Is a heat pump right for your home?

West Midlands Combined Authority

WEST MIDLANDS Greener Together

Is a heat pump right for your home?

You may have heard about heat pumps as a low carbon alternative to heating your home. They are suitable for almost all homes and may also reduce your energy bills, depending on the system you are replacing with a heat pump.

If you are thinking of installing a heat pump, this guide is to help you understand more about them and what questions to ask potential installers to ensure you are finding the right technology for you and your home.

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Heating your home

Before looking into changing the heating system in your home, here is some useful information about heat and heating your home.

1) How does heat move in our homes?

Heat is a form of energy, often described as energy in transit. We can think of heat as behaving a bit like water. Water flows downhill and only flows upwards if we pump it. Heat is the same and will move quickly if the difference between two temperatures is greater. For instance, a radiator will move heat into a room quicker if there is a larger difference between the room temperature and the temperature of the water in the radiator. The speed heat moves from inside our home to outside constantly changes depending on the outside temperature. If it is colder outside, heat will move quicker through the building fabric.

2) A heating system

It is important to remember that heating is a system, with boilers and heat pumps components of that system. Other parts of the system include your pipework, emitters such as radiators and underfloor heating as well as your controls. A very efficient boiler or heat pump does not necessarily mean the heating system will be efficient; the whole system needs to be designed well. It is worth keeping in mind that a heat pump will only be efficient if the whole system is.

This guide aims to help answer any questions you have concerning heat pump technology, and give you helpful information you can ask potential installers if you are looking at investing in a heat pump.

What are heat pumps?

Heat pumps are simply devices which move heat energy from one place to another. They exist already in our lives as many of our offices, restaurants, shops, cinemas, and TV studios are all heated and cooled with heat pump technology and have been for a few decades.

A heat pump captures air from the air, ground, or water, converts this into heat and moves it into your home. It uses electricity to do this, however the quantity of heat delivered into your home is much greater than the quantity of electricity used to power the system.

A heat pump takes energy from outside and transfers it into heat to be circulated around a heating and hot water system. Heat energy exists to some degree at all temperatures. The hotter the temperature, the greater the heat energy available. But even if it is a cold -10°C, a heat pump can capture heat energy, increase its temperature, and move it to where we want it to go.

There are different types of heat pumps: air source, water source and ground source. In this guide we focus on air source and ground source heat pumps.

Figure 1 and 2: Air source heat pump images courtesy of EGE Energy

Air source heat pumps take warmth from the air outside (even during winter) and use it to heat your home and water. They can circulate heat through a wet central heating system, including radiators and/or underfloor heating, and produce hot water.

They can cost between £8,000 - £18,000 to install but could save you money on your energy bills.

Figure 3 and 4: Ground source heat pump underground pipe work and hot water cylinder courtesy of EGE Energy

Ground source heat pumps gather heat energy from water circulating in underground pipes, which is pumped to a heat exchanger inside the house, which extracts the heat and transfers it to your home heating system.

They can cost between £20,000 - £35,000 to install but could save you money on your energy bills.

See more on our website for more information on the different types of heat pumps available and how they work.

Read the FAQs below to answer a few common questions.

FAQs

How much do heat pumps cost?

Air source heat pumps - The Energy Saving Trust estimates typical costs are around £7,000 to £13,000.

The costs depend on the size of the heat pump you need, the size of the property, as well as whether you need to change the way you move heat around your property.

You'll also need to allow for the cost of any extra work you may need to have, such as upgrading your radiators, or installing a hot water tank. You might also need extra wall insulation to ensure the heat pump is working efficiently.

Ground source heat pumps - The Energy Saving Trust estimates typical costs are around £14,000 - £19,000.

However, the cost of installing a ground source heat pump varies depending on whether you choose trenches or a borehole, the size of the property, the model and size of the heat pump chosen, whether it's a newbuild or an existing property and whether you are making any other home improvements, such as to your radiators to improve the efficiency of a heat pump.

Heat pumps are more expensive to install, compared to boilers, as the cost also includes the whole consultation, design, installation, and commissioning processes.

