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HEATING



Demystifying Myths Around Heat Pumps

SESSION 01

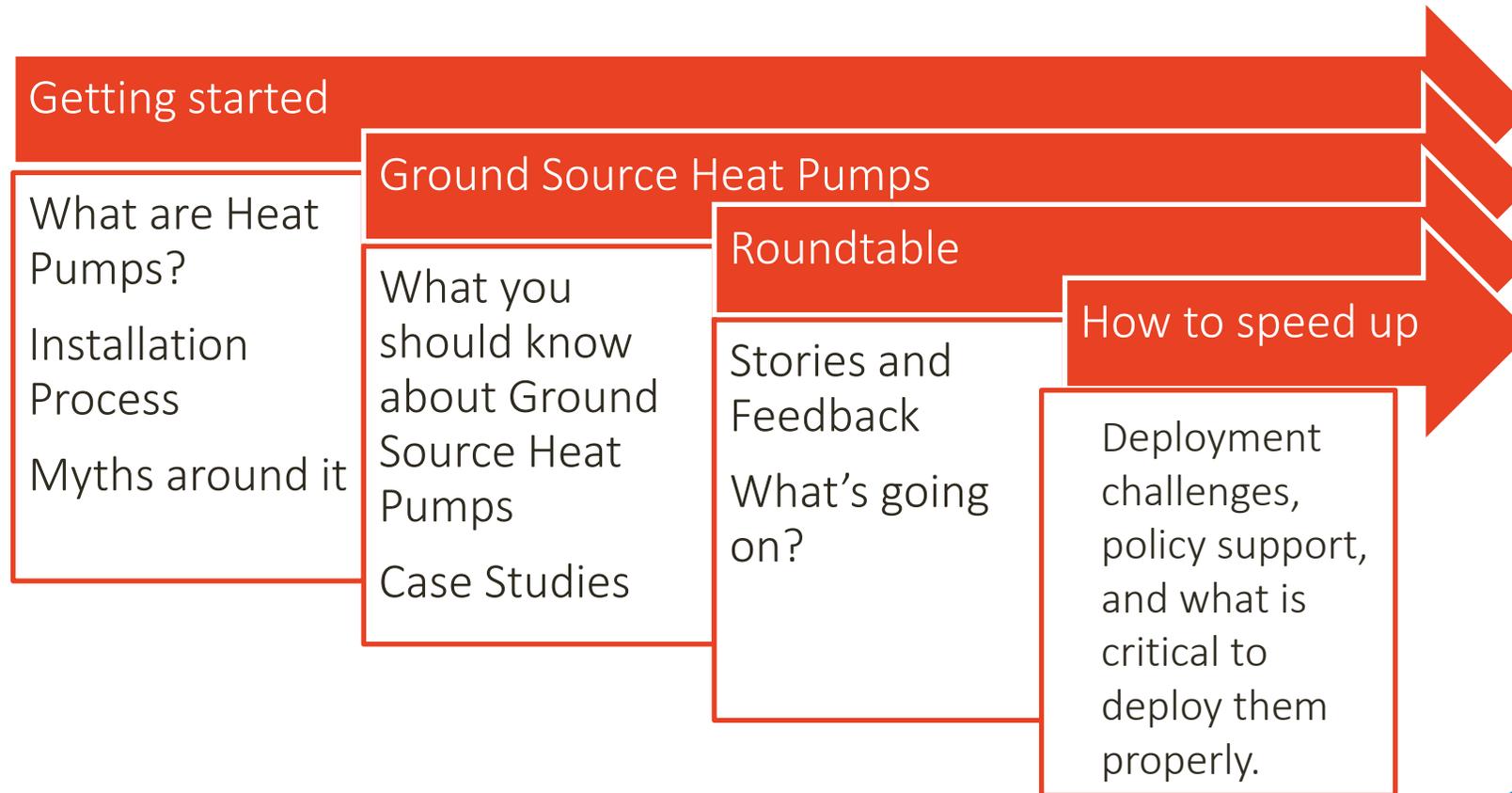


Housekeeping



- **The Chat section will be monitored throughout the session, but we will take questions at the end.**
- **Resources will be available afterwards.**

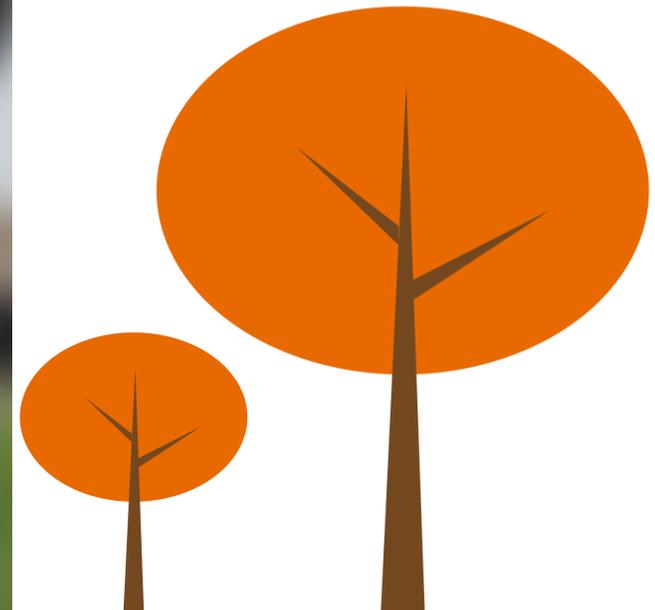
Demystifying Myths through 4 sessions-



Why are we talking today?

Factcheck: 18 misleading myths about heat pumps

1. FALSE: 'Heat pumps don't work in existing buildings.'
2. FALSE: 'Heat pumps only work in highly insulated buildings.'
3. FALSE: 'Heat pumps only work with underfloor heating.'
4. FALSE: 'Heat pumps won't work in flats.'
5. FALSE: 'Heat pumps don't work when it's cold.'
6. FALSE: 'Heat pumps will always need a backup heating system to keep you warm.'
7. FALSE: 'Heat pumps won't keep you warm.'
8. INCOMPLETE: 'You will freeze during a power cut and be better off with a gas boiler.'
9. FALSE: 'Heat pumps are noisy.'
10. INCOMPLETE: 'Heat pumps cost more to run and will increase heating bills.'
11. FALSE: 'Turning gas to electricity to heat via a heat pump is less efficient than burning gas in a boiler.'
12. FALSE: 'Heat pumps will never offset the carbon emissions resulting from making them.'
13. FALSE: 'Heat pumps devalue properties.'
14. INCOMPLETE: 'Heat pumps are unaffordable.'
15. INCOMPLETE: 'The grid cannot cope with heat pumps.'
16. INCOMPLETE: 'Heat pumps don't work with microbore piping.'
17. FALSE: 'Heat pumps don't last long.'
18. INCOMPLETE: 'Heat pumps are new and untested technology.'





Ele George (She/Her) • 2nd

23h ...

Advocate for built environment sector change // Consulting on sustainabl...

Just to add to the difficulties, this property wasn't necessarily missed out because of it's tenure/ownership. We have found that some residents do not want to have their homes retrofitted! They don't want the disruption or they don't want to have their gas removed so they choose not to sign up. Some want to wait until they've seen the outcome from the pilot projects (they don't want to be the guinea pigs!)

[Tania Jennings](#)

Like · 5 | Reply · 3 Replies



Tania Jennings (She/Her) • 1st

Policy Wonk by Day, Mad Crocheter by Night

The number of people we've had turn down works would make you cry.

