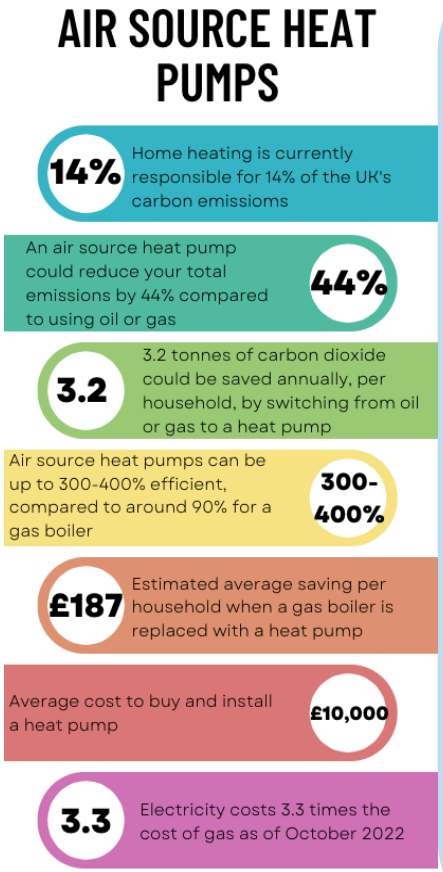
Air Source Heat Pumps – A Good Option for You?



The verdict

There are currently around 280,000 heat pumps installed in the UK, and the pace of installation has been growing, with a 35% rise in heat pump sales in the EU in 2021. They provide a much more sustainable and environmentally friendly method of heating buildings. The cost is an issue for many people, but typically heat pumps will save you money over a lifetime. Data analysis shows that a heat pump is cheaper to run than a gas boiler when the CoP is equal to 3.0, which is achievable for the majority of households. However, there are both advantages and disadvantages, so homeowners must decide what is right for them.

Today, the heating of many buildings still relies largely on fossil fuels, in particular natural gas. This produces huge amounts of greenhouse gas emissions, with home heating currently being responsible for around 14% of the UK's carbon emissions. To help minimise this and work towards the United Kingdom's ambition of carbon neutrality by 2050, a move is being made towards cleaner methods of heating buildings. An air source heat pump is one alternative, which could reduce your total emissions by 44%. According to Energy and Clean Growth Minister Lord Callanan, "heat pumps powered by clean, renewable energy will be key to warming UK homes in a net zero future". The International Energy Agency estimates that heat pumps globally have the potential to reduce global carbon dioxide emissions by at least 500 million tonnes by 2030, which is the same as the annual carbon dioxide emissions of all cars in Europe.

For more information, consult:
Energy Saving Trust
International Energy Agency
Climate Change Committee

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How does an air source heat pump work?
Air source heat pumps extract air from the outside using fans, and this heat is absorbed into a volatile liquid, known as the refrigerant, which will evaporate. The gas is compressed using electricity, which causes its temperature to increase. This hot gas then passes into a heat exchanger surrounded by air or water, and it can transfer its heat to the medium, allowing water and the home to be heated by renewable means.

How efficient are heat pumps?
Heat pumps are more efficient than other heating systems because the amount of heat they produce is more than the amount of electricity they use. This efficiency can be quantified using the Coefficient of Performance (CoP), which gives the amount of heat produced for every unit of electricity used. The Seasonal Coefficient of Performance is an average Coefficient of Performance which can be used to show efficiency across a year, as the heat pump system has to do more work when the temperature difference between the outside source temperature and the water temperature needed in the radiators or underfloor heating is larger. In an ideal scenario, a heat pump can be between 300-450% efficient, while the average efficiency for a gas boiler is around 90%. However, to achieve this idealised CoP value, the system must be very well designed, and the house in which the system is installed must be well insulated. Loft insulation, (cavity) wall insulation and double glazing have a huge impact. Whole house surveys should be done before installing an air source heat pump to ensure that it is suitable, and if other alterations are required.

Will my air source heat pump save me money?
Air source heat pumps are expensive, costing an average of £10,000 to buy and install, according to the Energy Saving Trust. Alongside this, houses with poor thermal efficiency may require extra upgrades and insulation to maximise performance, which can be costly. Radiators could need to be replaced to have a larger surface area, allowing more heat to be delivered whilst at the same water temperature. It has been estimated that most homes would need to replace at least one third of their radiators for a heat pump to work efficiently. However, there is currently a Boiler Upgrade Scheme running, allowing homeowners in England and Wales to receive £5,000 towards the cost of a new air source heat pump, which will help offset some of the initial costs. Once running, heat pumps are also very low maintenance, and will often last longer than a gas boiler. Typically, they can last 20 years, compared to 10 for a gas boiler. Despite the high initial cost of a heat pump, savings may be made in the long run. As of October 2022, electricity costs 3.3 times more than gas, at 34 pence per kilowatt hour (kWh), compared with 10.3 kWh. However, as heat pumps can often be over 4 times more efficient than gas boilers, there can still be overall savings. Less electricity can be put in to give the same heating effect for which a much greater quantity of gas would be required. Heat pumps can save consumers money if they are designed and installed well, so that high enough efficiency is achieved. However, CoP values which are large enough to result in savings on bills will depend on both the thermal efficiency of the house and the outside temperatures.