You should source three quotes from installers before deciding. We have drafted a few questions you can ask installers to ensure you are not only choosing the right installer but also the right option for your home.

How much will they save me each year on my energy bills?

Heat pumps run on electricity, but it should use less electrical energy than the heat it produces. This makes them an energy-efficient way to warm your home. Exactly how much energy they use depends on;

- Size of your home
- Your electricity tariff – especially if you are moving from gas to electricity
- How well insulated your home is
- How warm you want your home to be e.g. do you have your thermostat on 18°C or 21°C
- What type of system you are replacing
- The flow temperature to your radiators. This is one of the most critical factors with an air to water heat pump. A good engineer will design a system to have the lowest flow temps possible.

Air source heat pumps - The Energy Saving Trust estimated in October 2022, that for an average sized, three-bedroom detached home, with radiator upgrades required, replacing an old (G-rated) gas boiler could save £395 annually, and a saving of £1,500 if replacing old electric storage heaters.

However, if you were to replace a newer (A-rated) gas boiler, an air-source heat pump could be more expensive for you to run and you may see an annual bill increase of £330.

Ground source heat pumps - The Energy Saving Trust estimated in October 2022, that for an average sized, well insulated four-bedroom detached home, replacing an old (G-rated) gas boiler could save £870 annually, and a saving of £2,500 if replacing old electric storage heaters.

However, if you were to replace a newer (A-rated) gas boiler, an air-source heat pump could be more expensive for you to run and you may see an annual bill increase of £205.

Will heat pumps heat my water as well as heating rooms?

Yes, most heat pumps will not only heat your rooms, but also your hot water. The heat pumps will need to store hot water for when you need it, which means you will need to have a hot water cylinder. The size of the cylinder will depend on the volume of hot water that you need, but often it can be fitted inside a cupboard measuring 80×80cm. However slimline cylinders are available for smaller spaces.

Note: air to air source heat pumps do not generate hot water, so you will need to consider an alternative, such as using an immersion heater.

Will I need to change radiators?

In an air to water heat pump system, radiators and underfloor heating are just as important as the heat pump for good performance. To ensure the heat pump is working efficiently you may need to upgrade other parts of your heating system. An installer will be able to advise if any of your radiators need updating.

Do heat pumps only work when its warm outside?

No, heat pumps work in colder temperatures as well, because a heat pump takes energy from outside and transfers it into heat to be circulated around a heating and hot water system. Heat energy exists at all temperatures. This means, even if it is a cold -10°C, a heat pump can capture heat energy, increase its temperature, and move it to where we want it to go.

Do heat pumps require more maintenance than boilers?

No, heat pumps need a similar level of maintenance as boilers. They should be serviced once a year by a professional. Heat pumps also have a longer lifespan than boilers, as they last around 20-25 years and it's unlikely you will need to redo the groundwork (for a ground source heat pump), and instead can just replace the pump.

Do I need planning permission for a heat pump?

In some cases, a domestic property such as a house, or a block of flats, do not need planning permission for installing a single heat pump, as they are usually considered permitted developments. However, before installing you should check with your planning authority if you will need a planning application as heat pumps need to be a certain distance from neighboring properties. You will also need to check if you need to apply if you live in a listed property or a conservation area.

You need to make sure that the installer of the heat pump speaks to your local authority and gets clearance for the size and type of unit being installed as not all systems may comply.

Do I need a well-insulated house to install a heat pump?

Whilst you do not need to have a well-insulated house to install a heat pump, it is recommended to ensure it remains affordable to keep your home warm. The better your insulation, the smaller the heat pump will be. It also helps to reduce the temperature of the water flowing to your radiators, meaning the heat pump does not have to work too hard, resulting in lower energy bills.

Your heat pump installer will calculate the energy required to heat your home by considering its size and the level of insulation and draught-proofing it has. Improving the insulation of your home will not only make your home more comfortable but also reduce your heating costs.

An engineer should always perform a “heat loss calculation” or a “measured heat transfer test”. Measured heat transfer tests are new to the industry and more accurate than heat loss calculations.

