV installation is often much more than electrical work, for example some installations involve major roofing work and other structural changes especially when integrating photovoltaics into a building's fabric. This work goes beyond Part P and electrical installations; we are now talking about building work. The ability of the existing roof to carry the load (weight) of the installation will need to be checked and proven. Some strengthening work may be needed.

9. Maintenance

Solar PV requires very little maintenance and by and large the panels are self cleaning. However, it is worth visually inspecting them once a year to check they're not too dirty as this can impede performance. You should also check that shade from trees has not become a problem. The inverter may need to be replaced after 8–10 years. The wiring and general workings should also be looked over from time to time by a qualified electrician.

10. Choosing your solar panels

Most solar PV systems are retrofitted as panels. There are three different types:

- **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.
- **Hybrid** – made by combining crystalline cells with a very thin layer of electricity conducting silicon atoms on a glass or metal base.

Each type varies in terms of efficiency and cost. Roof integrated solar tiles are available and there are also solar PV systems that can be incorporated into glazing.

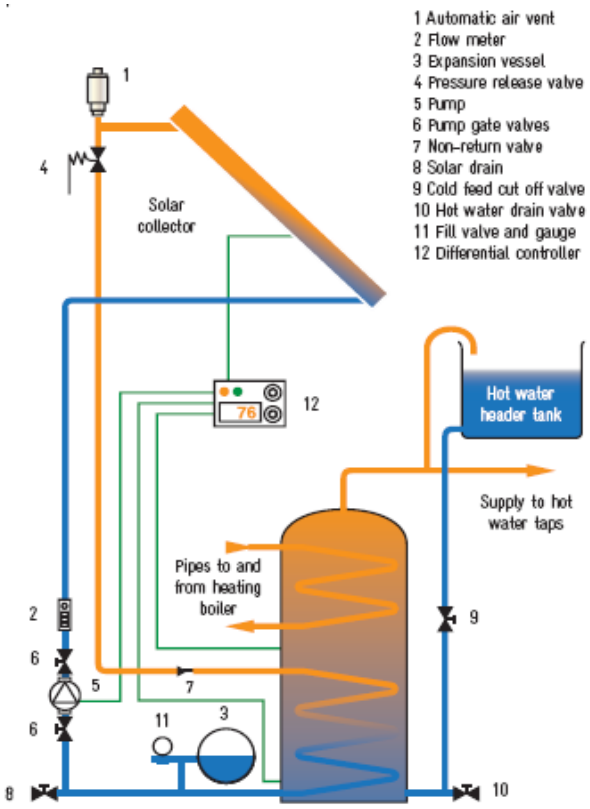
Durability of the panels

Crystalline modules are commonly warranted for 20 or 25 years but may be expected to have a useful lifetime of 40 years or more. Towards the end of this cycle, the output does tend to drop off a little.

Solar hot water
Produces hot water from solar energy

1. How does solar water heating work?

Solar collectors are normally fitted to roofs where they soak up and retain heat from the sun's rays. This heat is then transferred to a cylinder of water, which warms up throughout the day for later use. A simple plumbing system of pipes connects the cylinder to both the solar collectors and the dwelling's water supply. A pump is used to move the water around the system. The power used for the pump is relatively small.



2. How do I tell if a solar hot water system will be suitable for my customer's project?

It is worth making sure the dwelling is suitable for solar hot water by asking the following questions:

- Does the dwelling have a south facing roof or wall? A typical roof in the UK which has a pitch of between 30° to 50° from horizontal would offer the best performance. For a solar hot water system to work it needs an unobstructed roof or wall surface that faces between east and west through south.
- Is the roof shaded by other buildings or trees? The system will get less solar energy if it is in the shade for long periods of the day.
- Is the roof strong enough? The roof structure will need to be able to take the heavy weight of panels.
- Will the existing heating system and boiler be compatible? Some combination or boilers may not work well with a solar hot water system as they need to store the heated water within a cylinder for use later.
- Is there enough space for a larger or an additional water cylinder?

3. Benefits to my clients

- The system can provide around 50% of annual hot water requirements.
- Reduced bills.
- Potential income from the Renewable Heat Incentive (RHI), from 2011.

4. Estimating how much your clients save

During the summer months, solar thermal hot water systems will typically provide over 80% of domestic hot water demand, but this will of course be less during winter. Over the course of the year, the average solar fraction (the proportion of energy required for domestic water heating that is provided by solar means) is typically around 35%.

A solar hot water system on a three bedroom, semi-detached home with mains gas heating could save around £50 a year on fuel bills. Here are examples of a typical solar water heating system could save in homes using different types of heating fuels:

Typical Savings

Fuel replaced	£ saving per year	CO_2 saving per year tonnes
Gas	£50	0.25
Electricity	£80	0.6
Oil	£55	0.3
Solid	£60	0.5

This table gives likely savings depending on which fuel is replaced in a three bedroom semi-detached house. RHI payments not included.

For details of the Renewable Heat Incentive (RHI) scheme see page 26.

5. Types of solar thermal collector

Flat plate collectors consist of flat, dark-coloured absorber plates (made from metals such as copper or aluminium, polymers or a combination) attached to tubes through which the heat transfer fluid passes. The plates are enclosed within a glazed, insulated box that behaves like a mini-greenhouse to retain heat within the collector.

Evacuated tube collectors consist of rows of parallel glass tubes, each containing a metal absorber with a selective coating. During manufacture, air is evacuated from the tubes. The resulting vacuum reduces conduction away from the collector, improving its performance, especially at high temperatures.