Like · 1 | Reply



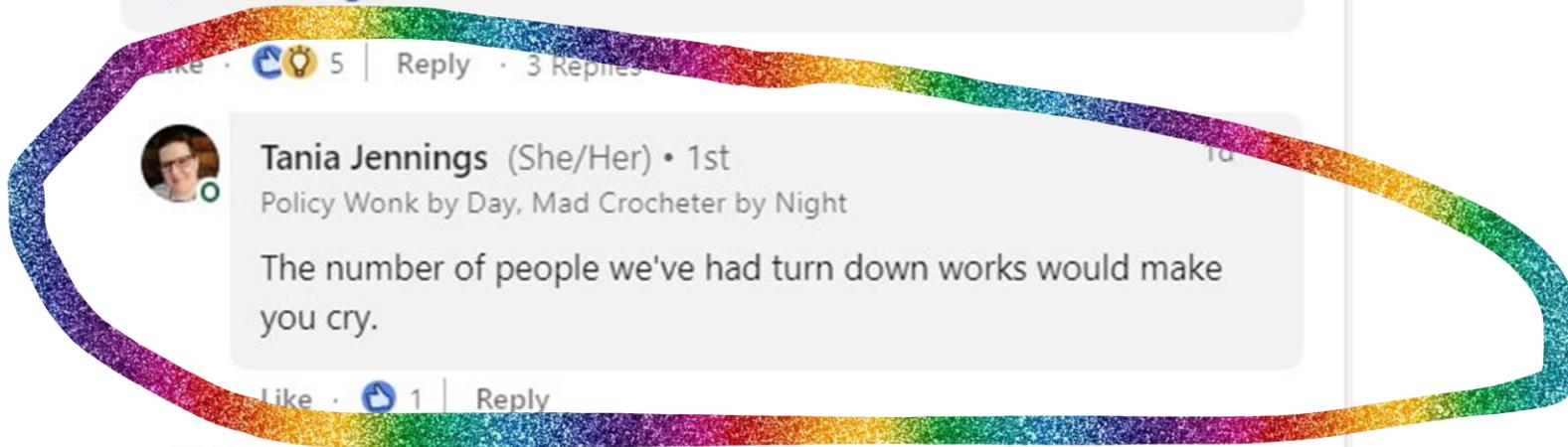
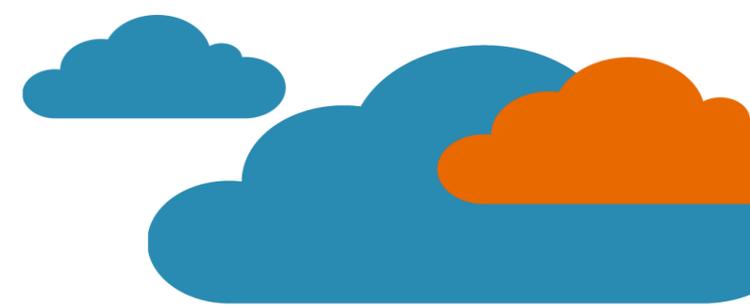
Andrew Piper **Author**

20h ...

Head of Sustainability at Vivid Housing

Yes I wonder how many of us are ready for the resident engagement challenge. [Ele Tania](#) do you have stats on access rates for retrofit?

Like | Reply



Most homes will need heat pumps, Welsh government says



GETTY IMAGES

The use of heat pumps are central in the Welsh government's plan to reach net-zero emissions by 2050.



Video coming up...

Let's be absolutely clear.

The money is massive,
the resources needed is massive.

If you don't include, engage and excite
tenants, you will incur significant challenges
in cost, effort and satisfaction.





Group by TPAS Cymru

Tenant Engagement Network (for tenants in Wales) by TPAS Cymru

Demystifying Myths Around Heat Pumps



Bean Beanland

Director for Growth & External
Affairs - Heat Pump Federation



Elizabeth Wilkinson

Head of Domestic Product
Management - Groupe Atlantic



Jez Climas

Head of Business Development,
Renewables - City Plumbing



What is a heat pump and why is everyone talking about them?

Lizzie Wilkinson

[idealheating.com](https://www.idealheating.com)

Rated **Excellent**



★ Trustpilot

CLIMATE EMERGENCY



Net Zero – why heating matters

- Aim: to reduce emissions from buildings to near zero (0-2MtCO₂e) by 2050
- 30 million buildings in the UK = 30% national emissions
- 79% of building emissions come from heating = 23% national emissions (17% homes, 4% commercial, 2% public buildings)

Figure 2: UK emissions in 2019

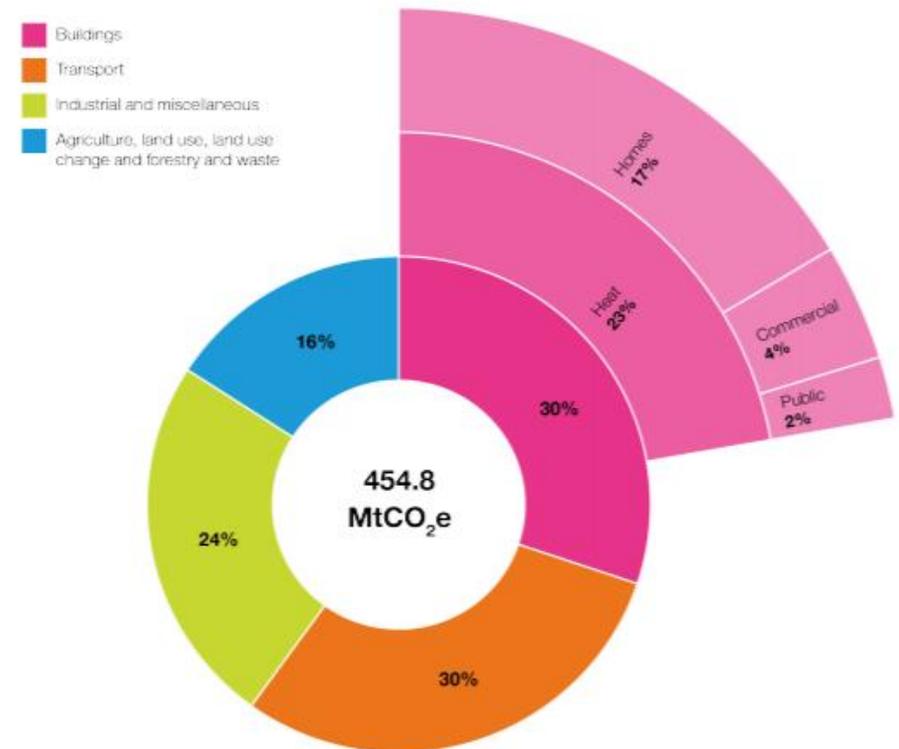
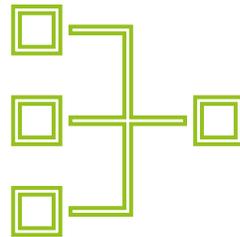


Figure 2 shows the proportion of emissions in 2019 from buildings to the nearest whole number; of the 454.8 mega tonnes of carbon dioxide equivalent (MtCO₂e) total emissions, 23% were due to heating buildings, with the largest proportion of this stemming from homes.³⁵

The future of heating

- To hit the UK target of Net Zero by 2050 we need to use different technologies to heat our homes and buildings and provide domestic hot water.



The gas boiler is the most common heating appliance in the UK with and estimated **83% of homes on mains gas**

What is a heat pump?



Heat pumps and energy – the basics



Energy is everywhere

Even the cool air in Scotland contains energy.

The refrigerant liquid contained inside a heat pump is very temperature sensitive – it boils at very low temperatures and turns into gas.

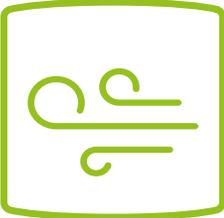
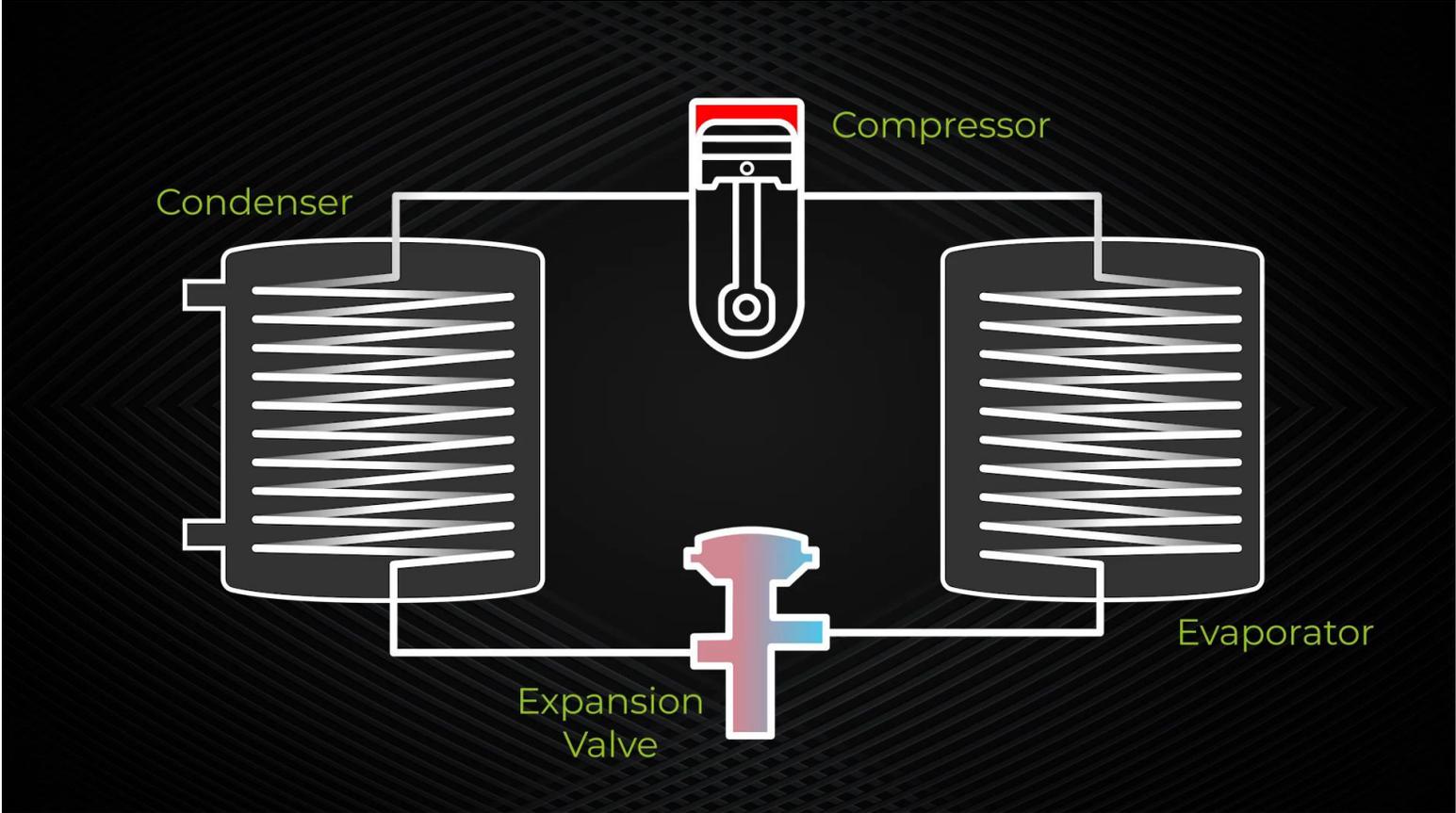
Squeezing the gas increases the temperature of it even further.

