



# LOW CARBON HEAT

How you can help the environment and save money on your heating bill by switching to a low carbon heat system...

This leaflet gives you some basic information about the options you might have to move to low carbon heating using renewable energy, but you could also contact your local community organisation, housing association or Council to ask what they are doing to help local people do this.

## **WHY IS REDUCING OUR CARBON EMISSIONS FROM HEAT SO IMPORTANT?**

In Scotland, heat is the biggest element of our energy use (over 55%), and the largest source of our carbon emissions (47%).

Fossil fuels (natural gas & oil) are the source of the majority (84%) of Scottish households' heating systems.

## **WHAT ARE THE SCOTTISH GOVERNMENT'S TARGETS FOR REDUCING EMISSIONS FROM HEAT?**

By 2032 we aim to achieve:



# 23%

EMISSIONS REDUCTION IN THE RESIDENTIAL SECTOR



# 60%

OF WALLS INSULATED BY THE YEAR 2020



# 35%

OF DOMESTIC PROPERTIES SUPPLIED WITH HEAT FROM LOW CARBON TECHNOLOGIES



# 15%

REDUCTION IN RESIDENTIAL HEAT DEMAND THROUGH ENERGY EFFICIENCY MEASURES

# WHAT CAN YOU DO TO REDUCE YOUR CARBON EMISSIONS FROM HEAT? ....

## USE ENERGY MORE EFFICIENTLY AND SWITCH TO LOW CARBON FUEL SOURCES

A first step is usually an energy efficient home – this is key to getting the most out of low carbon heating. Cavity or wall insulation, draught proofing and double glazing all minimise heat loss through roofs, walls and floors and are crucial if you want to reduce your energy usage and therefore your fuel bills.

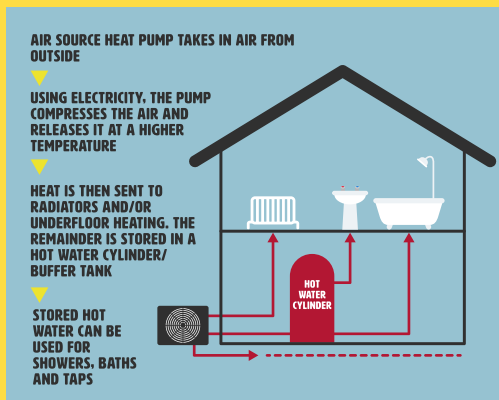
Smart thermostats on heaters which can be controlled from your phone or tablet will also help reduce your energy bills and carbon emissions. Keeping your home at a constant lower temperature will cost less and burn less fuel than periodically increasing and decreasing the temperature.

Home Energy Scotland<sup>1</sup> or your local community energy advice service can help you access detailed advice and any support packages that you might be eligible for.

[1www.energysavingtrust.org.uk/scotland/home-energy-scotland](http://www.energysavingtrust.org.uk/scotland/home-energy-scotland)

## WHAT TYPES OF LOW CARBON HEAT SYSTEMS ARE THERE?

Low carbon heat covers a number of different technologies and fuels. This includes hydrogen, heat pumps (where energy is sourced from the air, ground or water), bioenergy (biomass and biogas), and solar thermal.



### HEAT PUMPS

Heat pumps do not generate heat—they transfer heat from a source i.e. air, water or the ground using electricity. This heat can be used to provide heating and hot water to your home.

Heat pumps are much more efficient to run than gas and electric heating systems.

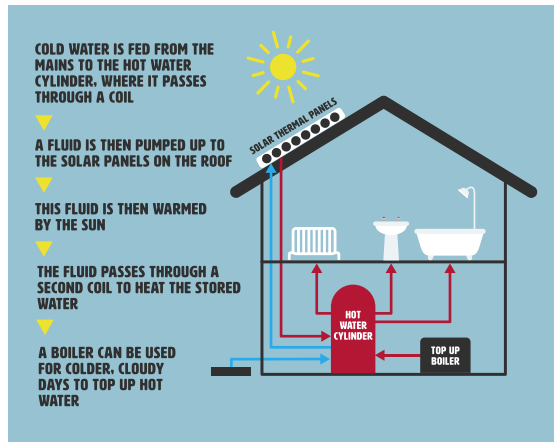
For example, electric heaters generate 1kW of heat for every 1kW of electricity used, whereas heat pumps can generate between 3-5 kW of heat for every 1kW of electricity used. Heat pumps, in particular, operate at lower temperatures than other technologies which means it is vital that you ensure your home is very well insulated. Installation times will vary but could take anywhere between three and five days if you are replacing a conventional heating system.

## FACT

**HEAT PUMPS USED FOR HEATING CAN OFFER CARBON EMISSION SAVINGS OF AROUND 30% WHEN COMPARED TO CONVENTIONAL NATURAL GAS BOILERS**

### SOLAR THERMAL

Solar thermal systems capture solar energy within collectors on your roof. This heats up water which is then stored in a hot water cylinder for use in the house. Usually, in the UK in winter, a boiler or immersion heater is needed to heat the water further, to the required temperature.



