

How to choose a heat pump and use it wisely



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Heat pumps are one of many heating options, and they can be an energy efficient and convenient way to heat your home. They can also be used for cooling.

Compared to electric heaters, they produce about two-and-a-half to five times as much heat for each unit of electricity, making it easier, cheaper and more environmentally friendly to heat your home properly.

But not all heat pumps are created equal – some are a lot more efficient than others. The right sized model for the job and a good installer are also critical for good performance.

This guide will help you choose the right heat pump for your home and get the best performance from it.

The keys to a good heat pump:

- Get your insulation sorted first – you'll be able to use a smaller heat pump and your home will be easier and cheaper to heat.
- Choose a highly efficient model by looking for the ENERGY STAR mark.
- Opt for a quality brand from a reputable supplier that offers at least a five-year warranty on parts and labour.
- Get the right size and type of system for your home.
- Have it installed by a suitably trained and experienced installer.
- Learn to use your heat pump and remote properly – ask your installer for a lesson.
- Use your heat pump wisely.

Insulate first

Before looking at your heating, it's really worth making sure you have good ceiling and underfloor insulation.

The state of your insulation will make a big difference to how hard your heat pump has to work to keep your home warm. Good insulation and draught-stopping will make it cheaper and easier to heat your home properly. It also means you can use a smaller heat pump to do the job, which costs you less to buy and run.

Insulation keeps in the heat

Good insulation significantly reduces the rate of heat loss in a house. It makes a home easier and cheaper to heat properly, and healthier and more comfortable to live in.

Unfortunately, nearly 60% of New Zealand's homes don't have enough ceiling and underfloor insulation, and even more have little or no wall insulation. There is a good chance your home could benefit from more insulation.

Plugging up the draughts

Even well-insulated houses can be hard to heat if draughts constantly replace hot air with cold air, so draught-stopping is also very important.

Good building airtightness, and controllable ventilation provisions (like openable windows, vents or mechanical ventilation systems), let you manage air replacement and avoid unnecessary heat loss.

Funding available

If your home was built before 2000, there is ENERGYWISE™ funding available to help insulate your house, and install clean and efficient heating, including ENERGY STAR qualified heat pumps. The funding level varies according to your circumstances.

To find out more about ENERGYWISE™ funding, go to www.energywise.govt.nz

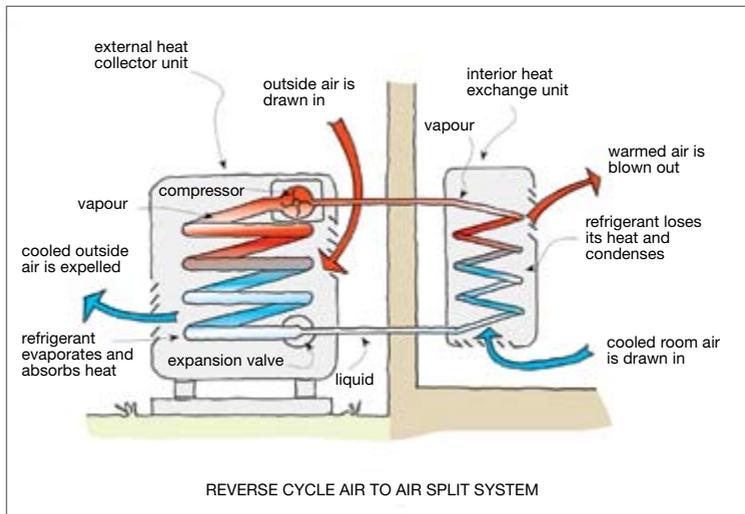
How does a heat pump work?

A heat pump works by the same principle as a refrigerator, only in reverse.

To keep food cold, a refrigerator moves heat from inside the fridge to the outside. Heat pumps extract heat from the outside air, which is warmed by the sun's energy every day of the year, and transfer it into the house. In cooling mode, heat pumps transfer heat from inside to the outside – just as a fridge does.

Unlike normal electric heaters, which simply turn electricity into heat, heat pumps use electricity to move heat. That makes them the most efficient way of using electricity for heating.

