Heat pumps - FAQs

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Is it true that heat pumps use less energy than a gas or oil boiler?

Heat pumps are highly efficient because they move heat from one place to another using refrigeration technology. They are like a fridge in reverse. A pre-2005 gas boiler will give you 85 units of heat for every 100 units of energy; a modern condensing gas boiler will give you around 95 units of heat for every 100 units of energy; an air source heat pump will give you at least 300 units of heat for every 100 units of energy; 400 in the case of the most efficient models.

Do I need to upgrade the insulation on my home?

If your roof and walls have been insulated since 2010, then you do not need to have your insulation upgraded.

If you have a suspended timber floor, then you should also consider insulating under the floorboards. If you have any open chimneys, then you should consider draughtproofing them.

If your roof and walls have not been insulated since 2010, then you should consider upgrading your insulation.

If you do not insulate your walls and roof, then a heat pump will still work, in the same way that a gas or oil boiler will still work; the appliance will simply use more fuel and be more expensive to run.

Are heat pumps noisy?

All heat pumps must comply with regulations on noise. A good heat pump installer will help you to find the best position for it to compy with the regulations. If you look at heat pump manufacturer's websites, you will find that they are competing with each other for whose heat pump is the quietest.

Do heat pumps take a long time to heat up? Should a heat pump be run at a low temperature?

Short bursts of on/off should be avoided on any heating system. All central heating systems, whether heat pumps or gas boilers, should be designed to run at a constant low background temperature rather than short bursts of on/off. Any installer of a central heating system, whether a gas boiler or an air source heat pump, will design the system in the same way - to be able to heat the home on an average cold night in January (i.e. -4 degrees in the West Midlands climate). This kind of heating regime means using the room thermostat(s) and thermostatic radiator valves rather than the timer as the main means of control.

Do I need underfloor heating and/or larger radiators?

Heat pumps work well with radiators. You may need to have larger radiators in some rooms so they can run at lower temperatures, or radiators with more fins. Some people find it is possible to move radiators from downstairs to upstairs in order to re-use them, and have new radiators downstairs. you are considering replacing the floor in any part of your home, then wet under-floor heating is more efficient than radiators for any type of central heating system, whether gas, oil, or heat pump. If you are not considering replacing the floor, then it is not cost-effective to install under-floor heating.

Radiator shelves and radiator reflective foil make most of heat from your radiators.

What should I look for in a heat pump installer?

Look out for:

- MCS accreditation
- Trading history of at least 5 years
- Positive consumer reviews e.g. on TrustPilot, Google reviews

What can go wrong?