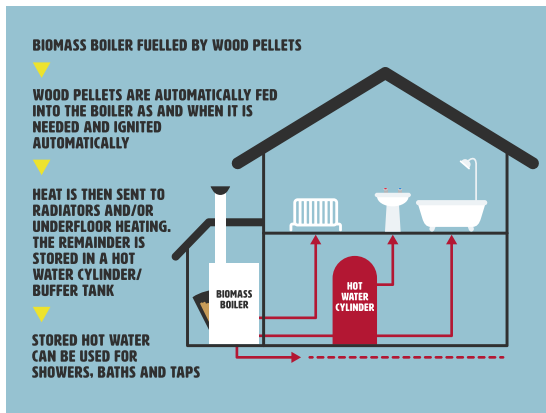
In the UK, solar thermal systems are not generally cost effective and energy efficient enough to be used for heating your home because in winter, when space heating is required, solar energy is at its weakest.

However, solar thermal could be used with other technologies particularly in well-insulated, new build housing with underfloor heating.

### ELECTRIC STORAGE HEATERS

Electric storage heaters contain ceramic or concrete blocks which “hold” the heat provided by an electric element running through the centre. They “charge” and store heat at times when they can take advantage of the off-peak or cheaper rate electricity and have controls which can be adjusted to release heat throughout the day.

They can be a low carbon option if you generate your own renewable electricity or you sign up to a 100% renewable electricity tariff. However, if you buy electricity from the grid, the high price compared with gas means it is one of the most expensive heating options and is most often found in homes that are not connected to the gas grid.



## BIOMASS SYSTEMS

Biomass systems generate heat by burning plant material like wood pellets, chips or logs to either warm a single room or power central heating and hot water boilers.

Biomass heating tends to work well in rural areas not connected to the mains gas network because they are

generally cheaper to run than electric heating or liquefied petroleum gas (LPG) systems.

Biomass boilers are usually larger so need more space than gas or oil boilers. Also you will need storage space to keep the fuel dry, so it burns cleanly and efficiently. You may also need to clean out the biomass boiler once a week or so. More expensive self-cleaning boilers do exist and only need cleaning once per year.

## HOW MUCH DOES IT COST TO INSTALL AND RUN A LOW CARBON HEATING SYSTEM?

Heat pumps and biomass systems cost more to install than conventional heating systems, but they generally last longer and have lower running costs, so you can make significant savings on heating bills over time.

Also, the Renewable Heat Incentive (RHI) is a government programme giving participants quarterly payments for seven years for the clean, green renewable heat it's estimated their system produces.

***See the information on the next page to see what the costs might be.***

**Installation and running costs for a 2-bed semi-detached house with an estimated annual heat & hot water demand of 12000kWh**

<b>Low Carbon Heating System<sup>1</sup></b>	<b>Estimated annual cost of fuel bills</b>	<b>Estimated installation cost</b>
Air Source Heat Pump	£630	£6,000 - £8,000
Ground Source Heat Pump	£540	£10,000 - £16,000
Biomass	£774	£8,000 - £15,000
<b>Conventional Heating System<sup>2</sup></b>	<b>Estimated annual cost of fuel bills</b>	<b>Estimated installation cost</b>
Gas	£449	£2,000 - £3,000
Electric Storage Heaters	£1,890	£1,000 - £2,500
Oil	£629	£2,000 - £3,000
LPG	£823	£1,500 - £2,500

<sup>1</sup> Calculations assume: HPs - coefficient of performance (COP) of 3 for ASHPs, 3.5 for GSHPs & electricity price of 15.75p/kWh; biomass - wood pellet price 6.45 p/kWh

<sup>2</sup> Estimates for current heating system assume: annual heat & hot water demand of 12000 kWh, and average prices/kWh for: oil (5.24p), gas (3.74p), LPG (6.86p) and electricity tariff (15.75p). Fuel prices from Energy Savings Trust (updated Mar 2019)

**Estimated RHI payments and installation costs for 2-bed semi-detached house with an estimated annual heat & hot water demand of 12000kWh**

<b>Low Carbon Heating System</b>	<b>Estimated annual RHI payments</b>	<b>Estimated RHI payments over 7 years</b>
Air Source Heat Pump	£915	£6,400
Ground Source Heat Pump	£1,880	£13,150
Biomass	£825	£5,775

# ARE THERE OTHER WAYS TO ACCESS LOW CARBON HEAT?

Heat networks (district heating) provide heat and hot water to your home via a network of pipes which receive heat from a central energy centre connecting multiple customers and buildings. Heat is typically delivered in the form of hot water. Energy centres can use a range of renewable heat sources such as heat from the ground, water, waste and biomass. Rather than having a boiler in your home, you would have a Heat Interface Unit (HIU) which is similar in size to a small domestic gas boiler. The HIU extracts heat from the hot water in the network pipes and transfers it your own central heating and hot water system.



For further details about heat networks, or if you are interested in finding out more about connecting to a heat network, you can contact Home Energy Scotland.

## LOOKING TO THE FUTURE

Hydrogen or biomethane may replace natural gas as a fuel source for heating buildings in future. However this will require repurposing of the gas distribution network and perhaps building a new H2 transmission system. These fuel sources are unlikely to be the dominant low carbon heat solution moving forward but will no doubt play a valuable long-term role alongside widespread electrification and further improvements in energy efficiency.

[www.districtheatingscotland.com](http://www.districtheatingscotland.com)

[www.gov.scot/policies/energy-efficiency/decarbonising-heat](http://www.gov.scot/policies/energy-efficiency/decarbonising-heat)

[www.energysavingtrust.org.uk/scotland/home-energy-scotland](http://www.energysavingtrust.org.uk/scotland/home-energy-scotland)

[www.energysavingtrust.org.uk/renewable-energy](http://www.energysavingtrust.org.uk/renewable-energy)



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