The hot gas can transfer its heat to water through a series of pipes called a heat exchanger.

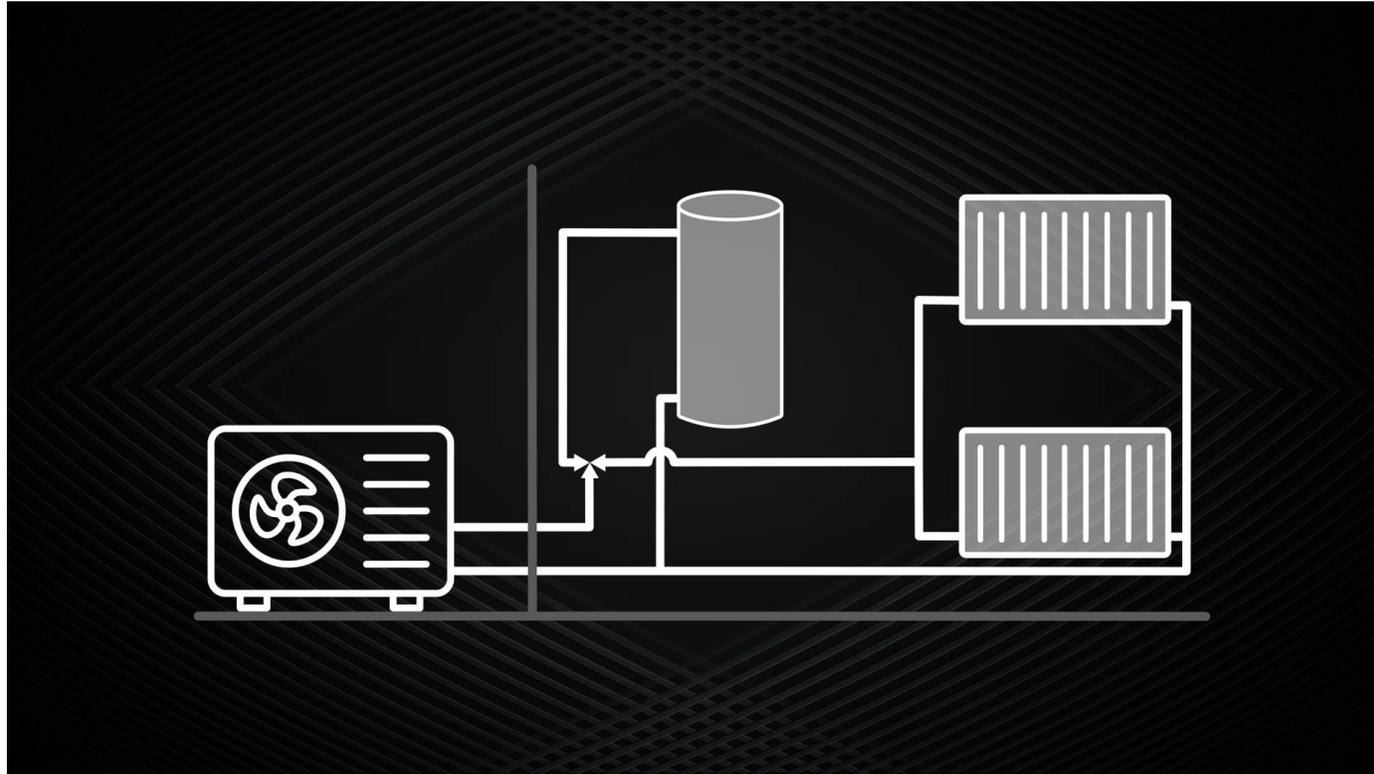
This water then flows around your heating system.



Heat pump technology in action



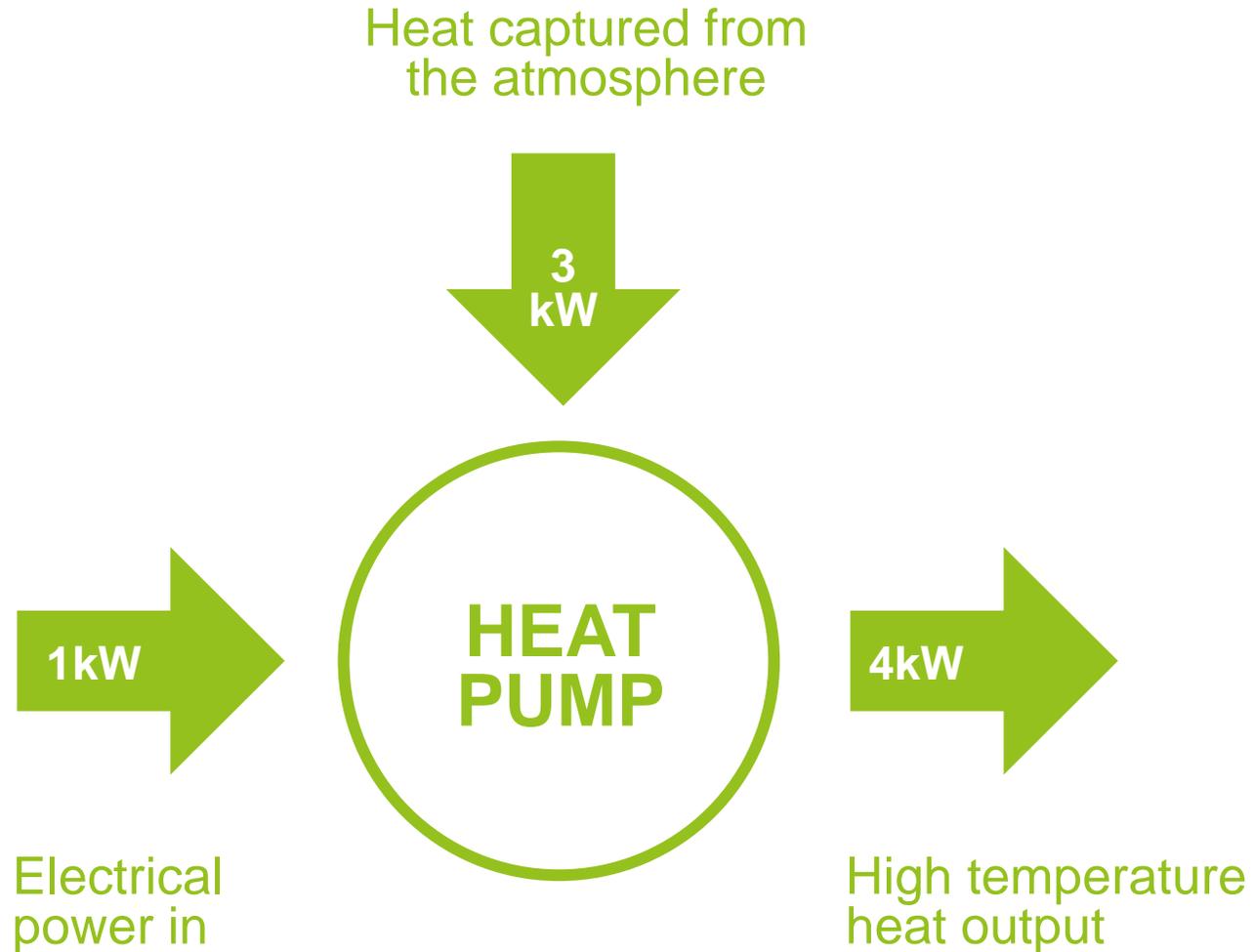
Heat pump technology in action



SCOP, COP and so what?

