

# Air Source Heat Pump (ASHP) - Factsheet

## What are Air Source Heat Pumps?

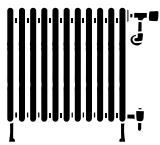
Air Source Heat Pumps (ASHPs) are a renewable heating technology that extracts warmth from the outside air (even when it's freezing) to heat your home **and** provide hot water.

It needs some electricity to do this, but the amount of heat produced is always more than the electricity it uses - much better for the environment!

Similar heat pumps exist that can extract energy from the ground or from water, however ASHPs are more widely installed in the UK. This is because they are suitable for a wider range of properties.

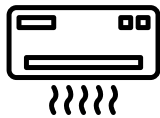
## What are the different types?

There are actually two types of ASHPs depending how they supply the extracted heat to your home:



### Air-to-Water

This type is what we usually mean when we say ASHP in the UK. Extracted heat is transferred to water that circulates through your radiators or underfloor heating. They can heat water stored in a hot water cylinder.



### Air-to-Air

This type is also known as air conditioning. Extracted heat is supplied to the property via fans. They are unable to provide hot water so you would need another way to do this. They are more popular in warmer climates as they can also cool properties.

## What will I see fitted to my home?

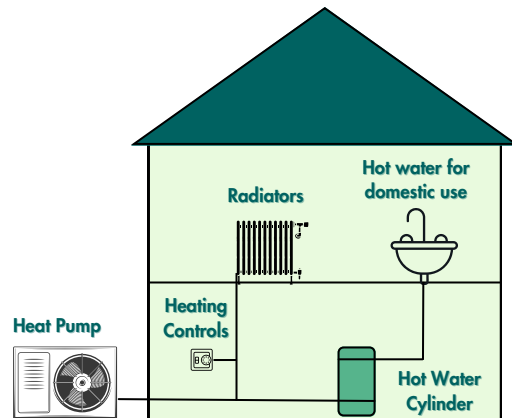
Typically, you'll have an outdoor unit that looks like an air conditioner (but its job is the opposite!). This contains all the components of the heat pump in one compact unit (Monobloc systems).



Within your home, you will have new radiators and pipe work (if needed) as well as a hot water cylinder to store hot water and heating controls. Inside, it will not look much different than an oil-fired or gas-fired central heating system!

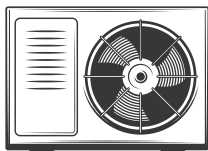


From [Daikin](#)



## How Do They Work?

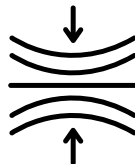
They use similar technology found in a refrigerator, but in reverse. There are three key steps:



1

### Collect Energy from Air

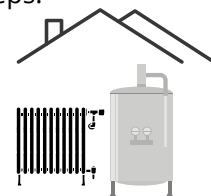
An outdoor unit containing a fan draws in ambient air to warm a refrigerant liquid inside the system. This causes the liquid to evaporate into a gas.



2

### Increase the Temperature

The refrigerant gas then flows through a compressor where it is placed under pressure. This increases the temperature high enough for use.



3

### Transfer Heat for Use in the Home

This hot gas passes through a heat exchanger (condenser) where the heat is transferred to a separate body of water which then circulates through your chosen emitter e.g. radiators or underfloor heating system. The refrigerant, now back to a cold liquid, flows back to start the cycle again.

## What is the install process like?

Firstly, your old heating system will be removed, then you will receive new pipework and radiators. Installers may need to go into your loft to fit pipework. A new hot water cylinder will be fitted, and the heat pump (outdoor unit) will be mounted outside.

Many installations are completed within just 2 days but this can vary. The majority of the work that makes the most mess will take place on the first day. The second day should be less messy as it entails connecting everything together. There can be a third day of work to tie up any last jobs that need doing and to make sure everything is working as it should.

## Will I save money on my energy bills

This will depend on what heating system you are replacing, the size and insulation levels of your home, as well as the make and model of the heat pump. It will also vary throughout the year depending on external temperatures.

They make the most sense financially for houses that are not connected to the mains gas network and so use a more expensive fuel.

Coal fire systems, oil boilers or storage heaters can be expensive to run, therefore we anticipate you will see savings. However, residents that use mains gas (not LPG) or don't currently use any heating, may not.

