Home Low-Carbon Energy & Heat Generation

If you have already insulated your home, that you could also consider generating your own energy using renewable energy technologies such as solar panels and air source heat pumps. This can have several benefits including saving you money on your energy bills and reducing your carbon footprint. This leaflet gives information on what types of renewable energy you might be able to benefit from, and one of the grant schemes currently available.

Renewable Electricity

When considering installing renewables in your home, there are several things to consider. For example, which way your roof faces (for solar panels), whether you have a water source nearby (for hydro) or what the average wind speed is (for turbines). You will also want to consider whether you may need or want battery storage to save excess energy use for times when there is less renewable energy produced.

Solar Panels (PV)

Solar panels capture the sun's energy using photovoltaic cells. These need light to work but it doesn't have to be direct sunlight and so can still work on a cloudy day. They are normally mounted on the roof of your house, but you can also get solar tiles to replace existing tiles, though these are often a lot more expensive. You can also be paid for excess energy exported back to the grid on certain electricity tariffs.

Solar panels generally require little maintenance other than ensuring they are clean to make sure they work effectively. They should last 25 years or more though will likely need the inverter (around £800) replaced at some point. If combined with battery storage this is also likely to need replacing depending on the battery used.

Summary

Renewable technology	Average installation cost	Average savings per year	Potential CO_2 saved
Solar Panels PV	£6200	Up to £390	1.6 tonnes

Renewable Heat

When thinking about renewable heat in your home, there are several things to consider. For example, how much space you have for ground or air source heat pumps, whether there is a water source nearby for water source heat pump, or which way your roof faces for solar water heating.

Ground Source Heat Pumps

Ground source heat pumps use pipes buried underground (typically a meter down) to extract heat from the ground. This is then used for underfloor heating, low flow radiators or warm air heating systems as well as hot water. If there isn't room to lay pipes horizontally then a 90-160m borehole can be drilled but this is often more expensive. Most systems will be expected to operate for 20 years or more with proper maintenance.

Air Source Heat Pumps

They utilise the same principles as ground source heat pumps but using the air. Heat from the air is absorbed at a low temperature into either liquid or air and then passed through a compressor to increase temperature. They can run even in temperatures as low as -15°C and can expect to operate for 20 years or more but require regular maintenance every 3-5 years.

Water Source Heat Pump

The same as ground source and air source except gaining heat from a water source. This is only an option if you have a nearby water source.

Biomass Heating

Biomass heating systems burn wood pellets, chips or logs to provide warmth, heat boilers or power central heating. They require regular weekly cleaning to remove ash though some have automatic systems. They are only really targeted at those on older fuel systems or off the gas grid as they still produce greenhouse gases but are thought to cancel out emissions when the trees grow.

Solar Water Heating

There are two types, evacuated tubes which are glass tubed mounted on roof tiles, or flat plate collectors which are fixed on roof tiles or integrated into the roof. These collect heat from the sun and use it to heat water in a hot water cylinder.

Maintenance costs are generally low, but the system should be checked every 3-7 years.

Summary

Renewable technology	Average installation cost	Average savings per year compared to a gas boiler	Potential CO_2 saved
Ground Source Heat Pump	£10,000-£18,000	Up to £500 depending on the existing boiler	Up to 2.9 tonnes
Air Source Heat Pump	£6,000-£8,000	Up to £600 depending on the existing boiler	Up to 4 tonnes
Biomass Heating	£8,000-£15,000, +£255 per tonne of wood pellet	Increase by up to £800	Up to 8.5 tonnes
Solar Water Heating	£4,000-£5,000	£55	0.26 tonnes

Renewable Heat Incentive (RHI)

The domestic RHI was introduced by the government in April 2014 to contribute to the 2020 target of 12% of heating from renewable sources. The main targets for the RHI are houses that do not currently have a gas supply, but the scheme is not limited to these properties.

Domestic RHI eligible technologies are:

- Biomass (wood-fuelled) boilers
- Biomass pellet stoves with integrated boilers
- Ground source heat pumps (Including some water source heat pumps)
- Air source heat pumps that transfer heat to water
- Solar thermal panels (flat plate or evacuated tubes only) that provide hot water.

To be eligible for the scheme, the applicant must be an owner-occupier, private landlord, registered Social Housing provider or self-builder who has installed an eligible technology in the last year. New properties are not eligible, unless they are self-builds however, single domestic dwellings are covered.

The systems installed and the installer must be certified by the Microgeneration Certification Scheme (MCS) or relevant equivalent, and systems must appear on the product eligibility list from Ofgem. Applicants must follow EPC recommendations and install loft and cavity wall insulation if recommended as this makes the renewable heat more effective. Following this you would need a new EPC completed before applying. There are also some specific requirements for each technology, and you may need metering, for these requirements please check the Ofgem website.

The tariffs pay quarterly based on estimates of the heat requirements of the property from EPC elements and estimates of system efficiency. To assist with the start-up costs of a technology eligible for RHI you could utilise an Assignment of Rights (AoR)

where an “investor” helps fund the purchase, installation and maintenance in exchange for receiving your RHI payments.

Micro CHP (Combined Heat and Power)

Micro CHP is an alternative low carbon energy source for electricity and heat; however, it is not renewable as it uses gas. It works similarly to a boiler but also generates electricity while heating water.

Battery storage

Batteries can be combined with renewable electricity to help ensure energy is available at times of low production. A battery bank may last for only 5 years depending on the type of battery, so will probably need replacing multiple times over the life of system. This is expected to change as the technology develops. Despite this they can be very effective at reducing energy bills further. An example of a battery set up with a solar inverter and energy management system is shown on the right.

Where to find more information:

For more information about renewables and the RHI, and for approved installers and energy saving measures visit **energysavingtrust.org.uk,** and search **‘Renewable Heat Incentive.** Or visit the Ofgem website **Ofgem.gov.uk**.