COP
COEFFICIENT OF
PERFORMANCE

SCOP
SEASONAL COEFFICIENT
OF PERFORMANCE



What makes up a heat pump system?



What makes a good heat pump system?



**High
Efficiency**



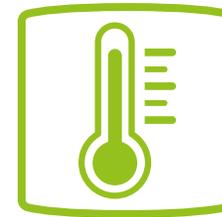
Sound



**Dimensions
and
Aesthetics**



**Easy to
Install**



**Hot and
Efficient
DHW**



**Simple and
Connected**

What is low temperature heating?

- Heat pumps operate low temperature heating
- The low temperature relates to the flow temperature that leaves the heat pump and flows around radiators and pipes
- “Low temperature” means 45°C to 55°C – so not that low!
- Gas boilers traditionally have a flow temperature of 70 °C
- The temperature of the room (set on your thermostat) is the same – usually around 21 °C
- A lower flow temperature means it might take slightly longer or you might need slightly larger radiators to warm the room.
- Heat pumps operate for longer periods of time at a lower temperature compared to a gas boiler



Logic Air - Case Study



TPAS Cymru Heat Pump 'Installation' Process

AGENDA

Design Aims

Cheap to run

Cost effective install

Longevity

Design Outside

Planning

Placement (R32, R290, noise, planning)

DNO (load)

Design Inside

Cylinder space

Radiators

Pipework

Low heat loss homes - compressor life

**DESIGN
OBJECTIVES**

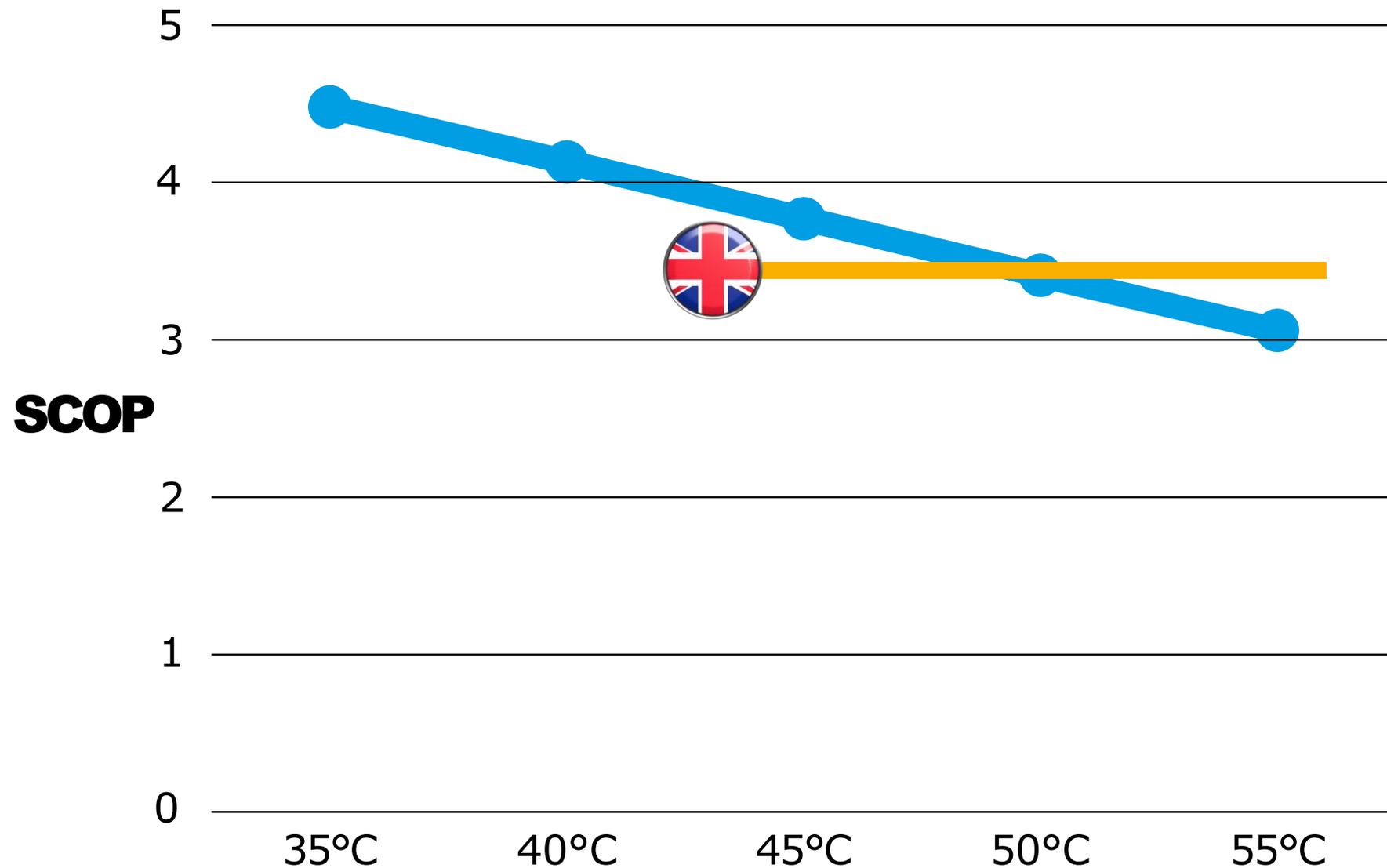
CHEAP TO RUN

**MINIMISE
INSTALL COST**

LONG LASTING

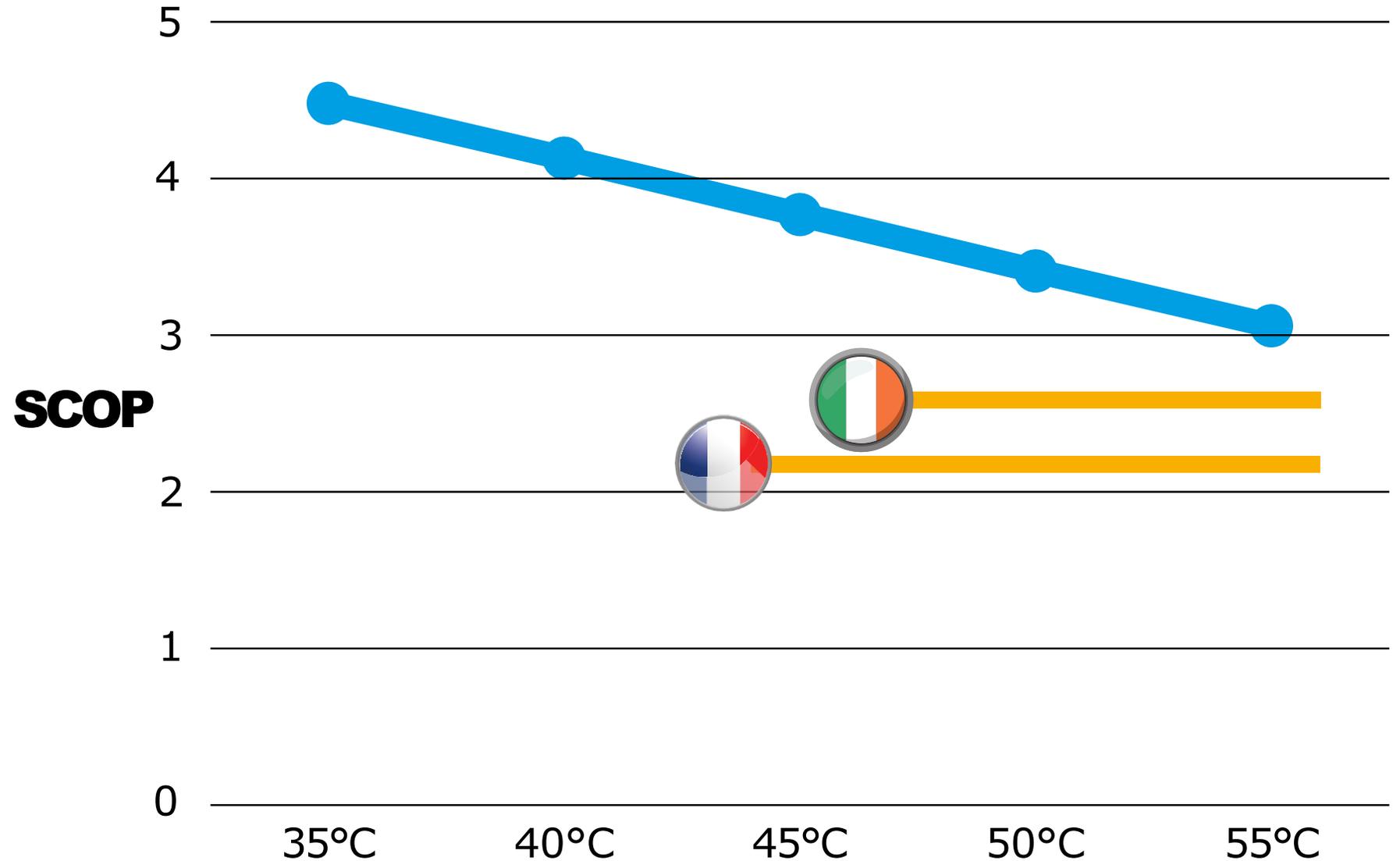
**CHEAP TO
RUN**

low temperature = high efficiency (SCOP)



