

Best renewable heating system

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We take a closer look at three renewable technologies - heat pumps, solar water heating and biomass - to help you decide... [Blog](#) Could solar water heating work for you? Find out whether solar water heating (a sustainable alternative to heating systems that rely on fossil fuels) could suit your household needs. [Blog](#)

Between them, water and space heating account for almost 80% of the energy used in our homes. So if you're designing or refitting a home to be as green as possible, adding a renewable heating system is essential. Coupled with insulation and energy-saving measures, such as triple glazing, renewable heating from biomass or a heat pump could slash emissions - it's likely to lower your running costs, too.

But low-carbon heating is often more expensive to install than simple electric or gas-fired alternatives, and the financial support available is patchy. If you're going to invest your own money in going carbon-neutral, you'll want to choose the best technology for your project. Here we look at the major alternatives, compare the support that's available, and discuss how they might perform.

There's plenty of innovation in space and water heating, but to be considered renewable, heating products must not burn fossil fuels. Typically that means either running on electricity or burning biomass - non-fossil fuels that absorb carbon dioxide from the atmosphere and which can quickly be re-grown.

There's active debate about whether the latter is truly better for the environment - or even renewable - but let's not get bogged down in the details. What's certainly true is that nobody considers biomass a renewable fuel unless it's grown sustainably, usually meaning that it's sourced from existing plant or animal waste. Similarly, electric heating is only as low-carbon as the electricity used to power it.

With these caveats in mind, the major renewable heating technologies are biomass boilers and burners, heat pumps, solar water heating, and electric heating. This last category includes direct panel and water heaters, storage heaters, and infrared panels.

It's also important to consider microgeneration, such as solar PV or wind. Although these aren't heating technologies, they can be an important way to provide renewable energy to electrical heating systems.

It might be surprising to learn that all forms of electric heating can be renewable. Even bar fires and panel heaters are carbon-neutral if they're using electricity from your own solar panels, or if you're on a 100% renewable tariff. Basic electric space and immersion heaters are essentially 100% efficient, converting every kilowatt hour (kWh) of electricity they use into one kWh of heat. They're cheap to buy, too.

Electricity is expensive, however, and heating a property and its water uses a huge amount of it. The average four-bedroom home uses around 17,000kWh of energy for heating each year - at the October 2023 price cap of

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27p per kWh, that would be an incredible £4,600! In practice, off-peak tariffs bring that price down, but even using off-peak electricity only you could still pay £2,780.

Infrared panel heating provides one alternative. Instead of heating the space, it heats the objects and people within it, a bit like when sunlight keeps you warm on a cold spring day. This typically uses much less power when on, and panels can be switched on and off dynamically as people enter and leave a room, but it's still a niche choice as a primary heating method.

When it comes to efficiency, nothing beats a heat pump. These are a lot like a fridge that works in reverse, taking heat from the air or ground and "pumping" it into your home. Because they're largely moving heat rather than generating it, they typically output around 3.5kWh of heat for every 1kWh of electricity they use; specified as a coefficient of performance (CoP) of 3.5. In the example above, that would slash the annual bill to a far more manageable £1,310, and a heat pump can be cheaper than a gas boiler.

Heat pumps are at their most efficient when heating water to lower temperatures than a conventional boiler - around 40-50°C rather than 55-70°C. For this reason they're best used with wet underfloor heating, and they may need larger radiators to be effective in other rooms. And because their hot water is less hot, they're usually partnered with a larger water cylinder that stores more of it.

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