temperzone
QUALITY AIR CONDITIONING

HITACHI
HEAT PUMPS

"THE HEAT PUMP FILES"

HOW IMPORTANT IS EFFICIENCY?

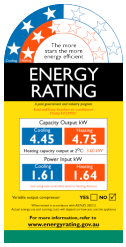
Lets face it – if you are considering buying a heat pump, one of the main reasons is probably because they are very efficient.

The efficiency of a heat pump is an important factor but does need to be weighed up with other factors when making your final choice.

Why do you need to consider efficiency?

The more efficient a heat pump is, the less it will cost you to run when producing the same amount of heating / cooling. Ultimately this effects your monthly electricity bill. So if you're spending the money and investing in a heat pump you should consider its efficiency, in combination with other factors, when deciding which heat pump to buy.

How do I work out how efficient a heat pump is?



To do this accurately you need to find each units "Energy Efficiency Rating" (EER) for cooling and "Coefficient Of Performance" (COP) for heating. These figures will be published by the manufacturers.

This can be quite confusing, so manufacturers are required to display star rating labels on their heat pumps – but even this can be confusing, because you don't know how many stars you need or how much a difference of ½ or 1 star will save you in running costs.

The easiest way to ensure you get a very efficient heat pump is to choose one that bears the "Energy Star" logo. Only the best of the best heat pumps (the top 25% of performers in each size) can achieve this award.

Do the running conditions effect efficiency?

Yes they do. To make comparisons fair, manufacturers are required to test their units' capacities (and therefore efficiencies) at a given set of temperatures, when operating in a stable and continuous way.

So, if the actual temperature is different when you are running a heat pump, the capacity and efficiency will also be different. A few manufacturers also publish data at alternate test conditions, but at present this is not very common. Some manufacturers "model" or "calculate" capacity and efficiency at different temperatures. This is only a guesstimate, and is unable to be verified as accurate, so should not be compared to actual tested data under any circumstances.

When inverter heat pumps slow down does the efficiency change?

Yes it does. All efficiencies quoted are when the heat pumps are running at 100% capacity (but not in "boost" mode). With inverter heat pumps, as the room gets close to the required temperature, the heat pump reduces capacity. When it does this the heat pumps efficiency will increase, sometimes dramatically.

As it is very difficult to make a test which would ensure an even comparison of brands and models at reduced capacity, no data has been published for this.

This increase in efficiency obtained when reducing capacity is one of the reasons why it is very important to get a correctly sized heat pump. A heat pump selected to operate mainly around the middle of its total capacity range will end up being much more efficient than one which is running at flat out or in "boost mode" the whole time.

How do I work out what my heat pump will cost to run based on its efficiency?

It you have the specifications for the models you are looking at, know your electricity rate and the amount of time you will use the heat pump then you can calculate your running costs.

As this is a little complicated, here is a table showing two heat pumps of the same capacity, but different efficiencies (both have Energy Star), running at full power for 4 hours every night during winter.

Remember, in reality the cost difference may be less than this because the heat pumps wouldn't be running at full power the whole time.

As you can see the running cost difference is about $20 per year.

Heating Cost Comparison	Model A	Model B
Amount of heating req'd	6kW	6kW
Efficiency (COP)	**4.03**	**3.67**
Electricity input req'd	1.49kW	1.66kW
Running hours*	500 hrs	500 hrs
Electricity per hour ($)**	24c	24c
Electricity cost	$178.90	$199.20
Electricity usage difference per year	**$20.30**	

* based on 4 hours every night for four winter months

** uncontrolled electricity hourly rate (inc GST)

Is running cost (efficiency) the only cost I need to consider when purchasing a heat pump?

No it isn't. To get a true picture of all your costs you also need to consider the purchase price of the heat pump, because a more efficient model could cost a lot more. Any extra cost to purchase the unit will take a while to repay with reduced running costs.

Using the same heat pumps as before, look at the table here.

Total Cost Comparison	Model A	Model B
Cost to Purchase	$2,999	$2,749
Purchase Price Difference	$250	
Efficiency (COP)	**4.03**	**3.67**
Running cost difference per year	$20.30	
Years to Payback Higher Efficiency	**12**	**0**

You can see that although Model A is more efficient it costs $250 more to purchase. So even though Model A saves $20 per year in running costs it takes around 12 years of running to get the extra $250 back when compared to Model B.

How do I know what the payback period is for buying a more efficient heat pump?

Unless you have all the information this can be difficult to calculate, so we have done the table that follows to make things easier for you.

PACKBACK PERIOD - EASY TABLE

Electricity Saving	Extra Purchase Cost of System					
	$50	**$100**	**$150**	**$200**	**$250**	**$300**
$10 less electricity per year	5 years	10 years	15 years	20 years	25 years	30 years
$20 less electricity per year	2 years	5 years	7 years	10 years	12 years	15 years
$30 less electricity per year	2 years	3 years	5 years	7 years	8 years	10 years
$40 less electricity per year	1 year	2 years	4 years	5 years	6 years	7 years

So which is more important efficiency or price?

Only you can decide this, but the best way is to determine what the heat pump will cost you over its whole life. To do this you need to compare many factors such as:

- Purchase price
- Running cost
- Maintenance costs
- Warranty period / spare parts costs