There are other heat pumps that work on the same principle but, instead of extracting heat from the air, they extract heat from the ground or from water. However, they are not common in New Zealand so they are not covered in this guide.



© BRANZ 2008 Heat Pump – Schematic diagram of how a heat pump operates in heating mode.

Not all heat pumps are equally efficient

While heat pumps are the most efficient way of using electricity to heat your home, some are much more efficient than others.

The most efficient heat pumps on the market will produce about twice as much heat as the least efficient models, using the same amount of electricity.

Choosing a highly energy efficient heat pump, instead of a lower efficiency model, can make a big difference to your power bill – the simplest way to do it is to look for the ENERGY STAR mark.

Choose an ENERGY STAR qualified heat pump

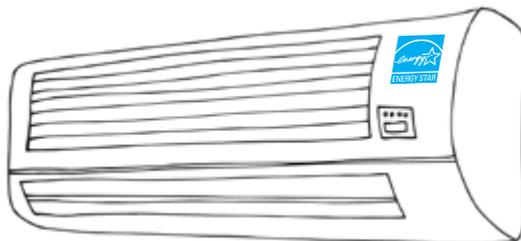


The ENERGY STAR mark is only awarded to the most efficient heat pumps on the market (for both heating and cooling modes), and you'll find the blue label on qualified products.

While some heat pumps struggle to keep up between 0-5°C, when the outside units are prone to icing up, ENERGY STAR models are also required to perform efficiently in this lower temperature range.

A heat pump must be ENERGY STAR qualified to be eligible for ENERGYWISE™ funding assistance (see the funding available section on page 2 for more information).

To see a full list of ENERGY STAR qualified heat pumps, visit www.energywise.govt.nz/heat-pumps

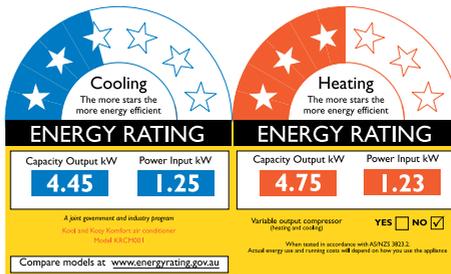


Compare efficiency with the energy rating label

Energy rating labels can help you compare energy efficiency between different heat pump models – the more stars, the more energy efficient a heat pump is.

The labels are compulsory on the most common type of household heat pump. You can also compare different models online at www.energyrating.gov.au

This side-by-side label is being transitioned in to replace an older version, so you may see two types of label in shops for a while. Take care when comparing them, as the star ratings are dialled back by about two stars on the newer side-by-side label – so a two-star model on this label is equivalent to about a four-star model on the other label.



Understanding the numbers on the energy rating label

Along with stars, energy rating labels also have two numbers that can tell you more about the heat pump's performance.

Capacity output The amount of heating or cooling (kWh) you will get out of the heat pump (at its rated capacity, at 7 °C for heating).

Power input The amount of electricity the product uses (kWh) to produce the cool or hot air.

Choose the right size and type of heat pump

Which part of your home do you want to heat?

There are different types of heat pump systems. It's important to know what you want from your heat pump so you get the right type of system for the job.

Heating for one area of your home

Single-split systems are the most commonly installed heat pump in New Zealand homes, and they are designed to heat just the room or space it is sized for and installed into; for example, your living area. They generally won't provide effective whole-of-house heating, so if that's what you're after, consider another type of system.

Single-split systems consist of one outdoor unit and one indoor unit, connected by pipework.



Heating for your whole home

For whole-of-house heating, a multi-split or ducted system may be appropriate, and it could work out cheaper than installing several single-split systems around the house.

Multi-split systems have one outdoor unit which supplies heat to several indoor units located in different parts of a house.

Ducted systems consist of an outdoor compressor unit connected to a number of air supply outlets, which supply heated air to different parts of a house.

An experienced installer can advise you on the right type of system for your home.

Size and climate matter

Getting the right sized heat pump for the job is extremely important. One that's too small or too large will use more energy, may not perform properly and may have a shorter life.

An experienced installer will calculate the right size heat pump for your home and climate, but here are the things they will consider.

The climate where you live

The climate where you live has a big impact on what size and type of heat pump is appropriate for your home. As the temperature drops, so does the performance of heat pumps – but some heat pumps can cope with the cold better than others.

