



Air source heat pumps



Air source heat pumps absorb heat from the outside to heat buildings. There are two types of air-source heating systems. Air-to-air systems provide warm air, which is circulated to heat the building. The other type, air-to-water, heat water to provide heating to a building through radiators or an underfloor system.

Benefits

The benefits of air source heat pumps are similar to ground-source heat systems. Firstly, neither type of system requires the use or storage of external fuel. The systems instead run on electricity, which eliminates the need for a gas connection or storage of oil/solid fuel. Air source heat pumps present an advantage over ground source heat pumps because they require less space to install. Instead of requiring the installation of buried underground coils, air source systems can be fitted using much less space and are therefore, more suited for an urban home.

How it works

In the same way that a fridge uses reffridgerant to extract heat from the inside, keeping your food cool, and air source heat pump extracts heat from the outside air, and uses it to heat your home and hot water. An air-source heat pump has three main parts:

- The **evaporator coil** absorbs heat from the outside air;
- The **compressor** pumps the reffridgerant through the heat pump and compresses the gaseous reffridgerant to the temperature needed for the heat distribution circuit;
- The **heat exchanger** transfers the heat from the reffridgerant to air or water.

In an air-to-water system, the heat produced is used to heat water, which can be used to pre-heat water in a storage tank or circulate through underfloor heating or radiators. Heat pumps produce hot water that is a lower temperature (typically 35-45C) than standard boiler systems, which makes underfloor heating the most effective option. In an air-to-air system, this heat is used to produce warm air, which is circulated by fans to heat a building.

The efficiency of air source systems is measured by a coefficient of performance (CoP). CoPs for air source systems are comparable with ground-source heat pumps, and generally range between 3 and 4. This means that for every unit of electricity used to power the pump, 3-4 units of heat are produced, making it an efficient way of heating a building.

It is even possible for air source heat pumps to extract useful heat from air at temperatures as low as minus 15°C.

Is it suitable for my home?

You should consider the following issues if you're thinking about installing an air source heat pump.

- You will need space on an external wall outside your house to fit the evaporator coil.
- An air source heat pump should cover the heating requirements of a well insulated property. Due to the lower temperature compared with traditional boilers, it is essential that your home is insulated and draught proofed. These measures will lower your heat demand and make the system more effective.
- Consider what fuel is being replaced: if it's electricity, oil, Liquid Petroleum Gas (LPG) or coal, the payback will be more favourable than gas. Heat pumps are a good option where gas is unavailable.
- The type of heat distribution system. Air source heat pumps can be used to heat water that is circulated through radiators but under floor heating is more effective due to the lower temperature of the air/water produced. Air-to-air systems require a ventilation system with fans to circulate the warm air.
- Is the system for a new building development? combining the installation with other building works can reduce costs.
- If you want to further reduce your home's CO₂ emissions you can purchase a green electricity tariff or install solar PV or some other form of renewable electricity generating system to power the compressor and pump.

Costs and savings

A typical 5kW domestic system, suitable for a well insulated detached property, costs in the range of £6,000 to £8,000 installed (ex VAT).

There are currently no costs savings available for this technology but as soon as there are they will be added accordingly.

Grants

At the moment grants for air source heat pumps are available in Scotland under the [Scottish Community and Householder Renewables Initiative \(SCHRI\)](#).

Installers and products

At present, there are no air source heat pumps installers or products, accredited through the [Microgeneration Certification Scheme \(MCS\)](#).

Find out more about air source heat pumps

For further information about air source heat pumps, you can visit the [Heat Pump Association's website](#).

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