

FAQs – air source heat pumps

What are air source heat pumps (ASHPs)?

Air source heat pumps (ASHPs) are a form of low-carbon heat energy generation used for both space and water heating. There are two types of ASHP: air to air and air to water.

How do they work?

ASHPs work by pumping a mixture of water and antifreeze around a loop of pipe contained in a unit located outside of the building. Heat from the air is absorbed by the fluid as it passes through the pipe and back into the heat pump itself. The job of the heat pump is to increase the temperature of the liquid up to an acceptable level to be used for heating or hot water by compressing refrigerant gasses and using the resultant heat to warm the liquid further. The heat pump uses a heat exchanger to transfer the heat to the heating circuit of the building.

Are they effective?

Air temperatures can vary significantly and have an impact on the efficiency of the heat pump, as measured by the Co-efficient of Performance (CoP).

The CoP is the efficiency of transforming electrical energy into heat energy. As an example, a system that uses 1 kWh of electricity to extract 3 kWh of heat energy from the ground would have a CoP of 3.

Whilst in theory ASHPs can extract energy from the air even when the temperature is -15°C , their efficiency is compromised, and their efficiency (CoP) is likely to be no more than 1. Conversely, when the air temperature is warmer, the CoP is likely to be nearer to 8, but this is when space heating is less likely to be required. The annual average CoP is likely to be between 3 and 4.

Why are they classed as a low carbon technology?

Systems are considered low carbon when compared to traditional heating systems, as the process of extracting heat from the air is efficient and only a relatively small amount of electricity is required to run the heat pump. Additionally, the heat energy in the air is renewable, as it is constantly renewed naturally after it has been extracted. If the electricity used in the ASHP system comes from a renewable source such as solar panels (and stored in batteries for overnight usage) or a wind turbine, an ASHP can be an entirely renewable and clean source of heat energy.

How do running costs compare to traditional heating?

The cost of heat per kWh from running a ASHP is comparable to a natural gas system (after accounting for boiler efficiency) and, therefore, ASHPs are one of the cheapest forms of heat energy. The most attractive financial returns will be at sites which do not have a grid gas connection and therefore the ASHP will offset all-electric heating, biomass, oil, or other liquid fuel heating.

A simple heat pump would typically cost approximately £550 per kW installed however the actual size of pump required to meet the demands of the property needs to be assessed by a specialist installer. If the heat emitters (such as radiators) require upgrading, this will be an additional cost to the system. The addition of water tanks and buffer tanks would also be required to store hot water in air to water systems.



Who can install ASHPs?

Information and frequently asked questions about accredited installers of ASHPs and other renewable technologies can be found at <https://mcscertified.com/>

Are there any grants for installation of ASHPs?

The Local Authority Delivery Programme is open to homeowners that meet the eligibility criteria for energy efficient measures. This project is being run in conjunction with E-ON.

For homeowners, the government will fund up to £10,000 worth of improvements, if someone in the household receives certain benefits, they may be eligible for a 100% of the cost of the improvements up to a maximum of £10,000.

To be eligible for the scheme:

- You need to own and live in your property; and
- Your gross household income must be less than £30,000 year; and
- Your home's energy rating EPC should be D, E, F, or G. If you don't have an EPC then E.ON can arrange this for you.

What energy efficiency measures are available?

If eligible, the scheme allows free energy efficient measures, such as:

- External wall insulation
- Air Source Heat Pumps (low carbon heating)
- Solar Panels
- Smart heating controls
- Cavity insulation
- Loft insulation

Further information can be found here [Energy grants | North Tyneside Council](#)

What if I live in a rented property?

Tenants who live in social or private rented homes should contact their landlord if they wish to discuss energy efficiency or renewable energy technology measures.

General energy information and advice can be found at <https://www.gov.uk/improve-energy-efficiency> and also here: <https://energysavingtrust.org.uk/>

Can all buildings have ASHPs?

ASHP systems work best in buildings which have underfloor heating or large radiators and work less well in buildings with undersized radiators. This is because ASHPs are good at efficiently generating warm temperatures (c. 35°C - 45°C) over longer periods, but less efficient at delivering the higher temperatures required for smaller radiators.



As with any heating technology, improvements to insulation should always be considered, as these will reduce running costs and cost of the heat pump, as a smaller system works well in a better insulated building.

It is advised that anyone wishing to install a heat pump system should use a reputable company to assess the suitability of the technology for the premises in the first instance and then carry out appropriate sizing of a system. Any planning considerations should also be discussed at this point.

What does an ASHP look like?

An example air source heat pump looks like this, and as the image shows, they are located very close to the building they are designed to heat.