6. What size collectors?

A rule of thumb is 1m^2 of quality flat plate collectors per person or 0.75 m^2 of evacuated tube per person to provide up to 35% of hot water demand over a year – this is based on a typical consumption of hot water of 30–50 litres per person.

7. What size cylinder?

A rule of thumb for sizing a domestic hot water cylinder is to allow 30–50 litres of cylinder capacity per person.

Or:

A 200–250 Litre cylinder for a 2–3 bedroom house
A 300–400 Litre cylinder for a 4–5 bedroom house

8. How much will it cost?

Installation costs can vary for a number of reasons, the size and type of the solar collector, the type of roof, the heating system already in place in the dwelling and where the property is in the country. But typically, a solar hot water system will cost from around £3,000 to £6,500.

9. Planning permission

Most solar water heating installations don't require planning permission, so long as they don't protrude more than 200mm from the building. Exceptions apply for listed buildings, flats, buildings in conservation areas and world heritage sites – if in doubt you should check with your local planning department

10. Building Regulations

Building Regulations will normally apply to solar water heating installations. The ability of the existing roof to carry the load (weight) of the panel will need to be checked and proven. Some strengthening work may be needed.

Building Regulations also apply to other aspects of the work such as electrical installation. Compliance with Building Regulations can be achieved by either submitting an application to your local building control body (e.g. Local Authority Building Control Department) for approval, or by ensuring that the work is undertaken under a Competent Persons Scheme.

11 . Maintenance

The good news is that these systems usually come with at least a 10 year warranty. They need little maintenance. A yearly check by the householder and a more detailed check every three to five years by a professional installer.

Heat pumps
Heating for homes

1. How do heat pumps work?

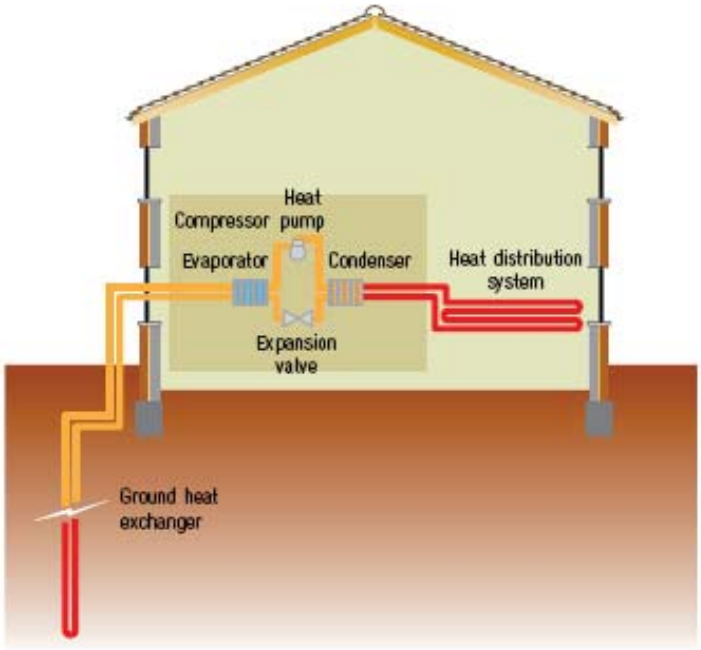
Heat pumps use electricity to move heat from one place to another via a heat transfer medium, from lower to higher temperature. Heat energy is removed from a low temperature source and upgraded within the heat pump by a compression and evaporation cycle to heat air or water inside the building. Heat pumps can use ground, water or air as the heat source, depending on availability in a given scenario.

2. Types of heat pumps

Ground source

Energy gained from solar irradiation is stored as heat in the earth. The high thermal mass of the earth means that it reacts more slowly to seasonal changes in temperature than the air above it and therefore acts as heat store in cold conditions.

Ground source heat pump (GSHP) systems consist of a ground loop, a heat pump unit and a heat distribution system. A water anti freeze mixture circulates in a ground loop, extracting low grade heat from the earth and passing through the heat pump, which turns it into higher grade heat.



Air source

Where neither ground or water source is suitable, the external air can be used as the heat source by using an air sourced heat pump (ASHP). In this case the cooling of the external evaporator coil by the heat pump allows the external coil to absorb heat from the air. The mean temperature of the air is lower than that of the ground during the winter season and so the efficiency of air source heat pumps is less than ground and water source heat pumps. Where a source of solar warmed air is available, such as from an atrium or conservatory, the seasonal performance can be improved.