**CHEAP TO
RUN**

low temperature = high efficiency (SCOP)



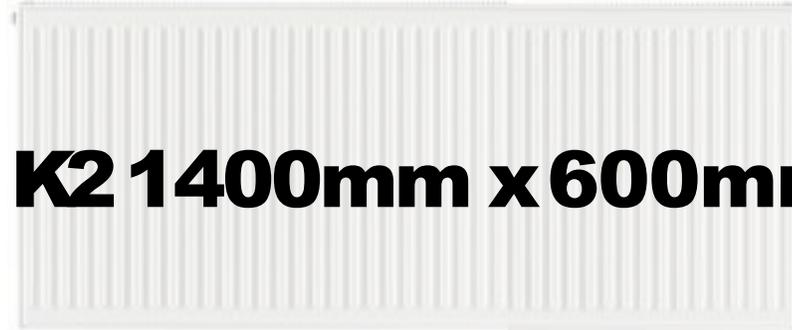
**CHEAP TO
RUN**

600W output in a 21°C room



K2 800mm x 600mm @ 50°C flow

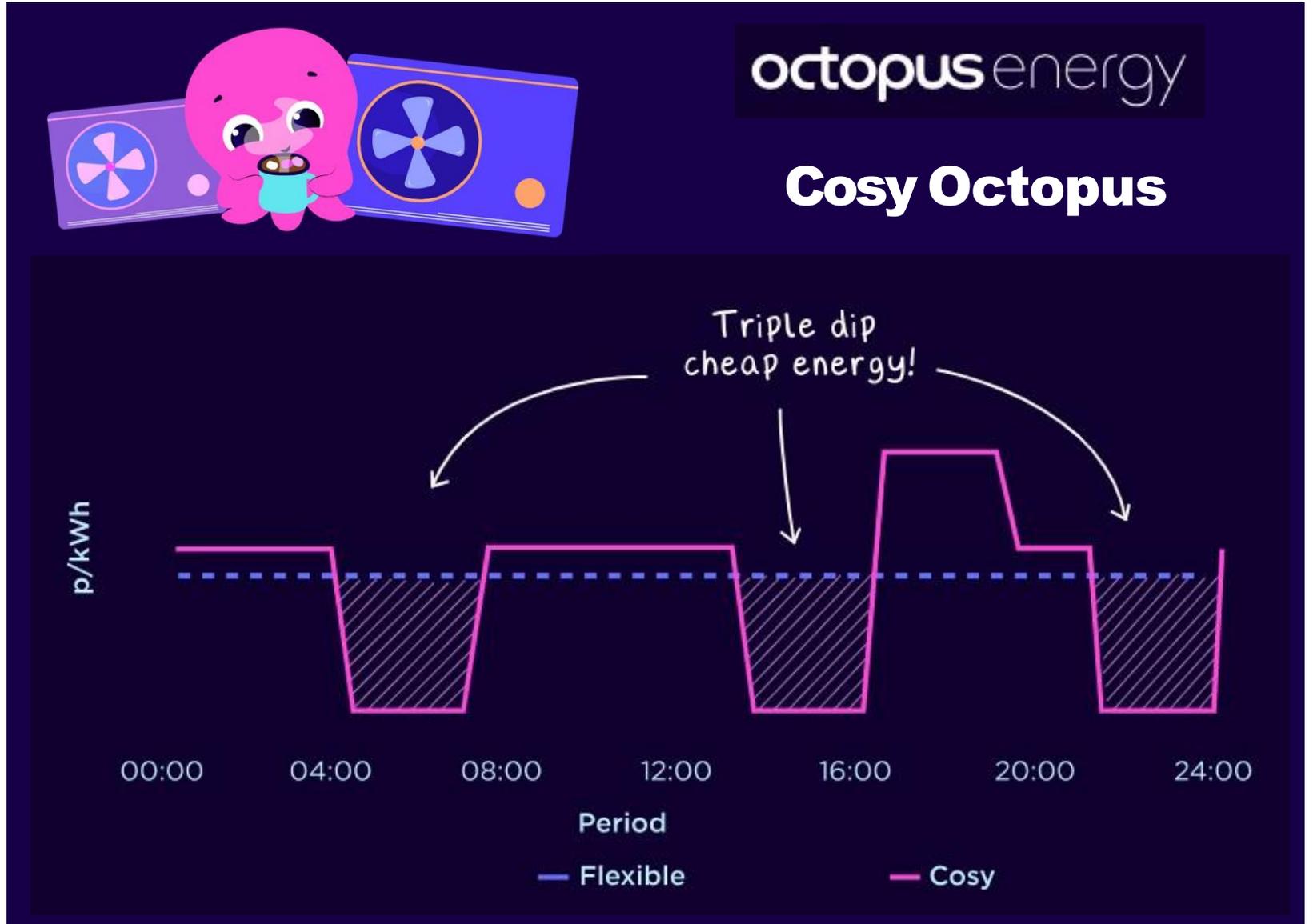
or



K2 1400mm x 600mm @ 40°C flow

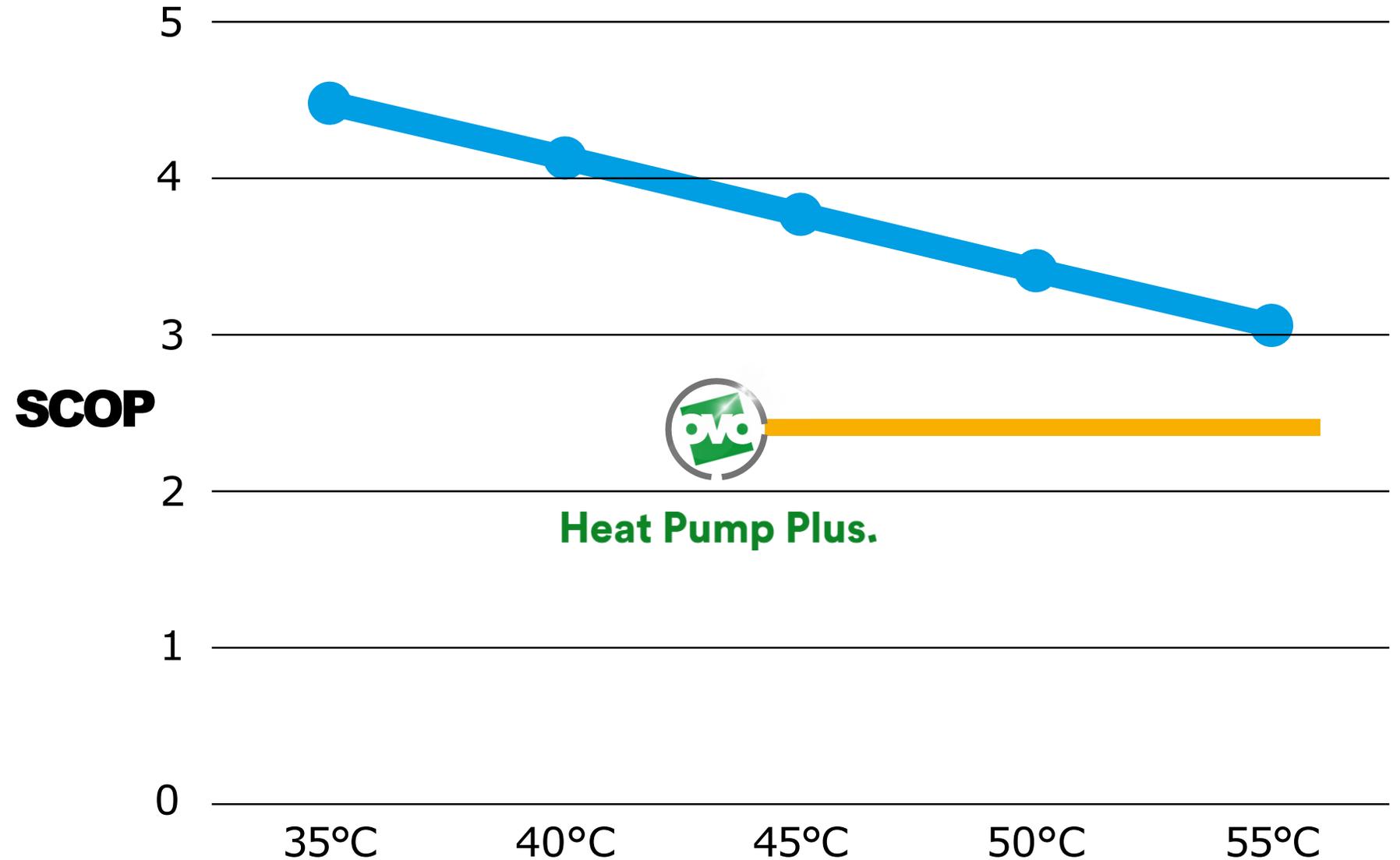
17.5% cheaper to run!