To apply for the Boiler Upgrade Scheme grants, you must have a valid Energy Performance Certificate (EPC). Check if you have a valid EPC or apply for a new one on the governments website.

Your EPC must not have any outstanding recommendations for cavity wall or loft insulation. If you do, you will need to insulate your home before applying for the grant.

Are heat pumps loud?

The external unit of the heat pump uses large fans to move air across the heat exchanger. Unless the heat pump is working very hard, such as in cold weather or producing high temperature water, you can expect the noise levels to be similar volume to a fridge. As it gets colder outside, the noise will increase but you should still be able to hold a conversation easily if you were stood next to it.

Do I need a big garden to install a ground source heat pump?

You don't necessarily need a large space, but you will need land near your home suitable for digging trenches or drilling boreholes.

Will I need to upgrade other parts of my heating system if I install a heat pump?

The costs of heat pumps depend on the size of the heat pump you need, the size of the property, as well as whether you need to change the way you distribute heat around your property. If your home needs to be insulated to ensure your heat pump works at its most efficient, you should do this before installing a heat pump to prevent this being oversized.

You may need to allow for the cost of any extra work you may need to have, such as upgrading your radiators, or installing a hot water tank. You might also need extra insulation to ensure the heat pump is working efficiently, such as wall and loft insulation.

What does 'design outside temperature' mean?

Design Outside Temperature (DOT) is the term given to the average coldest day. The average temperature in winter is 7°C but the average colder day is around -3°C. An engineer will design a heating system which will be able to maintain your homes internal temperature (usually around 20°C) when it is -3°C outside. Note, there are different DOT's depending what part of the country you live in.

Heat pump grants available

If you are thinking about upgrading your boiler and are looking into low carbon heating technologies, the government have opened the Boiler Upgrade Scheme to provide grants to encourage property owners to install low carbon heating systems such as heat pumps.

The scheme will be open from May 2022 to 2025 for homes in England and Wales and administered on a first come first serve basis. See more information on the governments website.

Grants available

You will be able to access grants for;

- £5,000 off the cost and installation of an air source heat pump
- £5,000 off the costs and installation of a biomass boiler
- £6,000 off the cost and installation of a ground source heat pump

The grant will only cover biomass boilers in rural locations or in properties that are not connected to the gas grid

There is no VAT to pay on all energy efficient measures until 2027. This includes heat pumps, solar panels, and insulation.

How to apply

Applications are now open with funding expected to be available until 2025.

As the funding is administered through grants to your chosen installer, the installer will apply for the grant on your behalf.

The value of the grant will be taken off the final price you pay but means that homeowners will need to pay the difference if costs exceed the grant.

You should look at gaining at least three quotes from installers before choosing the installer that is right for you. Your chosen installer will then redeem the voucher for the grant on your behalf. The installer shall confirm proof of the installation and process the paperwork.

You will need to confirm that the installer is acting on your behalf when you are contacted by Ofgem, who have been appointed by the government as regulators for the grant.

How will applying for the grant work?

1. You will need to find an MSC certified installer in your area to carry out the work. The MCS quality assurance scheme ensures that installers are qualified and the products they use meet the correct standards. You should obtain three quotes from installers to ensure you find the right installer for the work that needs completing.

2. The installer will advise you on whether your installation is eligible for a grant.

3. You will agree a quote with your installer, and this should include the grant from the Boiler Upgrade Scheme as a deduction from the total amount.

4. Your chosen installer will then apply for the grant on your behalf.

5. You will need to confirm that the installer is acting on your behalf when contacted by Ofgem.

6. Once issued, the grant voucher validity period is three months for air source heat pumps and biomass boilers, and six months for ground source heat pumps. Installation will need to take place within this time. This is to ensure the vouchers are used in a timely manner and unused vouchers can be re-issued.

Questions to ask installers when getting a quote and answers you should be looking for

It is recommended that you get at least three quotes from three different installers. Trading standards recommend householders do not sign up to contracts on the doorstep. Take time to consider the information and make an informed decision.

