

# Choosing to install an Air Source Heat Pump- FAQs

By Tim Woolman, Energy Alton (and householder with an ASHP) updated Aug'23

You may have questions about the common type of Air Source Heat Pump (ASHP), an Air to Water heat pump, which transfers heat to water-filled radiators and domestic hot water. An ASHP can replace a boiler run on gas or oil in 90% UK homes. They generally run at a similar cost to gas heating, cheaper than oil or electric heating.

## 1. What is an Air Source Heat Pump?

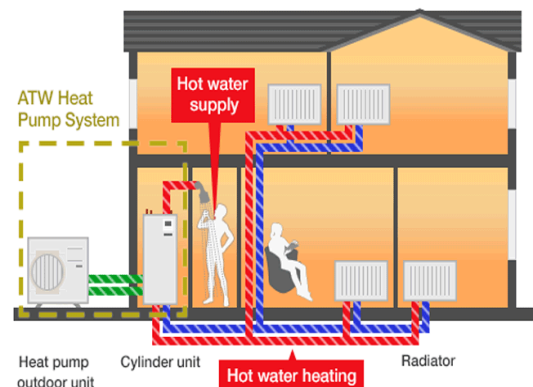
Heat pumps bring in heat from outside, either from the ground or the air. The heat energy they deliver is at least 3 times greater than the electrical energy they use. It is low level of heat, though provides enough warmth to heat a well-insulated home and provide hot water. An air to water ASHP system comprises an outdoor fan unit and an indoor hot water cylinder and associated plumbing and controls.



## 2. How does an Air Source Heat Pump work?

Heat in outdoor air is directed through the outdoor fan unit to warm a liquid refrigerant, even when it's -15°C outside.

The heat from this outdoor air is enough to cause a refrigerant to boil and turn to gas. The heat pump compresses this gas ready to transfer the concentrated heat to indoors. The heat in the compressed refrigerant is pumped into your home. Through a heat exchanger, heat is transferred to the water in your central heating system. Water circulates in your central heating system to warm your radiators, and water is held in a domestic hot water cylinder to serve hot taps, showers etc.



## 3. Will the low temperature an ASHP should run at, be enough to heat my home?

ASHPs are most efficient run at low temperatures e.g. 45°C though they can be run (less efficiently, with a lower Seasonal Coefficient of Performance 'SCOP') at higher temperatures e.g. 50/55°C. Gas/oil systems often run at 65°C. You can control the heating from an ASHP to give you the warmth that you need, say 18-21°C depending on the time & room. A system will automatically start earlier to reach & maintain chosen temperatures at times you select. ASHPs are used in cold climates e.g. Scandinavia as they can extract sufficient heat from outside air as low as -15°C.

## 4. Do I need new/larger radiators?

ASHPs need modern, double panel radiators. If you already have these, the radiators you have may be sufficient, if they are reasonably large for the room. Good loft and wall insulation will reduce the need for much larger radiators. Underfloor heating is ideal but not necessary. An advisor/installer will survey each room to confirm what is needed.

## 5. Would I need a new hot water tank?

A new unvented hot water tank with a suitable immersion heating element will be needed. There is no combi version of an ASHP. Replacing a gas combi boiler is possible, though space for a hot water tank and expansion tanks is needed. Fitment in a typical airing cupboard may be possible, depending how an installer designs the plumbing.

The 'immersion' heating element is needed to raise the temperature of the hot water stored in the tank to 65°C once a week (a normal disinfection cycle to prevent a risk of Legionella) and to offer a back-up source of hot water.

## 6. Where does the outdoor fan unit go?

A suitable outdoor space is needed for the external fan unit, Ideally this is near a house wall and close to an existing hot water cylinder/boiler location, to ease plumbing. To position the external unit a little further away from the house, flexible pipes with 100 mm diameter insulation can run (buried) to the 'monobloc' fan unit containing a compressor. If much further away than an insulated pipe can run, the system is 'split' with a compressor indoors. An ASHP fan unit needs a good air flow and must be more than 1 metre from a property boundary.