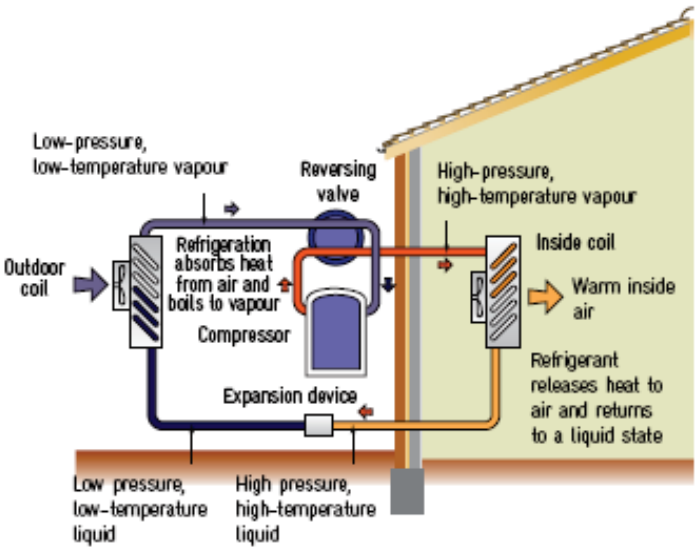


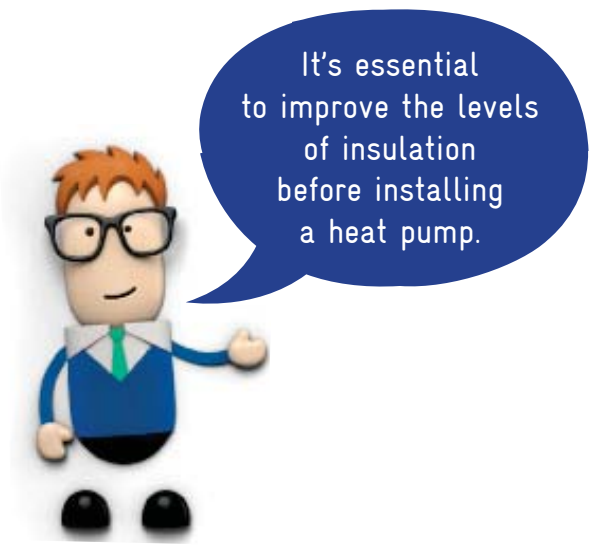
Figure 27: Air source heat pump system

3. How do I tell if a heat pump is suitable for my client's project?

Heat pumps are cost effective in suitable properties. Before choosing to install a heat pump consider:

Energy efficiency first
Although fabric improvements are important with all renewable technologies, when looking to install a heat pump it becomes of higher importance. Focus on improving the levels of insulation and tackling draughts within the dwelling. Without tackling this first, the heat pump will not offer a suitable source of heating to your customer. Heat pumps are most efficient when used in highly insulated buildings.

The current heating system
Heat pumps are most likely to save money and carbon dioxide when they are used to replace electric, LPG or coal heating systems, so if your client has gas or oil heating you may want to do the sums carefully before proceeding. Heat pumps work better with work slow release heat distribution systems such as under-floor heating. However, the system will adequately with conventional radiators if the surface area is large enough. Low temperature heating systems work better in buildings with a high 'thermal mass'. If the dwelling heats up and cools down quickly, a low temperature heating system is unlikely to provide the heating you require and a heat pump may not be the best option for the property



4. Benefits to the customer

- Heat pumps can reduce bills when compared to some heating fuels
- Heat pumps can reduce carbon emissions, depending on the fuel displaced
- No fuel deliveries required as with oil or solid fuels

5 How much do heat pumps cost?

Costs range from £6,000-10,000 including installation for an air source heat pump whereas a ground source heat pump will have a cost range of between £9,000 and £17,000 depending on the degree of excavation/boring and laying of loops/ pipes etc.

6. Estimating how much your client could save

A typical ASHP system used for both space heating (low temperature underfloor) and to meet 50% water heating demand with electric immersion top-up in a newbuild house, might have the following characteristics:

Capacity	8KW
Capital cost	£6,000 - £9,000
Seasonal Performance Factor	3.2 (heat pump) 1.0 (immersion)
Output	8,000KWh/yr*
CO_2 Saving	70kg CO2/yr

*Assumes ASHP unit delivers 4,500kWh space heating + 1,750kWh water heating; immersion delivers 1,750kWh.

At current fuel prices and running costs, ASHP's are unlikely to deliver financial savings compared to most gas or oil heated systems. Savings are much more favourable when replacing a coal, LPG, or electric heating system, although the payback period will still be long.

7. Planning permission

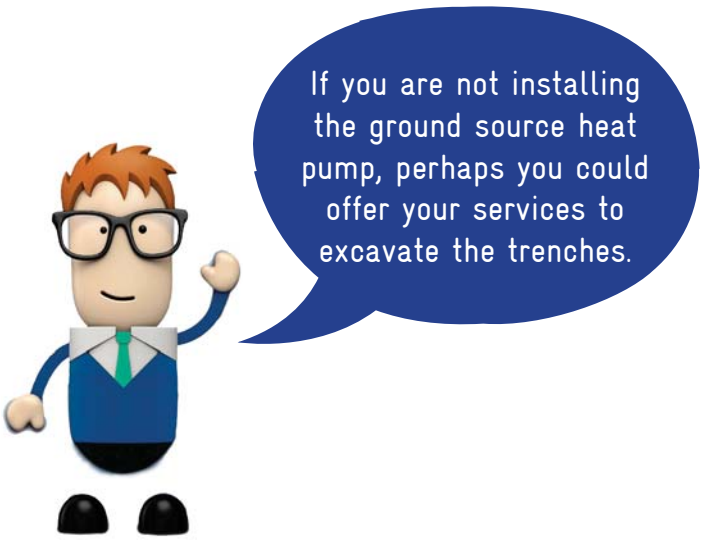
Ground source pumps are now permitted development as long as there are no historical remains in the ground being disturbed, however air source pumps still require planning permission and further advice should be sort from your local planning department.

8. Building Regulations

Building Regulations will normally apply to the installation of both ground source and air source heat pump installations. Building Regulations also apply to other aspects of the work such as electrical and plumbing installations. Compliance with Building Regulations can be achieved by either submitting an application to your local building control body (e.g. Local Authority Building Control Department) for approval, or by ensuring that the work is undertaken under a Competent Persons Scheme.