If you live in a cooler climate, it is important to choose a model that is designed for low temperatures. Some good quality units, when sized and installed correctly, perform effectively down to as low as even minus 15°C.

Also, make sure your installer sizes your unit using the manufacturer's information on how much heat it can deliver at a typical cold winter night in your area.

Check the manufacturer guarantees the unit performance down to this temperature.

Ask your supplier about ENERGY STAR-qualified heat pumps, which are required to perform efficiently at lower temperature ranges – find out more on page 4.

Your home's heating needs

Your home's heating needs depend on a number of things, including the size of the area you want to heat, how well insulated your home is, how big your windows are and, of course, your climate.

To get an idea of the right size of heat pump for your needs, use the calculator at www.energywise.govt.nz/choosing-a-heater

Use an experienced installer

Good design and installation are fundamental to a heat pump's effectiveness and efficiency, so it is worth looking for an experienced installer.

It is not recommended to purchase a heat pump and install it yourself. In fact, you may even void the manufacturer's warranty.

What to look for in an installer

It is important to have your heat pump installed by a professional installer who has the expertise and knowledge to:

- size the unit correctly
- advise environmental considerations for your heat pump (e.g. seaspray, sulphur from geothermal activity)
- advise on the best locations for the indoor and outdoor units to be installed
- install and commission the heat pump in compliance with relevant regulations and standards
- advise on service requirements and provide you with a service checklist and contact names and numbers in case of problems
- provide a warranty for the heat pump and its installation.

When looking for an installer, ask them about their qualifications and experience, and whether they follow EECA's *Good practice guide to heat pump installation* publication (which can be downloaded from www.energywise.govt.nz/heat-pumps).

Your installer should hold the appropriate license to carry out the required electrical work, and issue an electrical Certificate Of Compliance if required. Ideally they should also hold a 'no-loss certification' for the handling of refrigerants.

Get a lesson on using your heat pump

Getting the best out of your heat pump involves knowing how to use it properly. It's worth reading your operating manual, but also ask your installer to give you a lesson, including:

- basic heat pump operation
- how to use the remote
- how to use thermostat and timers
- what the different operating modes are and how to set them
- how to remove and clean air filters
- what other service and maintenance requirements there are.



Use your heat pump wisely

Once you've chosen your heat pump, you can maximise its comfort and energy efficiency benefits by using it wisely.

If your system is left running all day and night, or set to unnecessarily high heating (or low cooling temperatures), you could see your electricity bill increase significantly.

By following the tips below you can keep your home comfortable in the most efficient way.

Tips for winter heating

- **Only heat the areas you're using**, and only while you're using them.
- **Keep the heat in** by shutting doors and curtains.
- **Set the thermostat for healthy indoor temperatures.** World Health Organisation guidelines recommend at least 18°C in any rooms you're using (or at least 20°C if you have vulnerable people in the home, like children, the elderly or the ill), and at least 16°C in bedrooms overnight.
- **Don't set the thermostat higher than you need it.** Setting the thermostat to the maximum won't heat up your room any quicker, but it can make your heat pump run less efficiently.
- **Use the timer.** It should only take 15 to 30 minutes to heat up your home, so leaving your heat pump running when you're not at home is just a waste of energy. Set the timer so it comes on half an hour or so before you need it. It is also possible to get a seven day timer which allows you to program on/off times for each day of the week.
- **Avoid using the 'Auto' mode.** In this mode the heat pump tries to maintain the set temperature by constantly changing between heating and cooling modes as the room temperature fluctuates. This can waste a lot of energy.
- **Service and maintain your heat pump** as per the manufacturer's instructions. This includes cleaning the filter (inside and outside) regularly.

Tips for summer cooling

Reduce energy use for summer cooling by only using your heat pump/air conditioner when you really need it.

