



RISE

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Air source heat pumps

Quick guide

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Description and overview

This quick guide aims to introduce air source heat pumps and address some common misconceptions about their use in domestic retrofit. The document has been designed to help housing providers and local authorities advise residents about air source heat pumps and best practices.

What are air source heat pumps (ASHPs)?



Figure 1 - Condenser unit of an ASHP

An air source heat pump (ASHP) is a low carbon heating technology. ASHPs run similarly to a fridge but in reverse. The heat pump takes in outside air to warm a refrigerant, which is placed under high pressure to increase the temperature. This heat is then transferred to water which can be distributed around the house similarly to a boiler-fired central heating system. This means that ASHPs can be used to heat both radiators and hot water.

Common misconceptions

ASHPs are too expensive to run and install


ASHPs are more efficient at providing heat over longer periods and at lower radiator temperatures. If used correctly, ASHPs can be highly efficient and can help save on energy bills. Savings will however depend on many factors, including the fuel type and system efficiency they are replacing, the household electricity price, how well insulated the home is, usage patterns and the desired temperature of the home.

There may be extra costs to upgrade the existing heating system, such as increasing the size of the radiator panels and additional pipework.

The price of ASHPs has been falling in recent years, especially with the support of government grants such as the Boiler Upgrade Scheme (BUS).

ASHPs are large, ugly and loud

The largest part of the ASHP, which is installed outside, is comparable to the size of external units of air conditioning systems. These can be coloured to match the outside of the property so long as it does not block air flow. Old ASHPs were often found to be noisy when running. However, due to improvements in technology, if an ASHP is installed correctly, it should be no louder than a fridge or boiler flue pipe.



Inside the property, the ASHP relies on a similar set-up to a wet central heating system, such as water cylinder and radiators.

ASHPs require more maintenance than a gas boiler

Like gas boilers, ASHPs are recommended to have annual checks and servicing. They do not require more maintenance than a gas boiler. It is estimated that a well maintained ASHP can last for 12-15 years compared to a gas boiler at 8-12 years.

ASHPs are only suitable for houses and new builds

ASHPs can be installed in most types of properties where there is suitable space for the external unit. There may however be some additional associated work to prepare your home, such as insulation and upgrades to your radiators and pipework. Additionally, ASHPs are classed as permitted development and do not usually require planning permission, unless particular planning constraints apply (see the RISE article on planning constraints for more information).

In 2020 and 2021, several hundred heat pumps were installed across Great Britain as part of a project to test their suitability in a range of property types and ages. The study concluded that heat pumps can be successfully installed in homes of every style and from every era.

ASHPs only work in warm weather

Even if the air outside is sub-zero, ASHPs have been shown to be effective at extracting heat and warming the house. It may, however, need to be kept on for longer. This is not dissimilar to other heating systems when operating in colder weather.

Tips and best practice

ASHPs work best in well insulated homes. Compared to gas boiler central heating systems, heat pumps respond gradually to a change in set temperature. It is better to leave them running for longer and to make small adjustments to the temperature until you are comfortable.

Helpful resources

- [Air Source Heat Pumps: Myth Buster - GM Green City](#)
- [Making the most of your air source heat pump | Centre for Sustainable Energy \(cse.org.uk\)](#)
- [Electrification of Heat UK demonstration project - Energy Systems Catapult](#)



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