9. Maintenance

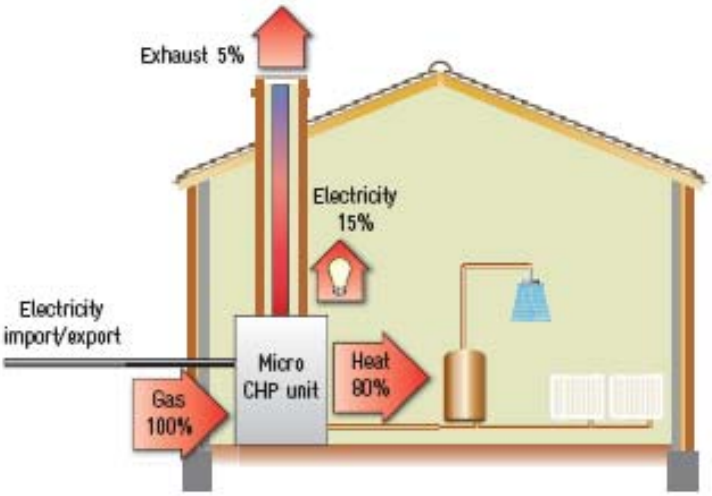
Heat pump systems typically come with a 10 year warranty. You can expect them to operate for 20 years or more, however they do require regular scheduled maintenance. A yearly check by your client and a more detailed check by a professional installer every 3-5 years is recommended.



Micro combined heat and power CHP
A boiler that generates heating/hot water and electricity

1. How does CHP work?

Micro-CHP units generate heat and power on a scale to suit a single dwelling. These units replace the existing domestic boiler, perform the same space and domestic hot water heating function and also generate electricity as a by-product. Their operation is controlled by heat demand so that no heat is ever wasted. Extra electrical power will often be required from the grid, but electricity may be exported when an excess is generated.



2. Types of micro CHP

There are a number of micro CHP technologies including the Stirling engine, internal combustion engine and fuel cell, each of which have different operating characteristics, notably in terms of heat to power ratio. The majority of domestic scale systems available in the UK are based on the Stirling engine, which generates between 1 and 3kW of electric power (kWe) and 6 to 12kW of heat (kWth). Matching the plant to building needs is critical for good performance, even more so than with other technologies.

Micro-CHP is an emerging technology, with a very limited range of products available at present, although a number are under development.

3. How do I tell if CHP is are suitable for my client?

These units are designed to replace existing domestic boilers and hot water systems, so should be suitable in most homes.

Micro CHP systems are most effective where there is likely to be a large heating load, for example a large family house or a Bed and Breakfast with many occupants.

4. Benefits to my client

- Free electricity.
- Income for every unit of electricity produced.
- Income on exported electricity.
- Reduced electricity bills.

5 How much does CHP cost?

A micro CHP unit will typically cost from £5,000 and can often be installed in place of a conventional boiler costing £2,500.

6. Estimating how much your client could be saving

A typical micro-CHP system installed in a newbuild house might have the following characteristics:

Capacity	1.1kWe
Hear to power ratio	6:1
Capital cost	£4,000 - £6,000
Thermal output	8,000kWhth/yr
Electrical output	1,330kWhe/yr
Thermal efficiency	75%
CO_2 saving	570kg Co_2/yr*

*Avoided emissions due to electrical generation of 700kg CO2/yr. Additional heating emissions due to lower heating efficiency of 130kg CO2/yr.

A CHP unit will not reduce your customer's fuel bill, however they will have the opportunity to claim payment via the Governments Feed-in Tariff scheme see page 26 for further details.

7. Planning permission

Planning permission is not normally required as flues are covered under permitted development legislation, as long as it is no more than one meter above the top of the building and the property is not in a conservation area..

8. Building Regulations

Building Regulations will apply to micro combined heat and power installations. Building Regulations also apply to other aspects of the work such as electrical and plumbing installations. Compliance with Building Regulations can be achieved by either submitting an application to your local building control body (e.g. Local Authority Building Control Department) for approval, or by ensuring that the work is undertaken under a Competent Persons Scheme.

9. Maintenance

Service and maintenance costs and scheduling are estimated to be similar to a standard boiler, although a specialist engineer is required.

This is a really new technology in the market, Make sure you are one of the first to offer this service to your clients and build your reputation as an installer.

