

# How to choose a heat pump and use it wisely



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**Heating and cooling accounts for almost 35% of the energy a typical New Zealand home uses. There are many heating and cooling options to choose from, and some are more energy efficient than others.**

An energy efficient heating system uses less energy, saves you money and helps our environment by reducing greenhouse gas emissions. This means more than just having a good heater – it's about having a well insulated house and choosing to use your heating wisely.

Heat pumps are the most efficient way of using electricity to heat your home. By using a heat pump instead of an equivalent electric heater, you can save around \$500<sup>1</sup> a year. Choosing the most energy efficient heat pump and looking for an ENERGY STAR® qualified model will save you even more.

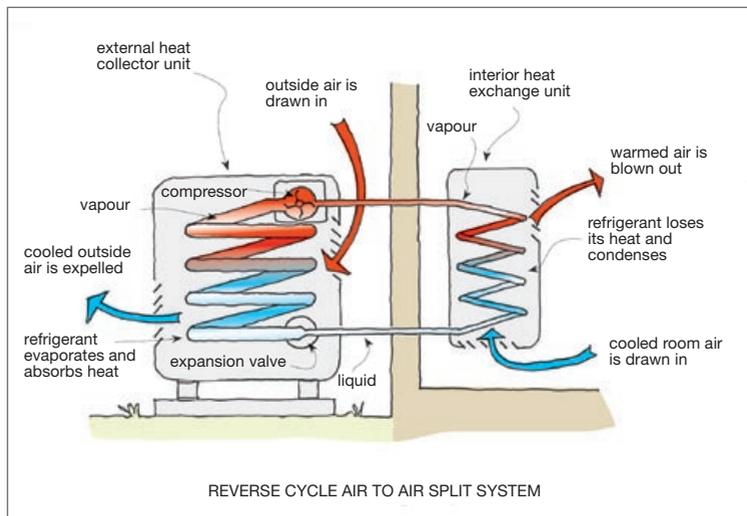
<sup>1</sup> This figure assumes 8 hours of use a day for 6 months of the year.

## How does a heat pump work?

To keep food cold – a refrigerator moves heat from inside the fridge to the outside. A heat pump heater uses the same principle in reverse. It transfers heat from outside the house to the inside.

The outside air gets heated up by energy from the sun every day of the year. So even when the sun is not shining brightly, or it is the middle of winter, there is still a lot of solar heat energy available.

Because heat pump systems only use electricity to ‘move’ heat they are very efficient. They don’t actually ‘make’ heat themselves like normal heaters do.



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

## **Insulating your home**

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 means a significant reduction in the rate of heat loss in your house via ceilings, walls, floors, windows and doors. This reduced rate of heat loss makes the house easier and cheaper to heat properly. It also means your house will be healthier and more comfortable to live in.

### **Heat loss in the home**

If your house is draughty, any insulation you install won't be able to do its job properly. It's important to minimise the amount of air leakage from your house at the same time as you improve the insulation.

Heat always finds the easiest path out of a house. If you insulate one part of your house, the ceiling for example, you reduce the rate at which heat is lost through the ceiling. But the rate at which it escapes through other parts of the house increases. To get best results you need to increase the insulation for all of the outside building elements of your house where possible.

The better your home is insulated, the more effectively a heat pump will meet your expectations.

There is ENERGYWISE™ funding available for insulation and heat pumps, go to [www.energywise.govt.nz](http://www.energywise.govt.nz) for more information.

## Not all heat pumps are created equal

Many people think all heat pumps are very energy efficient. But the differences in running costs and performance can vary greatly. On average an ENERGY STAR qualified heat pump costs about \$150<sup>1</sup> less per year to run than other models.

The lowest efficiency heat pumps that are available in New Zealand are 250% efficient (this means they give \$2.50 worth of heat for every \$1 of electricity used). The most efficient models on the market are just over 500% efficient and this is constantly improving as new technologies come on to the market.

Choosing an energy efficient model over lower efficiency models can make a big difference on your power bill. Over 10 years for a medium sized unit the difference can add up to around \$1500<sup>1</sup>.