- **Keep the sun's heat out** by drawing blinds or curtains.
- **Open doors and windows** to create cross-draughts on opposite sides of the house.
- **Use the 'fan only' mode** on your heat pump to provide air movement if opening doors and windows is not enough. This mode uses much less electricity than the active cooling mode. Keep your windows open while in 'fan only' mode.
- **Use the 'dehumidifying mode'** if the air is too humid. It will dry the air while using less energy than the active cooling mode. Keep windows and doors shut while in dehumidifying mode.
- **Only use 'cooling' mode on really hot days** when the other methods aren't enough. Shut doors and windows. It's best to just cool one room as this is what most heat pumps/air conditioners are sized for. Set the thermostat to around 22°C. The room won't cool down any quicker if you set it lower, but you are likely to use more electricity by overcooling.
- **When building or renovating**, install external shading for glazed areas which is much more effective than internal shading. Well-designed external shading keeps the summer sun out while letting the lower winter sun in.

The importance of maintaining your heat pump

To keep up your heat pump's performance, efficiency and longevity, it is extremely important to keep it serviced and maintained according to the manufacturer's instructions.

While you can do some things yourself (like cleaning the filter regularly, inside and outside), other things need to be done by heat pump installers – check your operations manual or talk to your installer for more information.

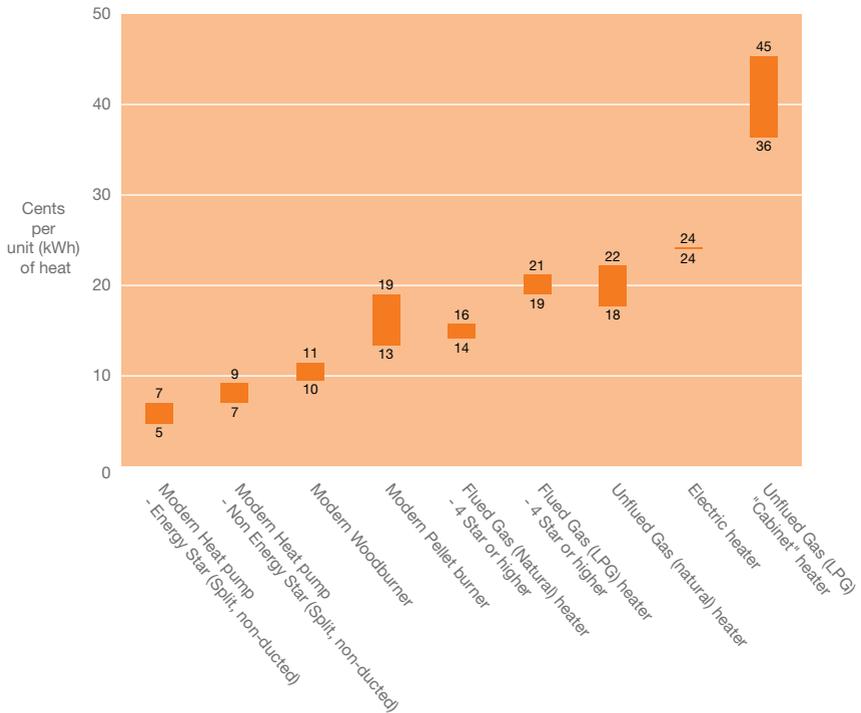
How heat pumps compare to other heating options

Along with high-efficiency heat pumps, there are a number of efficient heating options available, including modern wood burners and wood pellet burners, and flued gas heaters with high star-ratings.

The diagram below shows the cost per unit of heat when running different options of heating.

For more detailed information about all the options, visit www.energywise.govt.nz or talk to your heating supplier about your needs.

Indicative running costs of home heating options



Based on typical highest and lowest heater efficiencies. Does not include purchase/installation and maintenance costs. Fuel cost assumptions: Electricity 24 c/kWh; Wood pellets \$0.62/kg; Firewood \$75/m³; Natural gas 12.4c/kWh; LPG (45kg bottle) \$2.30/kg plus \$120 annual rental charge (18.5c/kWh including bottle rental assuming a total annual gas consumption of 7000 kWh); LPG (9kg bottle) \$3.50/kg. For unflued gas heaters 30% of the heat produced is assumed to be lost due to the requirement to leave a window open. Note that fuel costs can vary greatly depending on location, retailer and plan. *Natural gas price includes a portion of fixed charges assuming a total annual gas consumption of 7000 kWh. Actual cost depends on your tariff and actual total gas consumption.



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MAY 2010