Biomass
Generates heating and hot water by burning organic materials

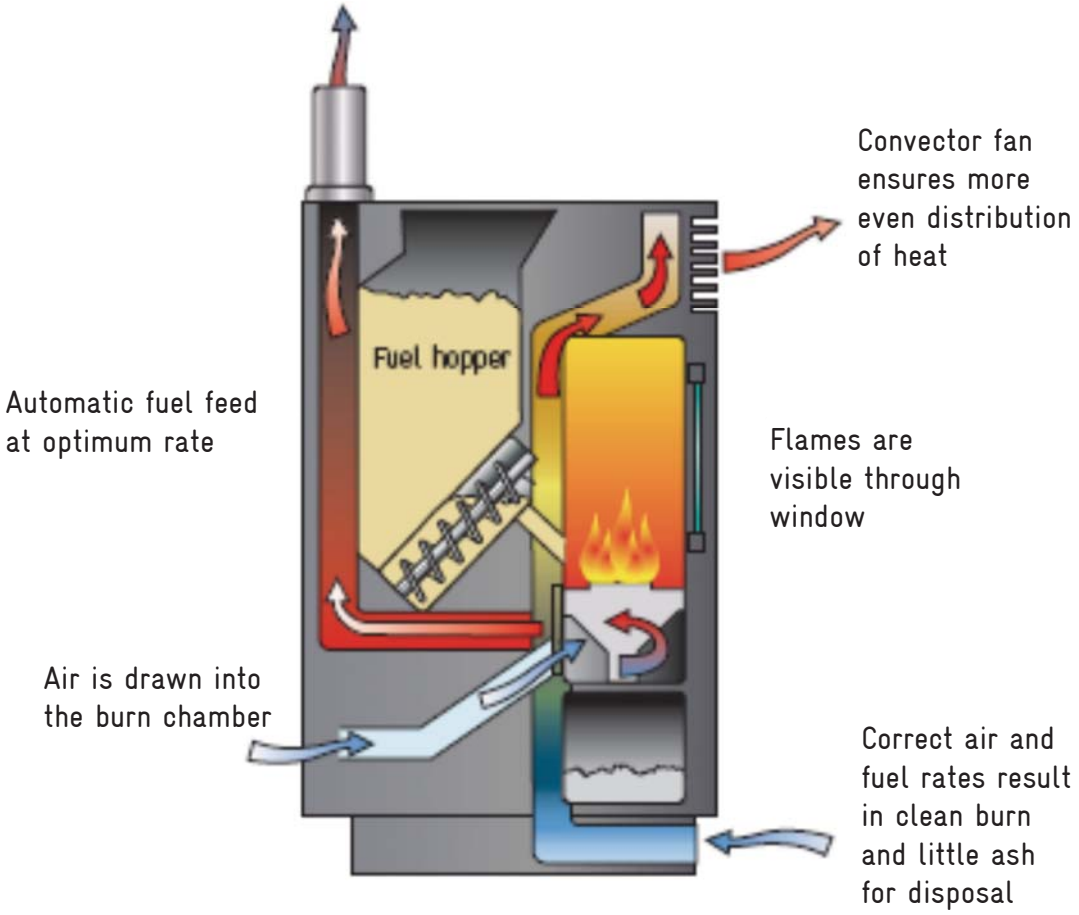
1. Basic principles

Domestic scale biomass systems are technically and aesthetically well advanced, offering a highly efficient alternative to fossil fuel based systems. Modern wood burning appliances can achieve efficiencies of 60 to 90%. They use microprocessors to set and maintain the temperature by regulating the rate fuel and air feed to the combustion chamber. Output is variable and can be reduced to around 30% of the maximum to match demand. However, efficiency is greatest, whilst minimising the amount of tar and ash when operated at maximum capacity.

2. Types of wood fuel available

Biomass is only considered a renewable energy technology if the carbon released when it is burning is balanced with new growth of the fuel source. so it is important that the fuel is purchased from sustainably managed sources and close to the customer to reduce the amount of fuel used to transport the wood.

There are three main wood fuel types. Each can be used in different ways and has different storage space requirements and availability.



Logs
Logs involve minimum processing. Generally, they are covered to keep them dry and left for one to three years to 'season'. In this time, the moisture content falls from around 50% to 20%, and they become lighter. The drier the logs, the hotter the fire and the less smoke and tar will be produced.

Pellets
These are derived from wood by-products from saw mills and wood manufacturing which may otherwise have gone to landfill. Pellets are denser, drier (8 to 10% moisture content) and require around a third of the storage space of logs or chips. This makes them ideal where storage space is limited. A higher energy density and uniform shape makes pellets ideal for automated domestic heating systems.

Chips
These are generally derived from forest or saw mill waste or from clean, untreated waste timber. They are typically used for larger scale applications such as leisure centres or community heating schemes. For problem free use in smaller systems they need to achieve high uniformity in size and have low moisture content. All wood fuels need to be kept dry.

3. Types of biomass boiler

Stoves
A log or pellet burning stove is ideal for providing secondary room heating in conjunction with a main central heating system. Typical capacity ranges from 5–15kW, although heat output can be regulated down to 2kW on some models. Higher output versions may have an integral back boiler to divert a proportion of their output to heating water for domestic hot water or central heating, rather than 100% space heating.

Boilers
Fully automatic log, pellet and woodchip boilers are available for heating the whole home, including hot water. Designed for installation in kitchens or utility rooms, log and pellet boilers are suitable for large households where space and water heating demand is greater than 8kW (pellets) or 12kW (logs). Small-scale woodchip boilers from around 25kW and above are better suited to communal schemes and apartment blocks.

4. How do I tell if a biomass system is suitable for my client?

A wood fuel heating system can usually be incorporated into the existing central heating and hot water infrastructure. Choosing the best wood fuelled system will depend on a range of factors and the situation should be assessed by a competent professional installer. Things that need to be considered include:

House characteristics
Newer houses are more 'airtight', so you may need to add an external air supply to ensure safe combustion of the fuel. Older houses with existing chimneys may be suitable but the chimney may need to be lined.

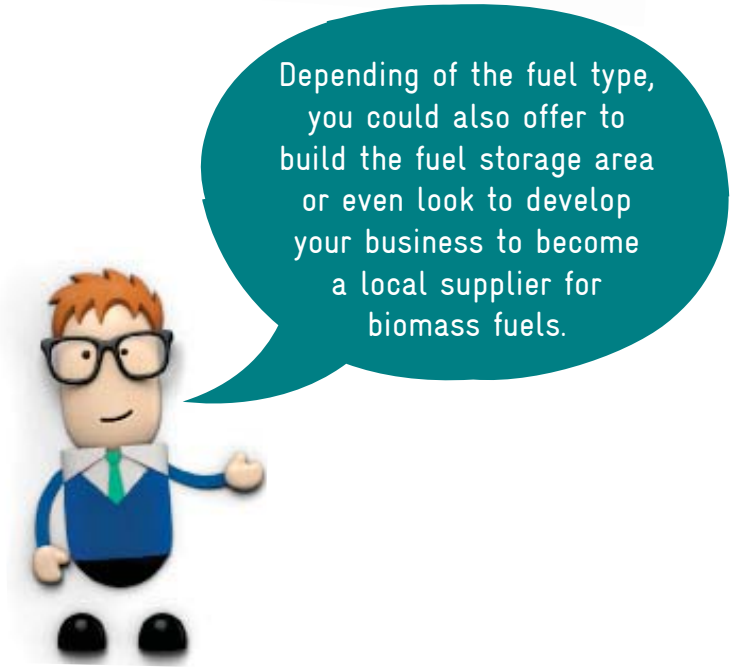
Space
Whilst the way burnt and used is similar, wood has a lower energy content than fossil fuels such as gas, oil or coal. This means you need more wood and therefore space to provide the same amount of heat as if you were using oil or coal for your main heating fuel. This storage area should be dry and have easy access for deliveries. Your client should have enough space to store the fuel needed to last between deliveries at the coldest time of the year, and still have some in reserve.