**CHEAP TO
RUN**



**CHEAP TO
RUN**

low temperature = high efficiency (SCOP)



**MINIMISE
INSTALL
COST**

QUICK

SIMPLE

UNBRANDED

RIGHT BITS

TRAINING/INSTRUCTIONS

LONGEVITY

WELL COMMISSIONED

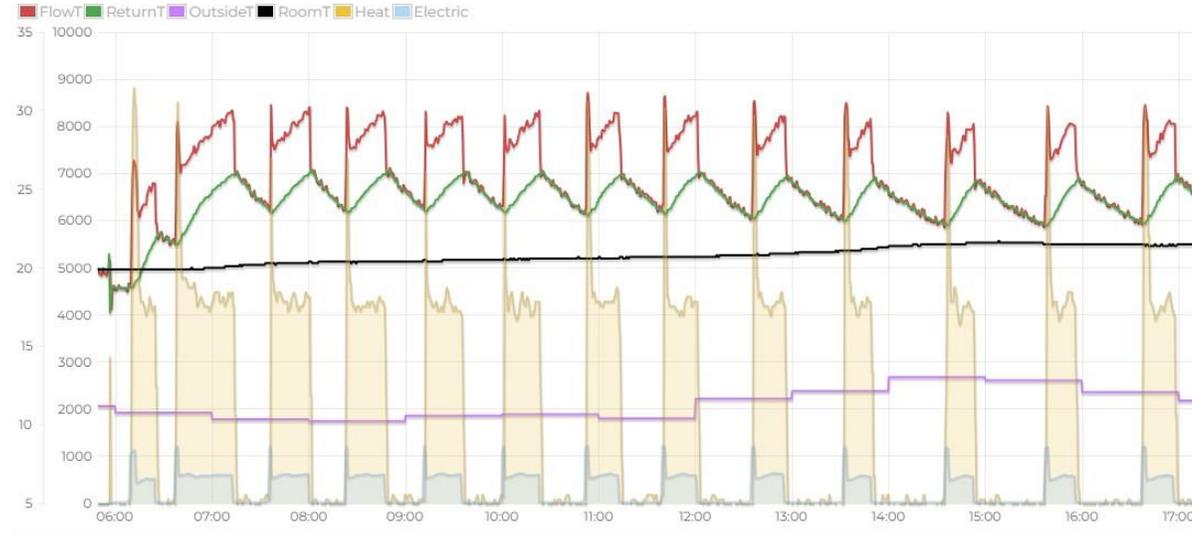
WATER CONTENT

WATER QUALITY

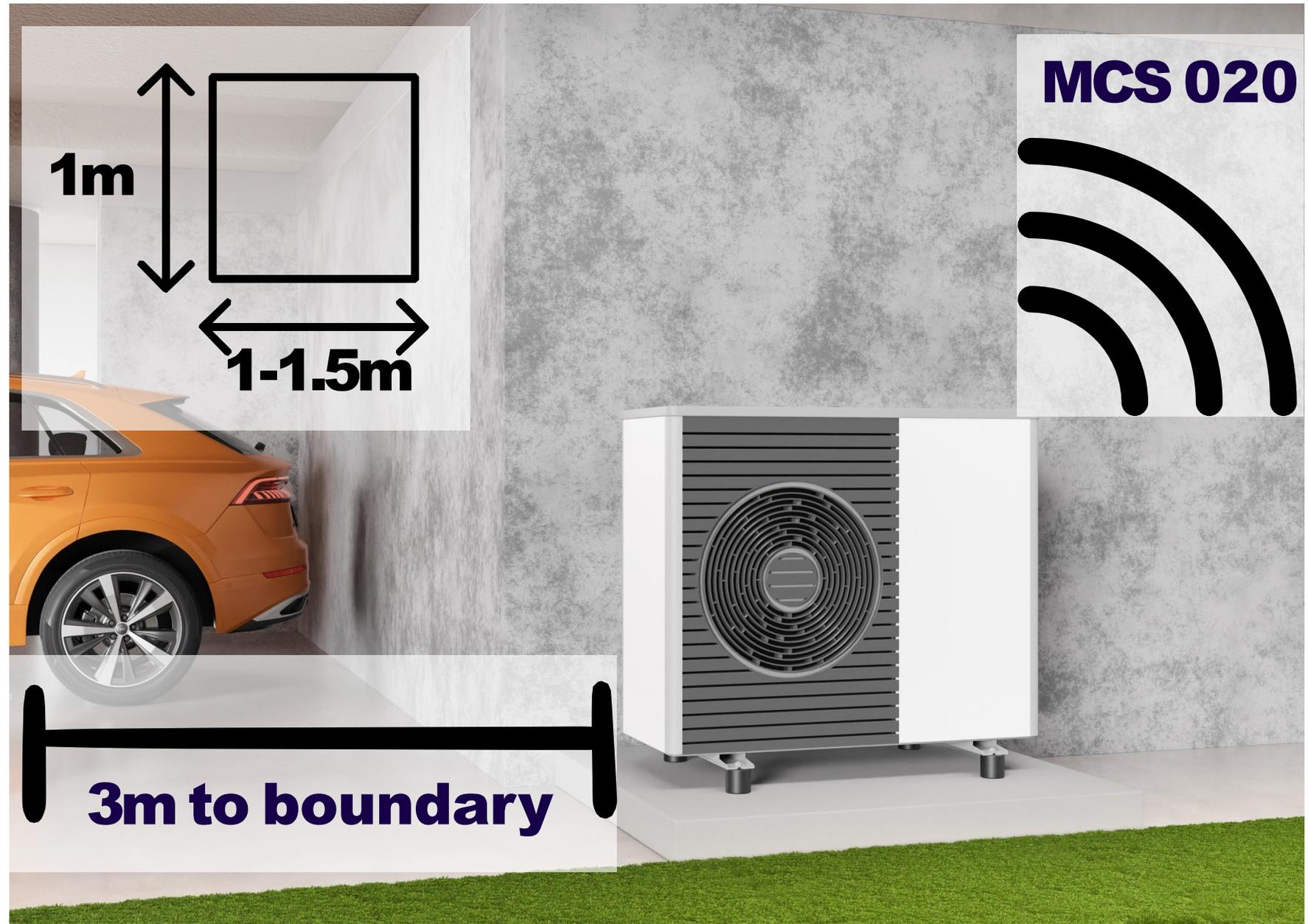
SERVICING AND MAINTENANCE

ELECTRICAL & RENEWABLES AT CITY PLUMBING

LONGEVITY



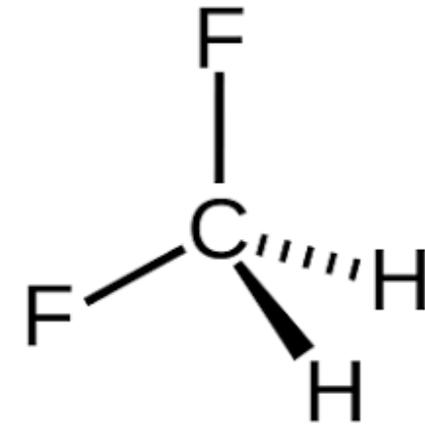
**DESIGN
(OUTSIDE)**



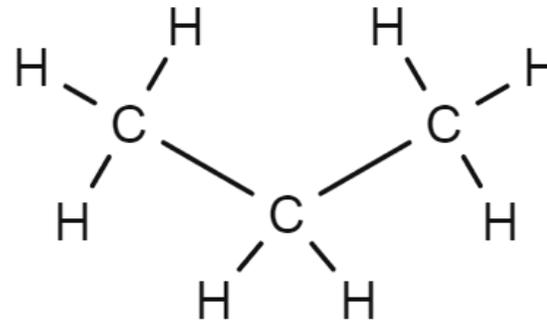