## Choosing a heat pump

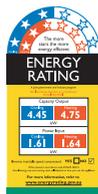
Compared to other heating options, a new heat pump can be a fairly large up-front cost. However the investment is worthwhile because when sized correctly and used wisely, a good quality heat pump can keep you warmer and can save you significant amounts on your power bill.

### Choose a quality brand from a reputable supplier

A quality brand from a reputable supplier should offer at least a five-year warranty on parts and labour.

### Choosing by labels

The energy rating label will help you compare between models of heat pumps, the more stars the better the energy efficiency. Go to [www.energyrating.gov.au](http://www.energyrating.gov.au) to compare products online. While only the most energy efficient products can carry the blue ENERGY STAR mark.



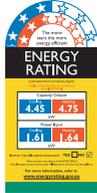
Energy rating label



ENERGY STAR mark

## Understanding the numbers

Compare the heating “Capacity output” (which tells you how many kW of heat you will get at the unit’s most efficient point) to the “Power Input” (which tells you how many kW of electricity it uses). The number of stars also shows how efficient it is compared to other models of a similar output. The more stars, the more energy efficient.



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**Capacity output** The amount of cooling or heating energy created (kWh).

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

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You can use the power input amounts to calculate the Energy Efficiency Ratio (EER) and the Coefficient of Performance (COP).

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 <p>Heating <b>4.75</b></p>	<b>Coefficient of Performance (COP)</b>	The ratio between the <b>heating</b> input and output. For example, 4.75 divided by 1.64 = 2.90
 <p>Heating <b>1.64</b></p>		
 <p>Cooling <b>4.45</b></p>	<b>Energy Efficiency Ratio (EER)</b>	The ratio between the <b>cooling</b> input and output. For example, 4.45 divided by 1.61 = 2.76
 <p>Cooling <b>1.61</b></p>		

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The higher the ratio, the more energy efficient the heat pump is.

**NOTE\*** Most manufacturers display COP and EER in their product brochures.



The blue **ENERGY STAR** mark makes it easy to choose the most energy efficient appliances. It tells you at a glance which models are the very best. ENERGY STAR qualified heat pumps are on average 15% more efficient than non-qualified models. ENERGY STAR criteria covers cooling as well as heating performance. That’s important if you use your heat pump for cooling in summer as well.

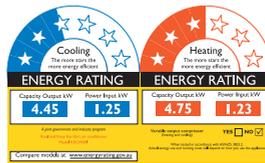
## New energy rating labels in October 2009

From October 2009 a new Energy Rating label for heat pump/air conditioners will appear on all **new** models. There are three major changes designed to make it easier to compare the heating and cooling performance between models.

**Design change** – The label will change from combined heating and cooling label to a new side by side label.



Current energy rating label for heat pump/air conditioners.

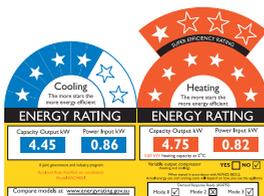


New energy rating label from October 2009 for heat pump/air conditioners.

**New star rating index** – From October 2009 all new labels for heat pumps/air conditioners will be dialed back by about 2 stars. So a 6 star model on the current label will become a 4 star model on the new label. When you see 2 labels you will see 2 less stars.

**NOTE\*** until all models have the new energy rating label, new models will look worse than older models. The new label becomes compulsory for all new models from April 2010.

**New 'Crown' for super efficient models** – Heat pump technology is improving every year. In 2010 you may see this label on super energy efficient models in the market. Models that exceed the 6 star energy rating can show an additional 7 to 10 stars.



'Crown' in the market from October 2009.

## Correct sizing

Heat pumps range in size so it's important to choose one that meets the size of the space you want to heat. If the heat pump is too small or too large, it will use more energy, cost more to meet your heating requirements and may not perform to the level required.

A heat pump's efficiency is gauged by its "Co-efficient of performance" or "COP". Depending on its size, a good heat pump has a COP of around 3.5, which means it produces 3.5 kW (or units) of heat for every 1 kW of electricity it uses.