In addition, a wood fuelled appliance will often be larger than its gas or oil equivalent and cannot be wall mounted.

Improving the energy efficiency of the client's home will reduce the heat demand allowing you to specify a smaller appliance and smaller fuel store.

Availability of a local supply
The environmental benefits of using wood fuel are greatest if the wood is sourced from a sustainable and ideally local supplier. Remember, the fuel is only low carbon if sourced sustainably and locally (under 10 miles.)

Wood suppliers are not currently available everywhere, but their numbers are constantly increasing. To find your nearest supplier visit www.logpile.co.uk, where contact details and fuel types supplied are provided using a simple postcode search. If a local supply is not available, then a larger storage facility will reduce associated transport emissions.



5. Benefits to my client

- Wood fuel maks use of local supply of energy.
- It can help many local jobs and businesses.
- There are a wide range of systems available to suit property and client requirements.
- Energy available on demand.
- Cheaper than or competitive with traditional (fossil) energy sources.
- It will help your client to do their bit towards saving carbon and tackling climate change.

6. How much does Biomass cost?

A wood fuelled system should meet the full heating demand of the home or complement a back up boiler or renewable technology if present. However, the system must not be too large because over-sizing reduces efficiency and will increase running costs.

- Individual room heaters or stoves are usually around 7kW, and cost around £3,000.
- A fully programmable space and water heating system can be installed, costing around £11,500 for a 15kW pellet system, although costs will vary significantly between installations.
- A manually fed log boiler could be cheaper, but a sophisticated log boiler system with accumulator could cost just as much. The boiler is likely to be larger perhaps 20 to 30kW for the same house.

7. How much could your client save?

This table shows the typical savings for a pellet central heating system in place of electric storage heating or coal fired heating, based on a three bed semi-detached property:

Savings for a wood fuelled boiler		
Fuel replaced	£ saving per year	CO_2 saving per year tonnes
Electricity	£275	72
Solid fuel	£120	7

Note: if your home is heated by gas, a wood fuel boiler may cost more to run, although you would still save around 4 tonnes of CO2 per year.

7. Planning permission
Wood burning boilers and stoves do not generally require planning permission unless the flue:

- Exceeds 1m above the roof height.
- Is installed on the principal elevation and visible from a road, on buildings in conservation areas and world heritage sites.

8. Building Regulations

All biomass heating systems have to comply with the Building Regulations. Compliance with Building regulations can be achieved by either submitting an application to your local building control body (e.g. Local Authority Building Control Department) for approval, or by ensuring that the work is undertaken under a Competent Persons Scheme (e.g. HETAS registered installer). 'Exempted' appliances are required if your client lives in a 'smoke control zone'. See www.uksmokecontrolareas.co.uk for more information. Remember, the system is likely to require additional ventilation if more than 7kw and is not sealed to the room.

9. Maintenance

Wood fuelled boilers, stoves and room heaters should be kept clean and swept regularly to remove ash. A log fire requires ash removal before every use and the flue should be cleaned every three months. Some appliancesparticularly boilers have self cleaning systems built in. The installer should give the client details of maintenance checks they need to do. These shouldn't take longer than a day over the course of a year. Wood fuelled appliances can last around 15 years if kept in good condition throughout their life.

Funding options

Feed-in Tariff (FIT)

The Government's FITs scheme guarantees a minimum payment for all electricity generated by the renewable energy system, as well as a separate payment for the electricity exported to grid. These payments are in addition to the bill savings made by using the electricity generated on-site.

Eligibility requirements

The scheme covers the following electricity – generating technologies, up to an installation size of 5 Mega Watts (mw):

- Solar electricity (PV) (roof mounted or stand alone)
- Wind turbine (building mounted or free standing)
- Hydroelectricity
- Anaerobic digestion
- Micro combined heat and power (micro CHP) (limited to a pilot at this stage)

The tariffs available and the process for receiving them vary, depending on when the technology was installed, and whether the system and the installer were certificated under the MCS* scheme. You will qualify for the full FIT payments if:

- The technology was installed between 15th July 2009 and 31st March 2010 and you transferred to FITs before 1st April 2010; OR
- The technology is installed after 1st April 2010 using an MCS* certificated product and installer;

The Microgeneration Certification Scheme (MCS) is an independent scheme that certificates microgeneration products under 50kW and installers in accordance with consistent standards.

How the scheme works

If your client is eligible to receive the FIT then they will benefit in 3 ways:

1. Generation tariff
A set rate paid (see table on following pages) by the energy supplier for each unit (or kWh) of electricity generated. This rate will change each year for new entrants to the scheme (except for the first 2 years), but once your client joins they will continue on the same tariff for 20 years, or 25years in the case of solar electricity (PV).

2. Export tariff
Your client will receive a further 3p/kWh from your energy supplier for each unit you export back to the electricity grid, that is when it isn't used on site. The export rate is the same for all technologies.