## 7. Does the outdoor fan unit make a noise?

The compressor and fan make a low hum, intermittently, when topping up the hot water. Try to find an example unit you can listen to and compare the decibel rating of fan units that you may choose with any that you have listened to – newer units are quieter. If there is an outside location which is a few metres from doors and windows (not under a bedroom window) and ideally round a corner, you may generally be unaware of the fan unit operating unless you come close to it.

## 8. What do ASHPs cost to install? Are there grants available?

ASHPs typically cost much more to install than replacing a gas boiler (£3k), perhaps £13k-£20k. A Boiler Upgrade Scheme (BUS) grant of £7,500 is available in most cases ( [www.gov.uk/apply-boiler-upgrade-scheme](http://www.gov.uk/apply-boiler-upgrade-scheme) ).

Costs vary depending on any radiator upgrades, any electrical supply upgrade (low cost) and need for additional plumbing. House buyers may value an ASHP, as well as better energy performance from enhanced insulation.

## 9. How much does an Air Source Heat Pump cost to run? Is it cheaper to run than a gas boiler?

A heat pump typically costs the same to run as a gas boiler and less than an oil-fired boiler or electric heating. ASHPs use ~1/3 the electrical energy vs. gas energy, but electricity currently costs ~3x more than gas.

## 10. Are ASHPs low carbon if they use electricity?

Heat pumps are low carbon compared to gas heating, more so if you buy 100% renewable electricity from your provider or generate your own renewable electricity. The government plans to ensure all electricity is generated from renewable/green sources by 2035.

## 11. Can ASHPs suit houses which do not have full and effective insulation?

Ensuring a good insulation level is important in any case and especially when preparing to install a heat pump. The heat pump can be smaller (cheaper) where less heating is needed, and running cost is also reduced.

ASHP heating can serve older, less well-insulated houses, though more care is needed in designing a system. To apply for an ASHP grant your home must have loft and cavity wall insulation, if you have a loft and cavity walls.

## 12. Can I find a suitable installer locally?

Once you know what types of heating and insulation you are interested in, an internet search may help you find installers. An example list of installers from Aug'22 is included in the Clean Heat Alton Project guide linked from <https://energyalton.org.uk/new-energy-alton-clean-heat-guide/>

The Trustmark website may help to find installers, though currently many suitable suppliers are not listed at [www.trustmark.org.uk/find-a-tradesperson](http://www.trustmark.org.uk/find-a-tradesperson)

Ensure a heating installer is Microgeneration Certification Scheme (MCS) accredited (check their entry in the list at <https://mcs-certified.com/find-an-installer/> ) so that you qualify for grant funding. Confirm how any grant application would be made for the installation, and note how warranties and maintenance will be handled.

To provide a quotation, an installer should do a room-by-room heat loss assessment to size heating units and recommend any radiator & control upgrades. This may also quantify the benefits of enhancing insulation. After installing a heating system, the installer should show you how to use the controls and outline the maintenance requirements and maintenance services available, to complement their response to warranty issues for any defects.

## 13. What servicing is required and how long should an ASHP system last?

An ASHP will need an annual service at a similar cost to that for a gas boiler service. It should last around 15 years.

## 14. Are people normally satisfied changing from gas boilers to an Air Source Heat Pump?

A Dec'22 survey of over 2500 heat pump users and 1000 domestic gas boiler users commissioned by NESTA found that, "Heat pump users are highly satisfied with their heat pumps, considering them to be safe, reliable, quiet heat sources that are effective for space heating and producing hot water. Overall, satisfaction levels between heat pump and gas boiler users are very similar." [ [www.nesta.org.uk/report/heat-pumps-a-user-survey/](http://www.nesta.org.uk/report/heat-pumps-a-user-survey/) ]

## Further Information

From Energy Alton: <https://energyalton.org.uk/clean-heat/>

Heating options: <https://energysavingtrust.org.uk/energy-at-home/>

Grants: <https://environmentcentre.com/advice-and-support/>

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