The energy rating label displays the heating capacity of a model, and suppliers and installers should size a unit using this information.

### **Do you live in a cooler climate?**

As an industry standard, all heat pumps sold in New Zealand have their heating capacity and COP measured at an outdoor temperature of 7°C. So if you live in a place that regularly drops below 7°C in winter, make sure your supplier sizes your heat pump using the heating output at 2°C. Also check the manufacturer guarantees the unit performance down to 2°C.

If a unit is under sized, it will have to work too hard to keep the room temperature up to where you want it on cold winter days. It is also likely to spend more time in defrost mode than in heating mode.

To get an idea of the size of heat pump you will need, visit the Consumer website and use their heat pump calculator – [www.consumer.org.nz](http://www.consumer.org.nz)

An experienced installer will measure the correct sized unit to suit your heating requirements, taking into account the climate in your area.

## Heat pump installation

An experienced installer will be able to advise you on the best place to locate the heat pump in your home to ensure it performs well. They will take into account the placement of walls, windows, doors and furniture, and how the room is used.

It is important that a heat pump is installed by a qualified installer who has the expertise and knowledge to:

- Size the unit correctly
- Advise on the right locations – inside and outside – for the unit to be installed
- Provide a warranty for the unit.

It is not possible to purchase a heat pump and install it yourself.

A single unit heat pump is designed to heat the room it is sized for and installed into. It is unlikely to effectively heat other spaces in the house but depending on the design of the house and the location of the heat pump, the heat from a single unit may flow through to other areas. If you want to heat other areas of the house you may be better to consider a multi-split or ducted system, where the outside unit connects to more than one inside unit.

An experienced installer can advise you on this.

The heat pump's outdoor unit should be located away from garages, under decks or in places where normal air flow is restricted. Both inside and outside units require space around them to allow for proper air circulation.

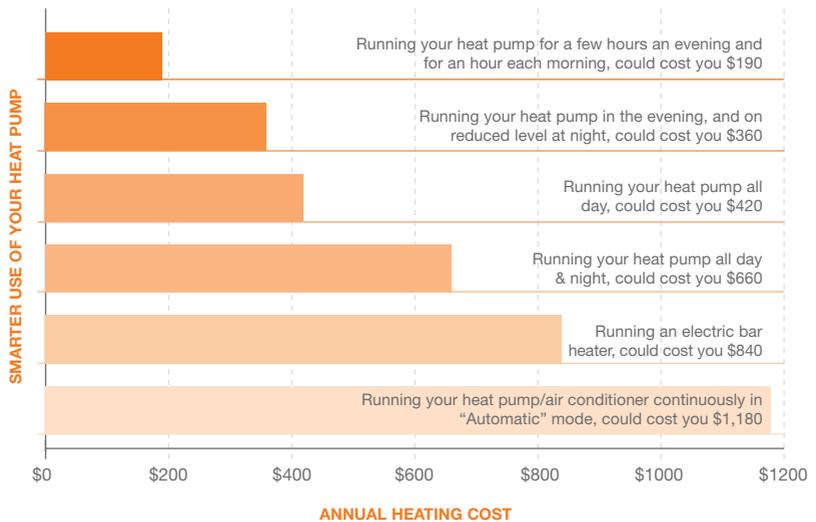
If the inside and outside units are installed back to back, there should be at least 2.5 metres of piping between them to ensure optimum performance, and quiet operation.

## Heat pump running costs

Now you've chosen your heat pump, you'll get maximum energy efficiency gains and savings on your power bill by using it wisely.

If your heat pump/air conditioner is run all day and night, you can expect your power bill to increase. But if you use your heat pump for a few hours in the evening, and an hour in the morning, you can expect to save about \$500 a year, as opposed to an electric heater.

The diagram below shows how much the cost of running a heat pump can vary depending on how you use it. This chart illustrates how you run your heat pump can have a significant impact on overall running costs.



NOTE: These figures are for information only. The values used are based on a number of assumptions (such as size of heat pump, ambient room and outside air temperature, levels of home insulation etc). Actual running costs will vary significantly depending on these assumptions as well as each particular product's characteristics and the individual installation.

