

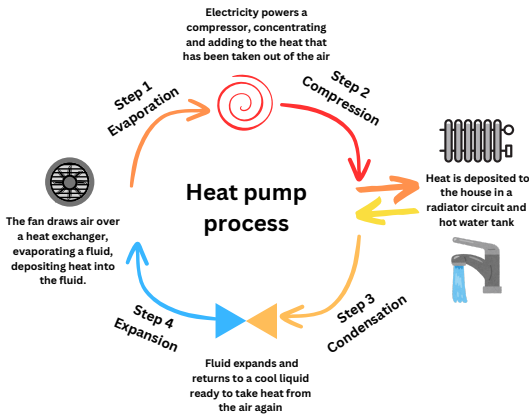
# How do heat pumps work?

Heat pumps work by recycling heat from the air, moving it from outside a house and delivering inside a house, it sounds a bit like magic, so what is going on? You can't **hold** heat, so how does it work?

## Just like a fridge

You experience something moving heat from one place to another every time you use a fridge, in keeping things cool a fridge is taking heat from the inside the door, and dumping it at the back. A heat pump is using the same process.

## Heat pump process



Inside the heat pump is a small amount of 'fluid' that we use to move heat around in a 4 step process. Heat is moved about by a constant process where the fluid is evaporated, compressed, condensed and expanded.

### Step 1 - evaporation

The fan in the heat pump draws air from around the heat pump through the box and over a heat exchanger. Within the heat exchanger is the fluid, in a cool, liquid state. The air moving over the heat exchanger evaporates the fluid, from a liquid to a gas, and in doing so, deposits some heat into the fluid.

### Step 2 - compression

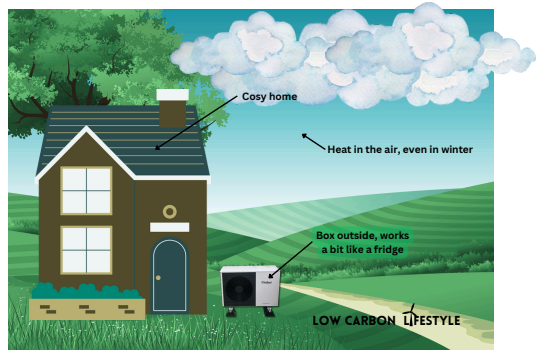
Now the fluid is a gas, it has taken some heat from the air around the heat pump, and we are now going to multiply that heat using some electricity. The electricity powers a compressor, that does exactly that, compresses the gas, concentrating and adding to the heat that has been taken out of the air

### Step 3 - condensation

Now we have a gas, with lots of energy in it, we want to use that energy, and we do so by 'condensing' the gas, turning it back into a liquid and in doing so depositing the energy through another heat exchanger and into a hot water circuit to go into the house to give heat to radiators and a hot water tank

### Step 4 - expansion

We are now nearly back at the start but we have a liquid that is still hot and under pressure, so we take it through an expansion valve so that it can start the process again at low pressure and low temperature, ready to take heat from the air outside again.



And **that is it**, we have taken heat out of the air, used some electricity to concentrate it, and then delivered it to a home to make it nice and cosy. We haven't burnt anything in making the heat, which makes heat pumps good for the environment without CO2 emissions, or impact on air quality.



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