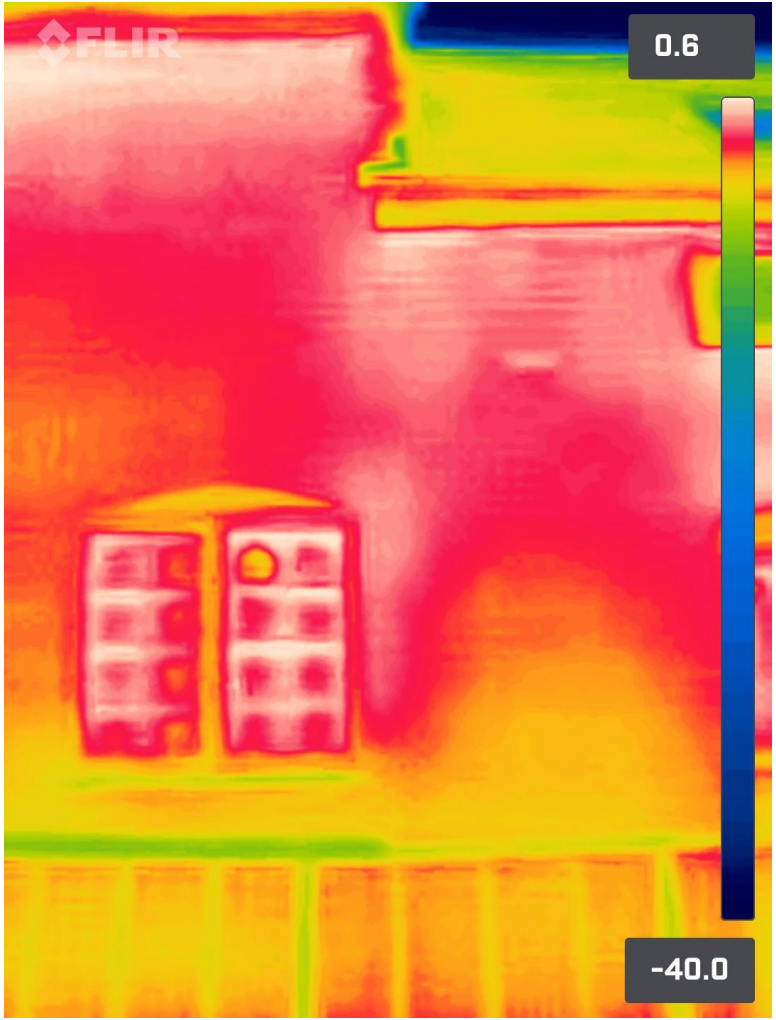
2 case studies

1 from Coventry

1 from London

Case study 1

Coventry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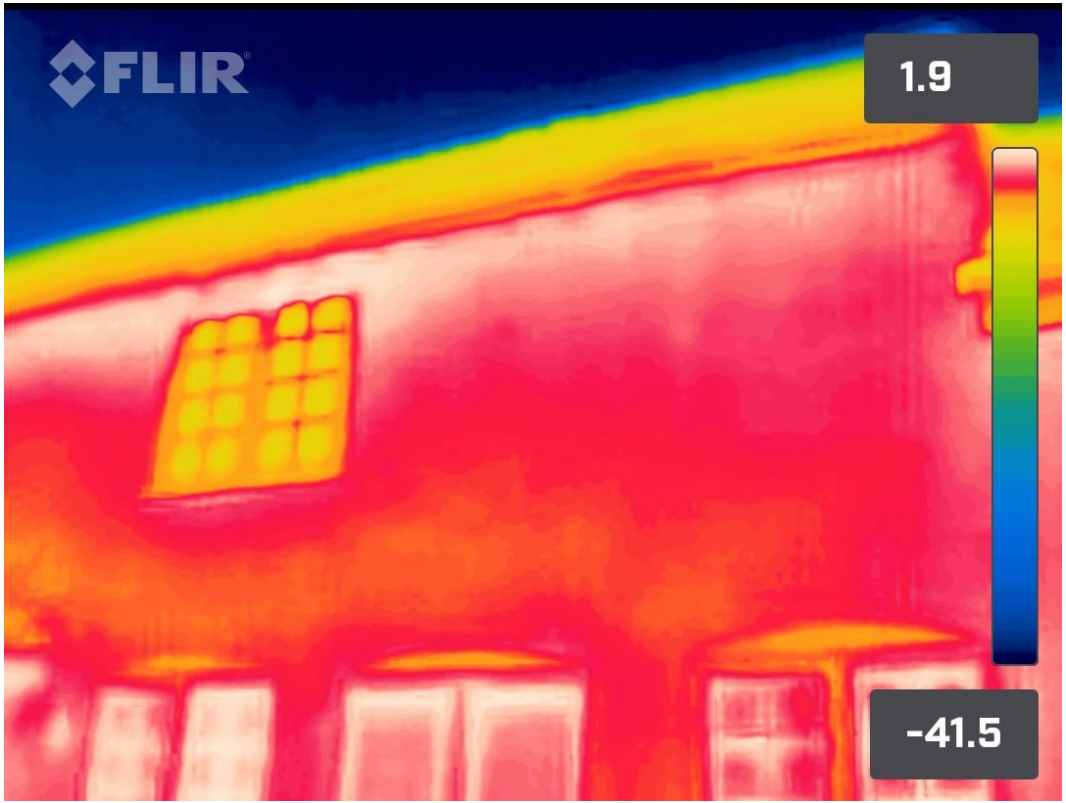
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	Action	Notes
1	Reduce thermostat temperature on cylinder from 72 degrees to 60 degrees	Hot water can be stored at 60 degrees.
2	Replace heating controls with smart heating controls with separate control over space heating and hot water	The existing controls that were fitted with the heat pump are out of date and you would benefit from heating controls that are smarter and easier to use
3.	Replace hot water cylinder with a smart cylinder e.g. Mixergy; check and reconfigure valves	A smart hot water cylinder would only heat hot water when you need it, and would use artificial intelligence to predict your hot water use.
4.	Ensure solar thermal is switched on all year round; reconfigure it to supply space heating as well as domestic hot water	Solar thermal will give you some free heat even in the winter. You can reduce the input of the immersion heater.
5.	Review flow rates to radiators and under-floor heating, have flow rates increased if necessary; replace pump(s) if necessary	The flow rates may currently be too low The pumps may be insufficiently sized or have worn out This should be done on your next service.
6.	Review thermostatic radiator valves and replace with valves suitable for higher flow rates	Current valves may be designed for higher temperatures and lower flow rates This should be done on your next service.

