

FAQ: Heat pump hot water systems

Metro Community Power Hub

What is a heat pump hot water system?

A heat pump hot water system provides an energy efficient alternative to traditional gas boiler, gas instantaneous, or electric hot water systems. They work a bit like a refrigerator, which extracts heat from inside the appliance and transfers it into the air in the room – only in reverse. The heat pump draws heat energy from an external source (usually outside air, but occasionally water or the ground) and transfers the heat to the water in the storage tank.

Heat pumps are powered by electricity, but use far less energy than other systems (for example, up to 80% less electricity than a traditional electric hot water system). This is because the heat energy is provided by using relative differences in temperature between the external source, a refrigerant (often CO₂), and the water, rather than using the electricity to heat the water directly.

How does a heat pump work?

A heat pump uses a refrigerant with a very low boiling point to transfer heat energy from an external medium (such as the air outside your house) into your hot water storage unit.



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As the refrigerant is pumped through pipes in an external medium, it absorbs heat and converts into a gas. When the gas is compressed, its temperature increases further. It then transfers the heat energy stored in the gas to the water in the storage unit via a heat exchanger, condensing into a liquid, before the cycle repeats. This technology remains effective even at low outside air source temperatures, although this depends on the specific system and refrigerant used.

Because the only energy used is in driving the pump itself, rather than heating the water directly, the heating system is incredibly efficient. generating roughly three to five times the amount of heat for the same amount of energy used by traditional boiler systems. This is called the 'coefficient of performance' or the 'energy efficiency ratio'. A more detailed explanation of how heat pumps work so efficiently can be found [here](#).

What benefits does a heat pump provide?

As heat pumps uses far less energy than any common hot water system alternative, it also has [far lower running costs](#) and associated greenhouse gas emissions. While the upfront costs are typically greater than traditional water heaters, households will make this money back in time through substantial savings on running costs – compare the running costs and emissions across a range of hot water systems [here](#). For those looking to find ways to reduce the carbon footprint of their household – especially by [creating an all-electric home](#) – the heat pump hot water system is one of the best choices you can make.

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What are the downsides?

There are some downsides to heat pump hot water systems, although some of these are context-dependent, rather than built-in to the system itself.

For instance, heat pumps take longer to heat water than traditional systems. This is especially the case if you live in a cold climate, and it can be a problem if you use a lot of hot water. The solution might be to ensure you have a large capacity tank, or to select a system that incorporates an electric booster to directly heat the water when necessary.

Another concern is that the pump itself can be noisy to run, similar to an air conditioner. Be mindful of where you choose to install it in relation to both your house and your neighbours', and this issue can be easily resolved.

Because they are less common than other hot water systems, heat pump systems require an installer with the appropriate skills and experience. This is unlikely to be an issue, since a reputable provider will have this expertise, but it is worth mentioning. This is where the Metro Community Power Hub can help! You can ensure your installer has the necessary skills by purchasing your heat pump hot water system through the [MCPH All-Electric Home program](#).

The most obvious downside, however, is the high upfront cost. While this is offset by the savings you will make through reduced running costs, it can nonetheless be prohibitive. This also means it is prudent to prepare for the day when your current hot water system fails, so that you are ready to take the heat pump dive when the opportunity presents. This may be a more achievable option than replacing a working gas or electric hot water system.



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Is it effective, and will it suit my property?

Generally, a heat pump hot water system is as effective as any available alternative, and more efficient. While they are more effective in warmer climates, those residing in cooler climates need not worry. Depending on the refrigerant used and the design, certain heat pumps can even be effective in sub-zero temperatures! It is always important to understand the suitability of a particular heat pump to your specific climate before purchasing and installing. Contact the manufacturer or supplier when in doubt, or [speak to the experts at Renew for specific, tailored advice.](#)

Like other hot water systems, heat pumps require space – generally a well-ventilated outdoor space – for installation, storage and operation. They also require power source and vary in size according to capacity. While they tend to be slightly bigger than an equivalent capacity gas or electric hot water system, there are also split-system heat pump hot water systems which separate the heat pump itself from the water storage tank. In some circumstances, this modular system might be more manageable at the cost of some aesthetic appeal. The pictures below compare a split-system (top) with an integrated system (bottom) – note, the pictures are not to scale and provide no indication of relative size.



A split Sanden heat pump hot water system.

Source: renew.org.au



An integrated Stiebel-Eltron heat pump hot water system.

Source: Stiebel-Eltron.com.au



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What about solar thermal hot water systems?