Here are questions you can ask installers to ensure they are legitimate companies and able to carry out the work required, as well as what answers you should be looking for.

Are you MCS certified?

The MCS is a quality assurance scheme supported by the UK Government, which certifies products and installers. To find an accredited installer in your local area, use the search function on the MCS website.

You should try to find an installer who is also listed on the Competent Persons Register(CPS). The CPS were introduced by the UK Government to allow people to self-certify that their work complies with the Building Regulations, as an alternative to submitting a building notice or using an approved inspector.

How long has the company been around for?

You should ask this question to ensure the company has experience in installing heating systems whether this has been gas boilers or heat pumps.

Will you be making sure the heat pump is weather compensated and not set at a fixed temperature?

This question is an important one. For a heat pump to perform well it will vary the flow temperature to the radiators depending on how cold it is outside. Some installation companies have been fixing the temperature which is not a good way to run a heat pump.

Could you explain how you would choose the best heat pump for my home and why?

The answer to this question should centre around;

1. **Availability** – what heat pump is recommended for your home will depend on what brands are available at that time.
2. **Size** – getting the size of a heat pump right is very important and some brands have different sizes, and this may result in why this brand is chosen.
3. **Technical back up** – some installers have good relationships with suppliers, and therefore some will choose a particular brand.

What will be the design temperature of my system?

Design Outside Temperature (DOT) are the average coldest days. They vary and can be -5°C in Scotland and -1.8°C in London with Birmingham around -3°C. An installer should design a system's flow temperature from the heat pump to be as low as possible at outside design temperature. For instance, a system which has a design temperature of 45°C flow from the heat pump when it is -3°C outside will be better than one which has a design temp of 50 or 55°C flowing from the heat pump when it is -3°C outside.

Do you offer a warranty and/or a contract for the installation?

All installers that are MCS certified should offer you a contract. It is worth asking this to ensure you are covered by any warranty and contracted for the work. In the contract you can ask for all rubbish associated with the works, to be taken away from your home and stipulate workmanship standards.

Can we use our existing hot water tank? If you do not have a hot water tank, where would the new tank be located?

A standard heat pump doesn't provide hot water on demand like a combi boiler, so you will need a way of storing hot water for when you need it. The size of hot water cylinder you need will depend on the amount of hot water your household typically uses, but the cylinder can usually be fitted inside any cupboard that measures around 80×80cm. Ask the installer where they think the cylinder will go in your home.

If you do not have space for a cylinder, there are some hybrid systems with a heat pump and boiler for hot water. It is worth asking your installer about these systems and researching them yourself.

What will the heat pump look like and where will this go?

It's important to ask this question for you to understand where the work will be taking place. You may need new pipe work, and you will need to ask if the pipes will be boxed in to prevent them from being exposed. Ask to see photos of the make and model of heat pump they are recommending and where this will be positioned outside. Ask if the installers will take away any rubbish with them to ensure that the work is tidy.

How efficient is the heat pump you are recommending?

Each make of heat pump you install has a coefficient of performance (COP) rating, which will tell you the efficiency of the system. For example, a COP of 2.5 will mean the heat pump will provide 2.5 times the heat energy, compared with the electrical energy used to power the heat pump. A COP of 3 or above would be very energy efficient.

How long will it take for you to carry out the works?

If you are wanting to use the grants available from the government, the heat pump must be installed within 3 months of the installer applying for the voucher.

Does any of my current heating system need changing to ensure the heat pumps runs at its most efficient?

It is worth asking this question to ensure that there are no hidden costs, and you understand the scale of the work you may need to have to install a heat pump, and that it will run at its most efficient to see savings in running costs.

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We hope this guide gives you all the information you need to make an informed decision about installing a heat pump. For more information these websites are useful for further research and have helped to inform this guide;

The Energy Saving Trust:

https://energysavingtrust.org.uk/advice/in-depth-guide-to-heat-pumps/

Simple Energy Advice:

https://www.simpleenergyadvice.org.uk/your-home/heating-and-hot-water

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