3. Energy bill savings
Your client will be making savings on their electricity bills, because generating electricity to power appliances means they don't have to buy as much electricity from their energy supplier. The amount saved will vary depending how much of the electricity is used in the home and not exported.

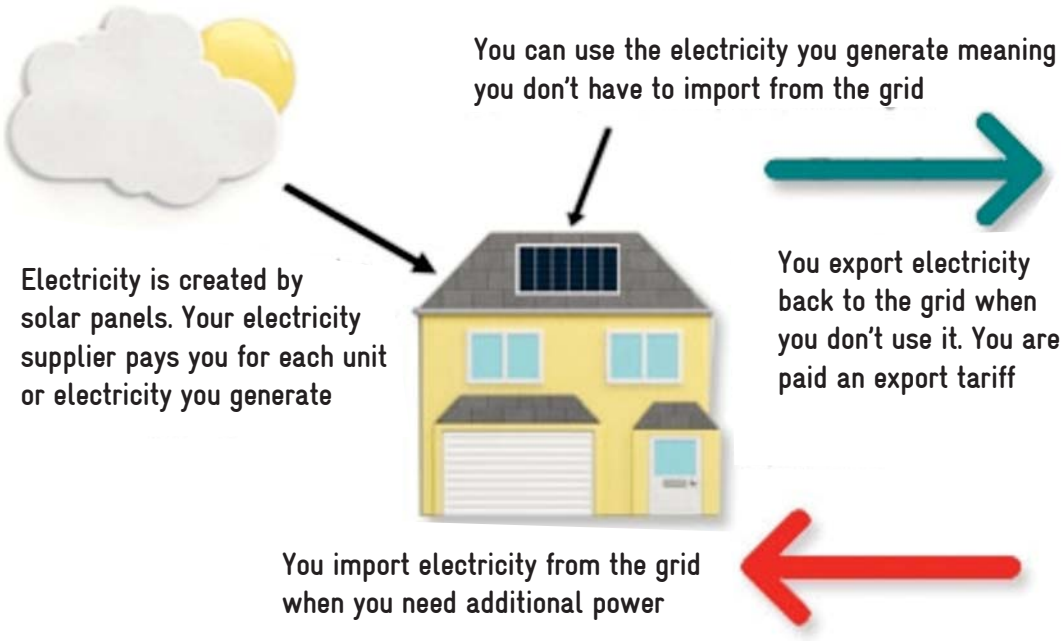
Deemed export

As an interim measure before the introduction of smart meters, domestic FIT installations are likely to have their export deemed (estimated) at 50% in most cases unless a Smart meter already measures the exact proportion used or exported.

Technology	Scale	Tariff level (p/kWh)*	Tariff lifetime (years)
Solar electricity (PV)	≤4 kW (retro fit)	43.3	25
Solar electricity (PV)	≤4 kW (new build)	37.8	25
Wind	≤1.5 kW	36.2	20
Wind	>1.5 - 15 kW	28.0	20
Micro CHP	≤2kW	10.5	10
Hydroelectricity	≤15 kW	20.9	20

*As of 1 April 2011 which takes into account rises in the Retail Price Index.

Example of how the Feed-in Tariff works



As an example, a typical domestic solar electricity system, with an installation size of 2.7 kWp could earn around:

- £990 per year from the Generation Tariff
- £40 per year from the Export Tariff
- £140 per year reduction in current electricity bills.

This gives a total saving of around £1,170 per year.

This assumes 50% of the electricity generated is exported. The figure will vary depending on how much is exported.

Once the initial cost has been recovered this can offer an appealing investment opportunity in addition to the other benefits.

Renewable Heat Incentive (RHI)

In March 2011, the UK Government announced the details of their Renewable Heat Incentive (RHI).

RHI is designed to provide financial support that encourages individuals, communities and businesses to switch from using fossil fuel for heating, to renewables such as wood fuel.

There will be two phases for domestic customers:

Phase 1 (available from August 2011) "RHI Premium Payment"

This is called the "RHI Premium Payment" and will be worth around £15m and available to 25,000 householders in Great Britain who install from July 2011.

These are one off payments; so not annual. DECC published details of the "RHI Premium Payment" and recipients of this payment will need to ensure that:

- They have a well-insulated home based on its energy performance certificate;
- They agree to give feedback on how the equipment performs.

For further guidance, including how to apply visit the www.energysavingtrust.org.uk.

Phase 2 (available from October 2012) – RHI tariffs

People in receipt of the Renewable Heat Premium Payments will be able to receive long term RHI tariff support once these tariffs are introduced, as will anybody who has installed an eligible technology since 15th July 2009.

Whilst Air source heat pumps will be eligible for the Renewable Premium Payment, a decision on whether or not they'll be included in the tariff payments will be based upon consumer feedback on the performance of the technologies. This should be clarified towards the end of 2011.

These tariff payments will start alongside the Governments new Green Deal from October 2012 to allow a more whole-house approach to heat production and energy saving.

Further information and reading

For trade and professionals, the Energy Saving Trust produces a wide range of technical guidance and solutions to enable industry to achieve high levels of energy performance.