R32

phase out ~2026

no constraints



difluoromethane



propane

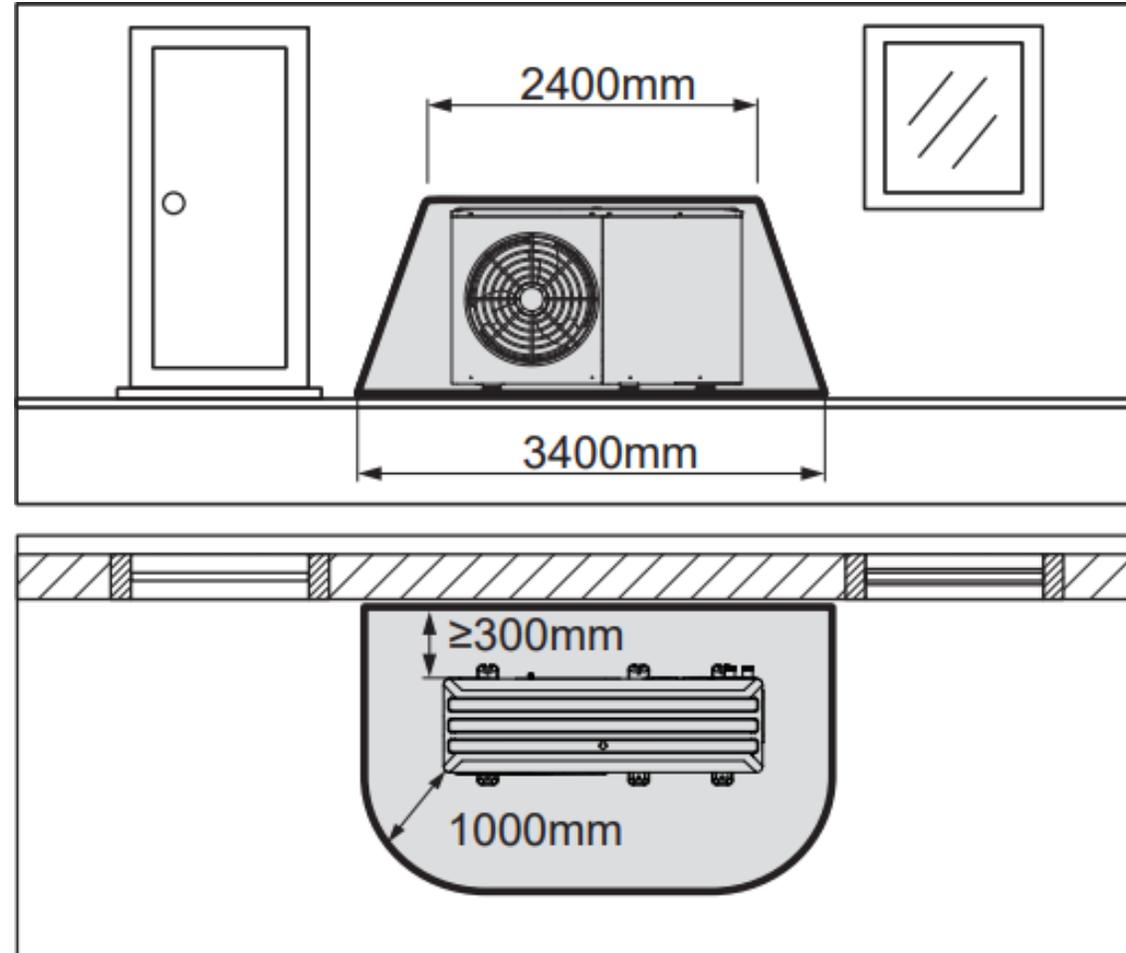
R290

now and future

flammable

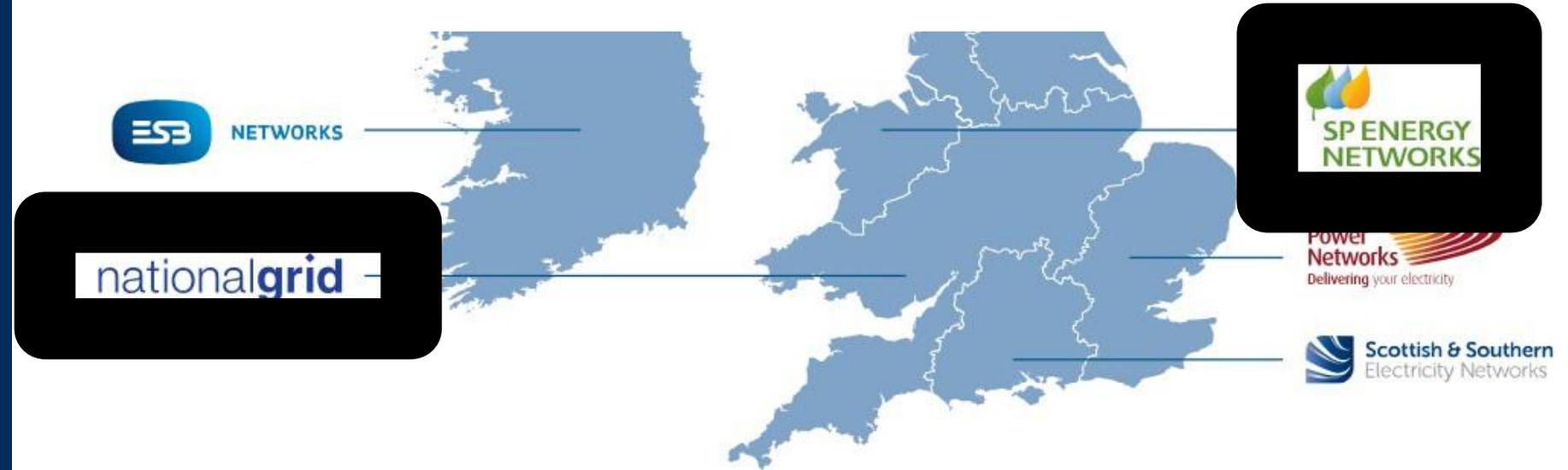
**REFRIGERANTS
CLEARANCES**

R290



ELECTRICAL & RENEWABLES AT CITY PLUMBING

ELECTRICAL DNO



<https://connect-direct.energynetworks.org>

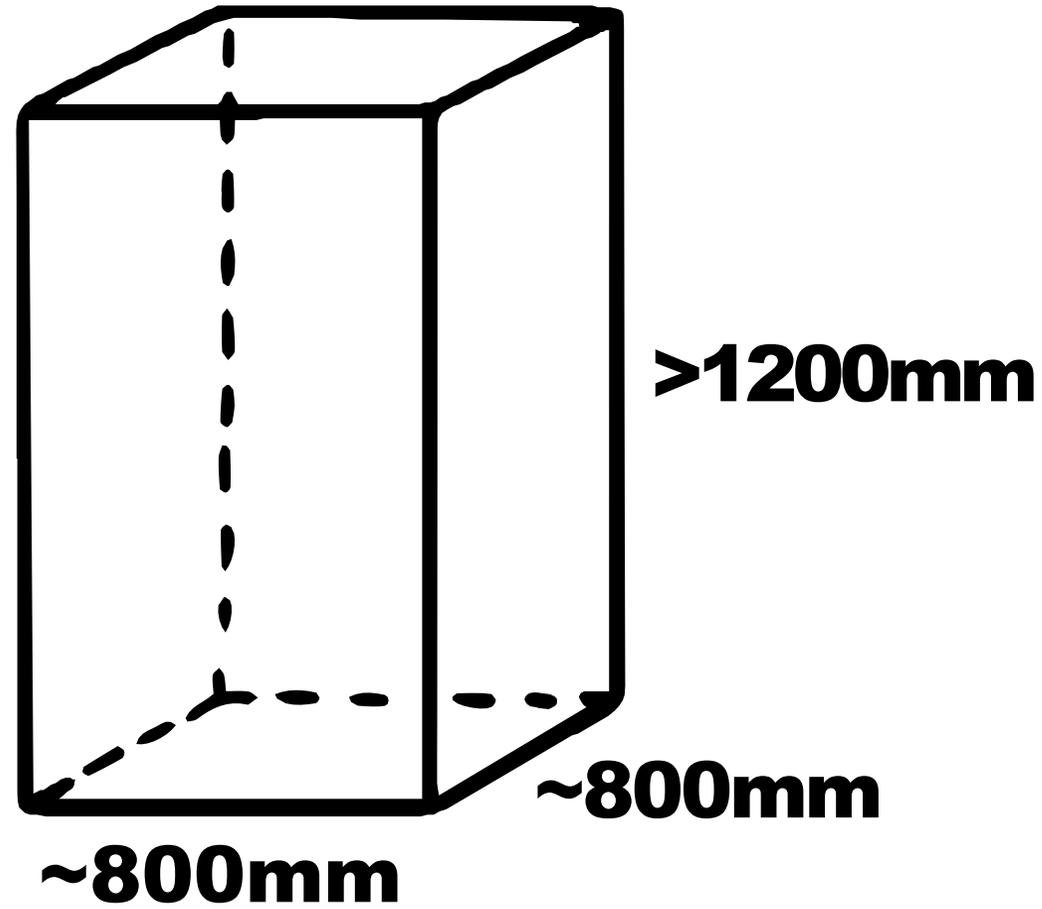
INSIDE

HOT WATER CYLINDER

PIPEWORK

RADIATORS

**INSIDE:
CYLINDER**



**INSIDE:
RADIATORS**

THE BIGGER THE BETTER!

