

## Heat Pumps

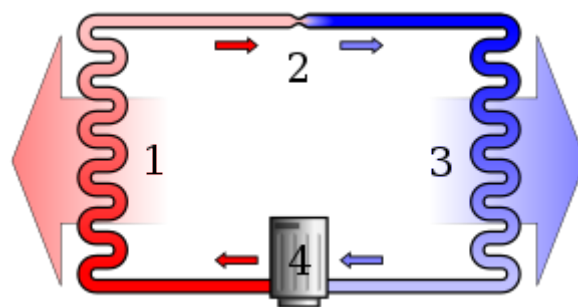
Given all of the recent announcements and articles about heat pumps, let's go through some of the key features of heat pumps, how they work, and what they mean for an EPC.

### What is a heat pump?

A heat pump is a device which generates heat by absorbing heat from one medium and transferring it to be able to heat a dwelling. Heat is normally absorbed through either the air, from water, or from the ground.

### How do they work?

Without going into too much detail on thermodynamics and the refrigeration cycle, a heat pump uses the compression of a refrigerant to generate heat.



Using an air-source heat pump as our example, the refrigerant absorbs heat from the ambient air temperature and is pumped into a compressor. By compressing the refrigerant, the increasing pressure increases the temperature of the refrigerant.

Once heated, this hot fluid is used to heat the internal space heating loop. Having lost much of its heat in this transfer, the refrigerant is cooled and condensed to begin the cycle again.

Given the fuel used is electricity to power the pumps, condenser, and compressor, the energy usage is fairly low, given the high efficiency of the process. On average, heat pumps are around 300% efficient.

### Heat pumps on the EPC

When Energy Performance Certificates were first introduced in 2008, there was a commonly held belief that the energy efficiency of a property could be best demonstrated by how cost-efficient a property is. This actually makes a lot of sense - the more expensive it costs to heat your property, the more likely the property being thermally inefficient.

Unfortunately, heat pumps present the exception to this school of thought. They are highly efficient and do an excellent job of meeting the heating demand for a property – their problem is that the electricity used is more expensive than gas.

The autumn of 2021 has seen a huge focus on increasing consumer energy costs, and anyone who has looked at shopping for their energy supplier will notice the cost difference between gas and electricity. For the British Gas fixed price tariff, electricity is 4½ times more expensive than mains gas; this is actually more than the price difference that SAP/RdSAP assumes.

This basically means that it costs 4½ times more for every kilowatt of heat produced by a heat pump than something like a gas boiler.

At its heart, a SAP rating is a ratio between the total floor area of the property and the total fuel costs for the property. With heat pumps, this will lead to a reduction in the SAP rating due to the increased fuel costs.

### **Why aren't Quidos doing anything about this?**

Well, this is a complicated question. Quidos do not write the SAP specifications and do not develop the metrics by which energy efficiency is determined. This methodology is produced by BRE for the Department of Business, Energy & Industrial Strategy, and we as an Accreditation Scheme can only respond to consultations on amendments to push for changes.

Based on early discussions, it would appear that SAP11 (whenever this becomes available) will push energy use as a primary metric for the EPC; this will result in EPC ratings for heat pump-powered properties increasing.

### **Why can't SAP10 use an energy metric?**

Every facet of the current methodology is based on cost-effectiveness, and most importantly, this extends into the recommendations generated on an EPC. Changing how the calculation and recommendations are generated to look at saving energy rather than saving money is a mammoth undertaking, and so trying to fold this into SAP10 would push back the release of a much needed update to the methodology.

This is not to say that a metric of energy cannot be displayed on the EPC itself, however the rest of the underlying calculation would remain cost-based.

### **Helpful Abbreviations**

ASHP	Air-source heat pump
GSHP	Ground-source heat pump
WSHP	Water-source heat pump
RHI	Renewable heat incentive - a scheme which gave heat pump owners a rebate to bridge the cost increase of renewable heat (closes 2022)
BUS	Boiler upgrade scheme - the recent announced funding of heat pumps to replace RHI