The following publications may be of interest: and are downloadable from our website

- CE317 – Domestic Low & Zero carbon technologies
- Sustainable Refurbishment (CE309)

Regional Building Control contacts

Blaenau Gwent County Borough Council
Enterprise House, Rassau Industrial Estate,
Ebbw Vale Gwent NP23 5SD
Tel: 01495 355520 Fax: 01495 355598
Email: building.control@blaenau-gwent.gov.uk
Web: www.blaenau-gwent.gov.uk

Bridgend County Borough Council
Civic Offices, Angel Street, Bridgend CF31 4WB
Tel: 01656 643406 Fax: 01656 646972
Web: www.bridgend.gov.uk

Caerphilly County Borough Council
Building Control, Caerphilly County Borough Council
Pontllanfraith House, Pontllanfraith
Blackwood NP12 2YW
Tel: 01495 235158 Fax: 01495 235013
Email: buildingcontrol@caerphilly.gov.uk
Web: www.caerphilly.gov.uk

Cardiff Council
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City Hall, Cathays Park, Cardiff CF10 3ND
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Email: buildingcontrol@cardiff.gov.uk
Web: www.cardiff.gov.uk

Carmarthenshire County Council
Building Control, Building 16, St. David's Park,
Jobswell Road, Carmarthen, Carmarthenshire SA31 3HB
Main Switchboard: 01267 246001 Fax: 01267 246017
Email: Building.Control@carmarthenshire.gov.uk
Web: www.carmarthenshire.gov.uk/building control

Ceredigion County Council
Building Control Section, Canolfan Rheidol,
Rhodfa Padarn, Llanbadarn Fawr,
Aberystwyth, Ceredigion SY23 3UE
Tel: 01970633484 Fax: 01970 615639
Email: hpw@ceredigiopn.gov.uk
Web: www.ceredigion.gov.uk

Conwy County Borough Council
Council Offices, Conway Road, Mochdre,
North Wales LL28 5AB
Tel: 01492 574172 Fax: 01492 546734
Web: www.conwy.gov.uk

Denbighshire County Council
Environment Directorate, Caledfryn,
Smithfield Road, Denbigh, LL16 3RJ
Tel: 01824 706979, Fax: 01824 706709
Web: www.denbighshire.gov.uk

Flintshire County Council
County Hall, Mold, Flintshire CH7 6NF
Tel: 01352 703631 Fax: 01352 703615
Web: www.flintshire.gov.uk

Gwynedd Council
Environmental Directorate Consultancy Section,
Penaralt Caernarfon, Gwynedd LL55 1BN
Tel: 01286 682769 Fax: 01286 682771
Web: www.gwynedd.gov.uk

Isle of Anglesey County Council
Council Offices, Llangefni, Anglesey LL77 7TW
Tel: 01248 752176, Fax: 01248 752232
Web: www.anglesey.gov.uk

Merthyr Tydfil County Borough Council
Building Control, Merthyr Tydfil County Borough Council
Ty Keir Hardie, Avenue de Clichy, Riverside Court
Merthyr Tydfil **CF47 8XF**
Tel: 01685 726263 Fax: 01685 382698
Email: building.control@merthyr.gov.uk
Web: www.merthyr.gov.uk

Monmouthshire County Council
County Hall, Cwmbran, Gwent NP44 2XH
Tel: 01633 644831 Fax: 01633 644878
Web: www.monmouthshire.gov.uk

Neath Port Talbot County Borough Council
The Quays, Brunel Way,
Baglan energy park, Neath SA11 2GG
Tel: 01639 686820 Fax: 01639 686101
Building Control Email: building.control@npt.gov.uk
Web: www.npt.gov.uk/buildingcontrol

Newport City Council
Building Control, Newport City Council,
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Tel: 01633 656656 Fax: 01633 232660
Email: building.control@newport.gov.uk
Web: www.newport.gov.uk

Pembrokeshire County Council
Department of Development,
County Hall, Haverfordwest Pembrokeshire SA61 1TP
Tel: 01437 775897 Fax: 01437 776496
Web: www.pembrokeshire.gov.uk

Powys County Council
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Brecon, Powys LD3 7HR
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Email: buildingcontrol@powys.gov.uk
Web: www.powys.gov.uk

Rhondda-Cynon-Taff County Borough Council
Building Control, Rhondda Cynon Taf
County Borough Council, Sardis House, Sardis Road
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Tel: 01443 494845 Fax: 01443 494774
Email: buildingcontrol@rctcbc.gov.uk
Web: www.rhondda-cynon-taff.gov.uk

Swansea Council
Building Control, City and County of Swansea
Environment Department, Room G.4.1, Civic Centre
Oystermouth Road, Swansea SA1 3SN
Tel: 01792 635622, Fax: 01792 635644
Email: bcon@swansea.gov.uk
Web: www.swansea.gov.uk/bcon

Torfaen County Borough Council
Planning & Public Protection Service,
County Hall, Cwmbran
NP44 2WN Tel: 01495 766922, Fax: 01633 648062
Web: www.torfaen.gov.uk

Vale of Glamorgan Council
Building Control, Vale of Glamorgan Council
Dock Office, Barry Docks, Barry CF63 4RT
Tel: 01446 704666, Fax: 01446 704843
Email: buildingcontrol@valeofglamorgan.gov.uk
Web: www.valeofglamorgan.gov.uk

Wrexham County Borough Council
Building Control Section, Wrexham County Borough
Council, Council Offices, Lambpit Street
Wrexham LL11 1AR. Tel: 01978 292000
Email: bc_admin@wrexham.gov.uk
Web: www.wrexham.gov.uk

Remember every refurbishment project is an opportunity to expand the value your business and build a reputation in an area of work that will grow significantly in the future. If you are completing, pricing or just talking to a client about a project it's worth offering additional services in order to grow your business.

Other publications in this range include **Trade guide to whole house energy refurbishment** which is available from your local building control department

For further advice and support on refurbishing your property, contact your local building control department.

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LABC Cymru
labccymru.co.uk

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