Also, you may see your electricity bills increase, but you will be saving on another fuel i.e. gas, oil, LPG or coal!

**Based on a 3-bedroom detached home, potential yearly savings could be:**

System being replaced	Old (G-rated)	New (A-rated)
Gas Boiler	£590	£115
Oil Boiler	£295	-£135
LPG Boiler	£780	£230
Electric Storage Heater	£1500	£870
Coal	£470	

Figures from [Energy Savings Trust](#) (June 2023) - based on fuel prices under the Energy Price Guarantee running from April 2023 - June 2023. Negative figures show an increase in bills

## What are the benefits?

A well designed system is:

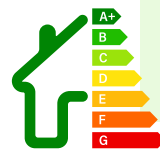
### Environmentally Friendly

Most of the heat ASHP generates comes from natural/renewable sources. This makes it more environmentally friendly option compared to fossil fuel heating systems like oil or coal. If you install Solar PV or switch to a green tariff to provide the electricity needed to run the pump, you could cut your carbon footprint further.



### More Efficient

Although Heat Pumps use some electricity, they use it more efficiently. Current ASHPs on the market are around 300-400% efficient! This means they give out 3-4 units of heat for every unit of electricity consumed. According to the Boiler Guide (June 2023), top gas boilers are around 90-94% efficient whereas oil boilers achieve over 90% efficiency.



### Long Lasting

It is estimated that a well maintained ASHP can last for 12-15 years compared to a gas boiler at 8-12 years.



### Get in touch:

To find out more and for free advice and support, please contact **Warmer Derby & Derbyshire:**

0800 677 1332  
 [wdd@mea.org.uk](mailto:wdd@mea.org.uk)

### About us:

**Warmer Derby & Derbyshire** provides free and impartial energy advice for residents in Derby & Derbyshire, and is managed by **Marches Energy Agency**, an independent charity.

We are focused on delivering practical solutions to reduce fuel poverty and cold homes, promote energy reduction and encourage the uptake of renewable energy.



## Myth 1: ASHPs are a new technology and we don't know much about it!

Whilst using heat pumps to heat homes in the UK is a relatively recent development, the technology has been around for longer than you might expect - 160 years ([Octopus Energy](#)).

Also, UK is far behind the rest of Europe in ASHP installs. According to the [Eco Expert](#), there are now 19.3 million heat pumps installed in Europe, with Norway leading the race (one heat pump for every 3.4 people)



## Myth 2: 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. A hot water cylinder will need to be fitted inside the property which will require some space.

It's best to anticipate some noise, especially when first installed and the system is settling. This should minimise over time especially because of the rubber dampers used where the unit is mounted. There should only be sound when heat is needed.

Heat Pump technology has advanced considerably and continues to do so - units are more compact and quieter than ever. If an ASHP is installed correctly, it should be no louder than a fridge or boiler flue pipe.

Check out Valliant Soundbox tool [here](#)



## Myth 3: ASHPs only work in warm weather

Even if the air outside is below 0°C, 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.

Also, they are popular in colder Scandinavian countries. According to the [Eco Expert](#), there are ASHPs available that can work at temperatures as low as -25°C



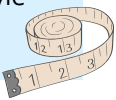
## Myth 4: ASHPs can only be installed in modern, well-insulated houses

Improving insulation (until costs outweighs benefits) should always be priority before installing an ASHP. At least, loft and cavity wall insulation must be present.

However, ASHP can be installed in older, poorly insulated properties (i.e., those with solid brick walls), provided a correctly sized system is designed. This should include a room-by-room heat loss calculation to ensure the heat pump and radiators can provide the heat demand of the property despite the heat loss - a requirement for all MCS certified installers!

Essentially, a large house with poor insulation would need a bigger heat pump and larger radiators to operate with the same efficiency as a heat pump in a better insulated property

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.



## Myth 5: ASHPs are complicated to use.

The system can be set up to suit your needs. Generally, heat pumps work best if they are left on a low but comfortable setting all day. The system will boost up in the morning so your home is nice and snug for you getting up, and boost up again in the evening. If you want it warmer during the day, you can boost it up yourself on the control.

Inside, it will not look much different than an oil-fired or gas-fired central heating system!



## Myth 6: 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.