600W output in a 21°C room



K2 800mm x 600m @ 50°C flow

or



K2 1400mm x 600mm @ 40°C flow

**INSIDE:
PIPES**

HALF THE TEMPERATURE DIFFERENCE

TWICE THE FLOW

4 x PRESSURE DROP (SAME PIPE)

CAN NEED PIPEWORK UPGRADES

INSIDE: PIPES

Pipe	Most heat downstream (kW @ 5K dT, <350Pa/m)	Flow velocity (m/s)
15 ø copper	1.6	0.58
22 ø copper	4.8	0.71
28 ø copper	9.6	0.85
35 ø copper	17.4	0.99

**INSIDE:
LOW HEAT
LOSS**

70m² @ 40 W/m² = 2.8kW

HEAT LOSS BELOW MIN HP CAPACITY

DELIBERATELY ADD WATER CONTENT

DESIGN FOR V.LOW FLOW TEMP

**INSIDE:
LOW HEAT
LOSS**

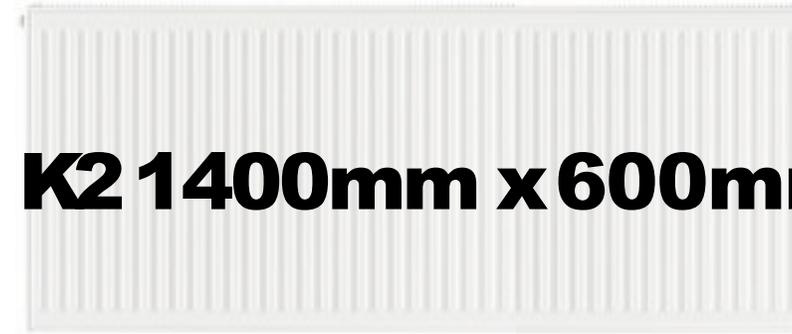
600W output in a 21°C room



K2 800mm x 600m @ 50°C flow

**5.5
litres**

or



K2 1400mm x 600mm @ 40°C flow

**9
litres**

or



K2 2400mm x 600mm @ 35°C flow

**16
litres**

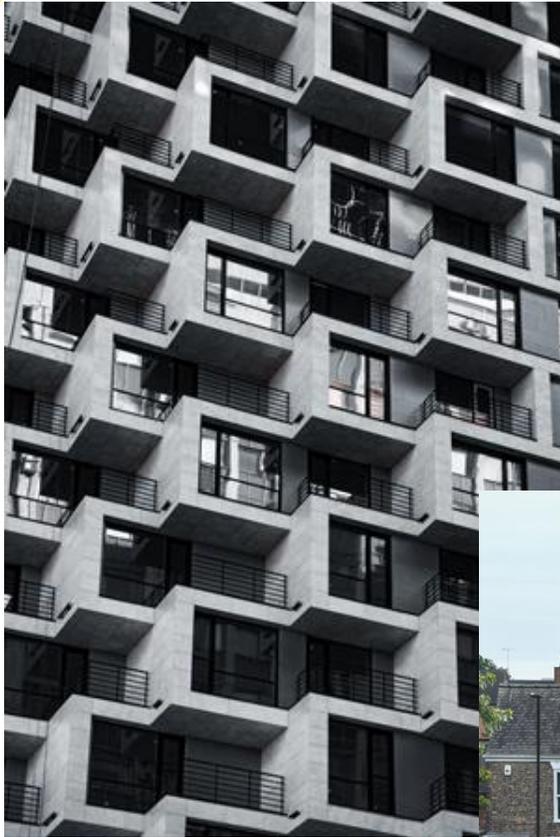
Heat Pump Technologies

Common Myths & The Lived Experience

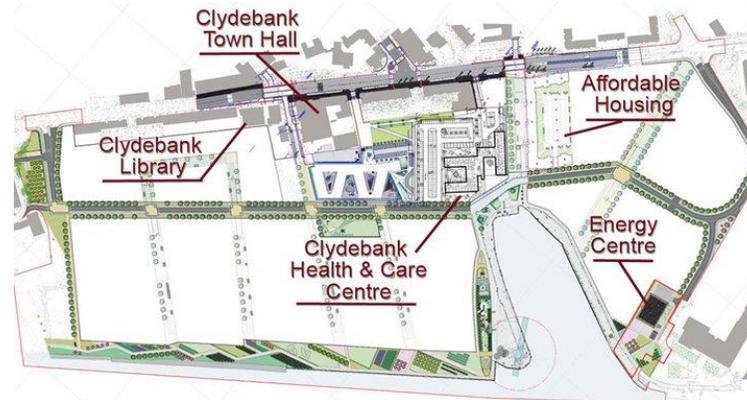
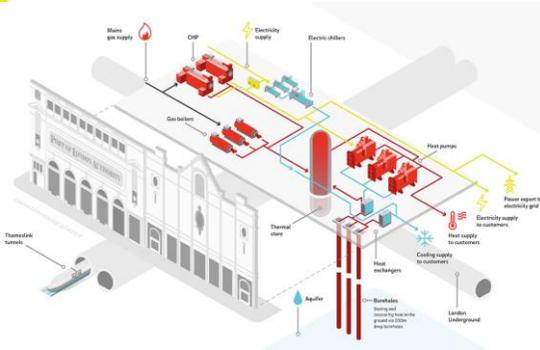
September 2024



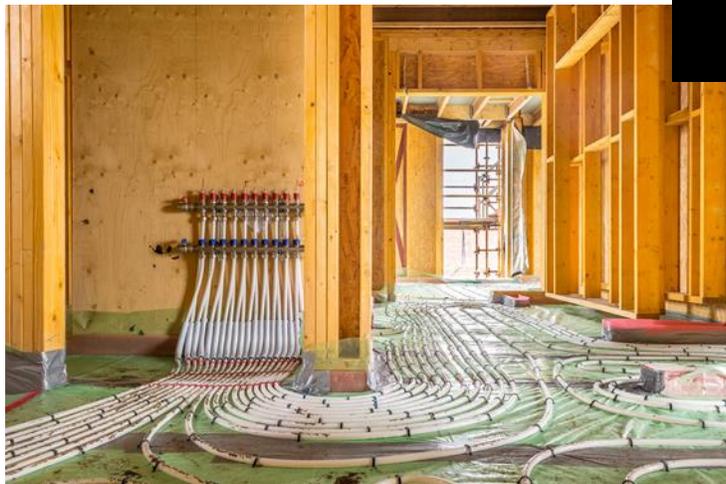
Heat pumps 101 – all house & development types



Heat pumps 101 – community scale systems



Heat pumps 101 – any emitter type



Heat pumps 101 – the visuals



Heat pumps 101 – Listed Buildings



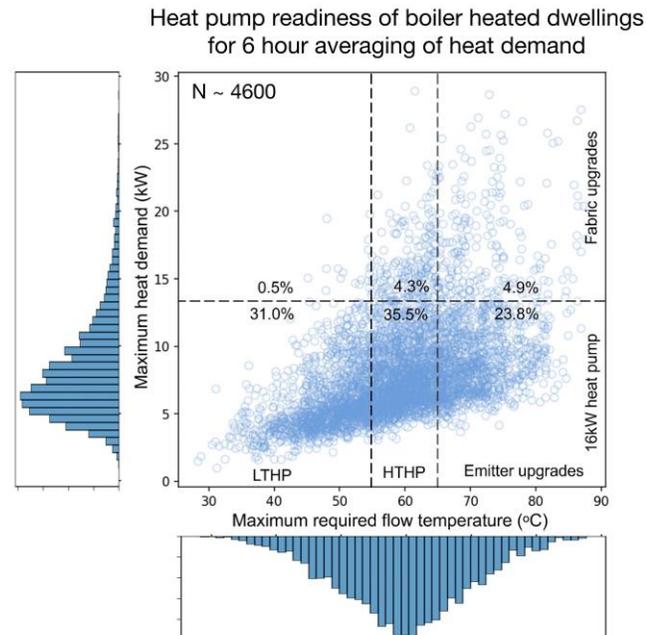
Fabric 1st or fabric 2nd

- Attention to fabric is essential to heating costs and emissions but is not a prerequisite to successful heat pump deployment
- High temperature (R290) heat pumps now provide wider consumer choices on when to carry out improvements to buildings and emitters
- Insulation comes in many forms and budgets
- Thermal imaging can be used to identify easy wins against the biggest losses



Research & references

- <https://www.nesta.org.uk/report/air-source-heat-pump-cumulative-noise-impact/>
- <https://www.pumpchic.com/>
- <https://heatpumpmonitor.org/>
- Radiator sizing



Comfort & air-quality

- Most people with weather compensated heat pump systems report enhanced comfort levels
- Burning fossil fuels generates CO₂, CO, NO_x, SO_x & particulates (PM_{2.5}). Approximately 25% are derived from heating
- Heat pumps are zero-emissions devices at the point of use
- Open fires to central heating, and gas to heat pumps, both for comfort & air quality



Thank you

www.hpf.org.uk

<https://www.hpf.org.uk/advice/homeowners>

Bean Beanland

Director for Growth & External Affairs

Bean.Beanland@hpf.org.uk

info@hpf.org.uk