While solar water heaters can also provide cheap, low-carbon hot water, their effectiveness is dependent on the local climate and the amount of solar radiation they are exposed to across different seasons. In most cases, these systems must be supplemented by another heat source such as an electric or gas booster to ensure consistency, which is likely to generate emissions and costs. Solar water heaters also consume rooftop real estate which could equally be dedicated to solar panels.

In most places, a heat pump powered primarily by rooftop solar PV is likely to be a more effective solution with lower overall running costs.

Can I use a heat pump for hydronic heating?

Yes! There are heat pumps specifically designed for hydronic heating systems, which are an excellent choice to efficiently and sustainably heat your home. Just know that in some cases, it can be complicated and expensive.

An average domestic heat pump hot water system might draw about 1kW of power and can heat water to about 50-60°C. Hydronic heating systems, however, have energy requirements many times that, depending on the size of the home and/or the number of radiator panels. This makes them more affordable for households who produce their own electricity with rooftop solar, which can power the heat pumps. Heat pumps rated above 12kW may also require three-phase power rather than the standard domestic power supply.

They also normally require water to be heated to higher temperatures – 80°C in the case of hydronic panel systems – which heat pumps struggle to achieve,

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especially in lower temperatures. However, heat pumps specifically designed for hydronic heating aim to overcome these issues, and can operate in sub-zero temperatures. This can also be resolved in practise by turning the hydronic heating system on earlier, giving it more time to warm the room with temperature at a lower temperature.

Whether heat pumps are an appropriate or economical option for your hydronic heating system is therefore dependent on a number of factors:

- the size of your house
- the number of radiator panels installed
- whether you produce your own electricity
- how hot the water needs to be
- your climate
- and the availability and cost of the appropriate products

If you would like to discuss your options with experts in the field, we can connect you with the experts at Renew for [a free, 30-minute consultation](#).

You can also read about how one Melbourne couple made the switch from gas-powered hydronic heating to heat pump hydronic heating – including their innovative solutions to the challenges above – [here](#) and [here](#).

Can I set my heat pump on a timer?

A high-quality heat pump hot water system will have an in-built block out timer or modes that allow you to run the heat pump at specific times. This is useful to ensure the heat pump operates during off peak tariffs, or if you are powering it through rooftop solar, during daylight hours. Using a regular powerpoint timer external to the system may risk damaging the system and voiding the warranty.



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High quality heat pump systems are also very thermally efficient, so may not need to be heated more than once a day depending on water consumption. Rather than exporting 2kWh of solar power for 12 cents, send it into your heat pump during the day for essentially free hot water!

How much do they cost?

Depending on your needs, supplier, model, and eligibility for government rebates, heat pumps cost in the realm of \$2500 to \$6000. Given the wide range of prices, it is advisable to base your decision on a tailored quote. Once again, we can help! Request a quote for installing a hot water heat pump at your property through the MCPH by [contacting us](#).

It is worthwhile factoring running costs into any consideration of the expense involved in replacing a hot water system. The upfront cost might soon be covered by the [cheaper running costs of a heat pump hot water system](#).

How long will a heat pump hot water system last?

This depends on the quality of the product, the system design, and whether it is well-maintained. The average heat pump lifespan is currently around 15 years, but with proper care and maintenance, some could last 25 years and even far longer.

What rebates are available?

Since heat pumps are considered a renewable energy technology, upon installation owners receive small-scale technology certificates (STCs) proportionate to the renewable energy provided. According to the [Australian](#)

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[Government](#), “an STC is a measure of renewable energy which can be traded for cash or a discount on the purchase price of the system.”

In Victoria, owner-occupiers may be eligible for a [50% rebate of up to \\$1000 from Solar Victoria](#) if they meet the eligibility criteria. Note that those who have already received a rebate for solar panels or a battery through the Solar Homes Program are not eligible for a rebate on a heat pump hot water system.

Is it complicated to install?

Installing a hot water heat pump is generally no more complicated than installing any other hot water system, provided the installer has the necessary skills and experience. However, it is important to consider the suitability of the proposed location for the system, ensuring there is an electricity source and a suitable air source. These factors depend partly on your property and the model you select. Ensuring you choose a trusted supplier is also key to a simple, stress-free installation.

Where can I find more information?

The experts at [Renew](#) have published an [FAQ](#) on heat pump hot water systems, as well as a more detailed [buyers guide to efficient hot water](#). There is also valuable information provided by [Sustainability Victoria](#), [Energy Rating](#), [Australian Energy Foundation](#), and certain commercial suppliers.

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