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| **Heat pumps** | Heat pumps |
| Heat pumps work like a fridge but in reverse. They take heat from the surrounding environment (e.g., the ground or the air) and use it to heat water which heats the radiators in your home. |
| **Level of disruption for installation:** The installation of a heat pump will vary depending on which type of heat pump you choose, whether or not you need additional insulation or whether or not you need to upgrade any radiators. If you do not require insulation, the typical installation period for an air-source heat pump is approximately 2-5 days[[1]](#footnote-1). | |
| **Installation cost:** The average cost for an air source heat pump can vary between £4,000-£8,000, depending on the pump brand and its heat output. The added installation cost could bring the total to around £5,000 and £10,000[[2]](#footnote-2). The cost will also depend on the government grants available at the time. | |
| **Running cost:** This will depend on the size of the home and the electricity prices. However as of Winter 2022, due to the rising gas prices, households with an efficient heat pump could save up to 27% on their heating bills compared to a gas boiler[[3]](#footnote-3). | |
| **How to use:** Typically, the most efficient and cost-effective way to run a heat pump is to run it constantly on a low temperature. This means you will not be switching your heating on and off as and when you need it, but rather keep the heating running. | |
| **Technological readiness:** The technology is currently commercially available. Heat pumps are already widely used in several countries. | |
| **Environmental impact:** If using renewable electricity, heat pumps produce no carbon emissions at the point of use. | |

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| **Hydrogen** | |  | |
| Hydrogen boilers work similarly to a gas boiler, except that the source of fuel is different. Instead of running on fossil gas (also known as natural gas) they run on hydrogen gas. | |
| **Level of disruption for installation:** The installation process would be similar to installing a new fossil gas boiler. However, there is the possibility that new hydrogen compatible pipes would need installing as well. Connecting or upgrading to a hydrogen network may cause some disruption on your street for several days/weeks and mean that heating and hot water would not be available in that time. | | | |
| **Installation cost:** Hydrogen boilers are not yet available to buy and install on the market, so it is unclear how much a hydrogen boiler will cost. Estimates have suggested that the cost will be similar to current gas boilers at around £2,500[[4]](#footnote-4) to buy and £1,000 to install. The cost will also depend on the government grants available at the time. | | | |
| **Running cost:** It is not yet known how much it will cost to run a hydrogen boiler for heating. It will depend on how much it will cost to produce hydrogen and which type of hydrogen is used. It is not yet clear how many hydrogen suppliers there will be and therefore how much competition there will be (potentially affecting prices on the market). | | | |
| **How to use:** Hydrogen boilers will be similar to use as current gas boilers. You will have control over the temperature in your home and which rooms to heat by adjusting the setting on your radiators. | | | |
| **Technological readiness:** Hydrogen boilers are not available to buy or install. However, manufacturers have developed working prototypes[[5]](#footnote-5). The current gas network will need to be fully converted to be ready for 100% hydrogen gas. Part of the network has already been converted. | | | |
| **Environmental impact:** Hydrogen’s environmental impact will depend on which kind of hydrogen is produced. Hydrogen gas can be produced either from water using renewable electricity (e.g., wind farms) or from fossil gas (the gas we currently use for heating). If fossil gas is used it will have to be combined with carbon capture and storage. This technology captures carbon emissions and stores them under ground when producing the hydrogen. | | | |
| **District heating** |  | |
| District heating, also known as heat networks, takes heat from a central source and uses it to provide heating and hot water to multiple homes through a shared system of insulated pipes. |
| **Level of disruption for installation:** District heating will need to be installed in your neighbourhood and your home will need to be connected to the network. It is unclear how long this will take because it depends on the exact circumstances of your area and home. | | |
| **Installation cost:** It is unclear how much it will cost to connect to district heating. Building district heating in your area will typically be paid for by the district heating provider. One cost example is that there will be an annual connection fee for residents (except for social housing tenants as this cost is to be picked up by the landlord). For private households, this connection fee will be £350 per year over the course of 20 years[[6]](#footnote-6). | | |
| **Running cost:** The running cost of district heating varies because it depends on the supply used. Prices will be set by the district heating operator. You will have to sign a contract with the operator and will not have the choice of different providers. | | |
| **How to use:** Once you are connected to district heating, your heating will be similar to heating with a gas boiler. You will have control over the temperature in your home and which rooms to heat by adjusting the setting on your radiators. | | |
| **Technological readiness:** The technology is highly developed and has been commercially available for decades. District heating is widely used in several countries. In the UK there are already over 14,000 heat networks in place. They are particularly effective in dense urban areas[[7]](#footnote-7). | | |
| **Environmental impact:** The environmental impact of distract heating depends on the source of heating. They can provide heat produced as a by-product of industrial processes (waste heat) or from a central heat source. If this heat source is run using renewable electricity, then the district heating would be low carbon. | | |

1. https://www.greenmatch.co.uk/blog/air-source-heat-pump-installation [↑](#footnote-ref-1)
2. https://www.edfenergy.com/heating/advice/air-source-heat-pump-guide [↑](#footnote-ref-2)
3. https://www.raponline.org/knowledge-center/analysis-running-costs-of-heat-pumps-versus-gas-boilers/ [↑](#footnote-ref-3)
4. https://www.checkatrade.com/blog/cost-guides/hydrogen-boiler-cost/ [↑](#footnote-ref-4)
5. https://www.checkatrade.com/blog/cost-guides/hydrogen-boiler-cost/ [↑](#footnote-ref-5)
6. https://heatthestreets.co.uk/costs-and-heat-network-connection-charge-explained/ [↑](#footnote-ref-6)
7. https://energysavingtrust.org.uk/what-district-heating/ [↑](#footnote-ref-7)