	length	width	height	u-Value	radiator type
GROUND FLOOR					
KITCHEN/dining					
EXT WALL N	3.7625	1	2.419	0.3	ufh
ext wall W	3.81625	1	2.419	0.3	
ext wall s	3.7625	1	2.419	0.3	
ceiling	3.7625	3.81625	1	0	
floor	3.7625	3.7625	1	0.62	
INTERNAL WALL	3.81625	1	2.419	0	
internal door	1	0.762	2		
subtract					
window 1/1	1	2.37	2	1.6	
window 1/2	1	2.35	2.246	1.6	
hall/LOBBY					
internal wall w	3.81625	1	2.419	0	ufh
internal wall e	3.81625	1	2.419	0	
external wall n	1.6125	1	2.42	0.3	
external wall s	1.6125	1	2.419	0.3	
internal door	1	0.762	2		

Mitsubishi Ecodan is one of the best and most efficient heat pumps on the market.

[redacted] show good signs of being a reputable company.

There are a number of issues above that need to be clarified in the site survey. This will lead to a more accurate survey from [redacted]. I don't

anticipate that there will be any major surprises in this. I would expect the heat loss figure to change slightly - there are both push and pull factors that will affect the final result (e.g. U-values for roof/floor versus delta T values). I would anticipate that the heat loss figure might change slightly but that the overall conclusion of an 11.2 kW Mitsubishi Ecodan will still be the right size heat pump for you, bearing in mind that Ecodan is considerably more efficient than your current heat pump.

I will have another look for you when they have done the site survey - particularly looking out for flow rates and flow temperatures - but I am confident that they will produce a design for the new heat pump that will enable you to buy from them

Case study 2

London

The Excel template used for the heat loss calculation was supplied by [redacted] This is a different template to that most frequently used by heat pump installers, namely the more comprehensive MCS template [2]. The use of this template is optional not mandatory, and installers can use other spreadsheets or SaaS applications such as www.heatpunk.co.uk and www.heat-engineer.com to design a heat pump that complies with MCS regulations.[3]

In the heat loss calculation carried out by [redacted], there are inconsistent figures for the heat loss from the house:

- Cell B3 *Heat Loss Calculator tab* - 8.1 kW (8081 W)
- Cell B7 *Your System tab* - 4.8 kW
- Cell B11 *Pricing tab* - 8.1 kWh (8081 W).

It seems likely that a heat loss of 8.1 kW has been used to design the heat pump; however there is not sufficient paperwork to be able to confirm this.

Some of the assumptions made in the heat loss calculation should be checked:

- Ground floor is shown as having a U-value of 0.25; I am not aware of the ground floor having had an insulation upgrade during the

When it’s done properly …

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