Some heat pump installers suggest to consumers that they leave the heat pump on 24 hours a day. Heat pumps should only be used in this way if there are people in the house all day (especially if they are elderly, babies or have health problems) and if the householder wants to keep the house warm at night, otherwise they are wasting energy and increasing the potential for your heating bill to go up.

### **Heat pumps work harder on cold nights**

Heat pumps work harder, and therefore use more energy, when the outside air is colder. If you need to run your heat pump at night (for example for health reasons), turn down the thermostat setting to keep a minimum of background heat. Efficient home insulation will also make a big difference in keeping homes warm at night.



### **Use the remote**

Remote controls come standard with most heat pumps. Users can set the timer so that your heat pump turns on an hour before you get home, and by using a temperature sensor to make it easy to achieve a constant, comfortable temperature.

It is also possible to get a 7 day timer which allows you to program on/off times for each day of the week for maximum energy efficiency.

## Summer cooling

Using a heat pump as an air-conditioner in summer instead of opening the windows and doors will increase your power bill. Instead, try creating a cross-draft by leaving windows open on opposite sides of the house. You can also close blinds or curtains to keep the sun out during the heat of the day. If you do use the air conditioner to cool the space, close windows and doors otherwise the heat pump will have to work harder to keep the temperature down and end up costing you more.

### Checklist for using a heat pump efficiently

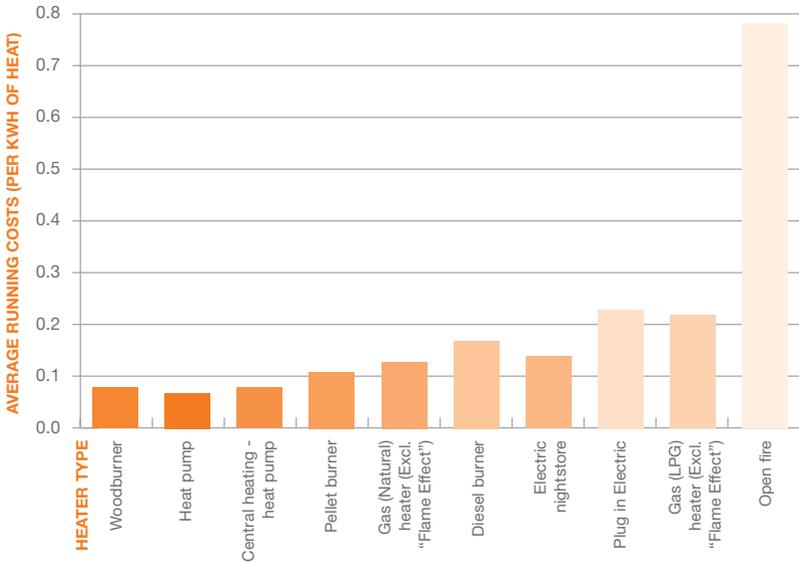
Like any heating option, heat pumps give the best energy savings when they are used wisely.

- Heat the spaces that you are actually using and shut doors and curtains to keep the heat in.
- Don't have the temperature higher than you need it – aim for between 18°-22° Celsius while you are using a space, and 16° Celsius overnight if required.
- Learn to use the timer features so your heat pump turns on an hour or so before you get home, instead of leaving it on all day.
- Make sure your house is well insulated, so that you keep the heat you are paying for in your house longer.
- Clean the filter (inside and outside) regularly, as per the manufacturer's instructions.
- Only use your heat pump as an air conditioner if you really need to. Try opening windows and doors on either side of the house to get a through breeze. Close curtains on hot, sunny days to keep your home cool and shady.

## How heat pumps compare to other heating options

There are a number of home heating options available. Heat pumps used wisely are the most efficient way of using electricity to heat your home.

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



## Funding available

You can get ENERGYWISE™ funding to help insulate your house, and install clean and efficient heating. The funding available varies according to your circumstances.

**To find out more about ENERGYWISE™ funding go to [www.energywise.govt.nz](http://www.energywise.govt.nz)**





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[www.energywise.govt.nz](http://www.energywise.govt.nz)

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