

13 November 2025

Getting into the Details: Practical considerations for Heat Pump Installations

Fiona Hughes Green Heat Coop founder
Peter Miller Conga Founder
John Somerville Heat Pump owner



A Cambridge Carbon Footprint offer, with thanks to our funders and supporters:



Agenda

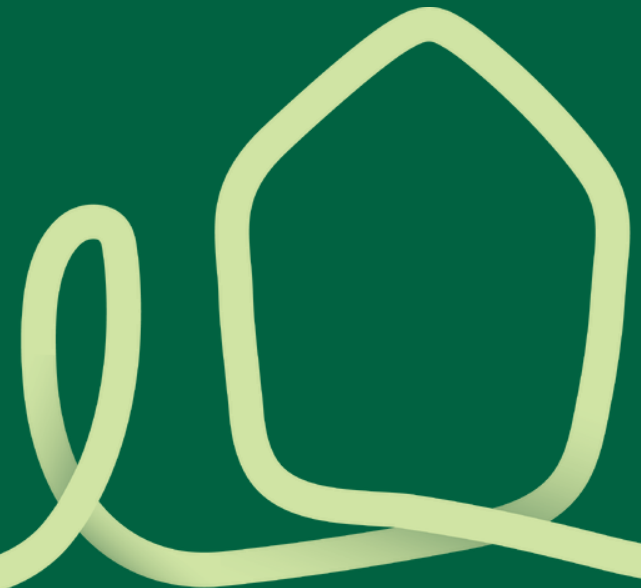
- 7:30 Intro
- 7:32 Practicalities - Fiona Hughes
- 7:44 Considerations – Peter Miller
- 7:56 Our Install – John Summerville
- 8:08 Q&A
- 8:28 Outro
- 8:30 Close, Optional extra Q&A

Practicalities of heat pump installations

Fiona Hughes

Open Eco Homes

13th November



About Green Heat Coop

- How can we inspire people to take action in their own homes, and how can we make it easier?
- Non-profit, volunteer-led, based in Royston
- Serving North Herts and South Cambs
- Members support education and outreach (£10/year)
- Heat pump home survey and advice (from £350)



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Why get a heat pump?

- Biggest carbon savings
 - 60% to 100% reduction
- Savings on running costs
 - £50 to £350 per year
- Steady, comfortable heating
 - Light cooling also possible
- £7,500 off upfront cost from Boiler Upgrade Scheme

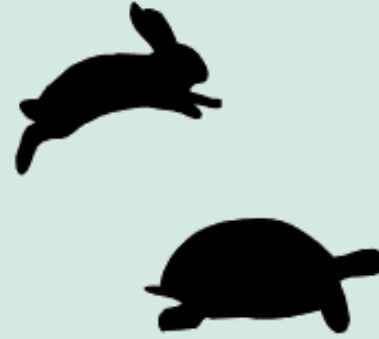
green
heat 



How is a heat pump different from a boiler?



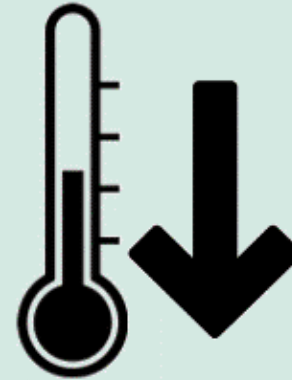
1. Moving heat,
not burning fuel



2. Running slow
and steady



3. Hot water
storage tank



4. Low flow
temperature

What size heat pump do I need?

House type	W/m ²	kW for 100 m ² house
Passive haus	2-10	0.1 to 1 kW
Eco/low carbon home	10-20	1 to 2 kW
Post-2006 new build	20-40	2 to 4 kW
Pre-2006 or recent renovation	30-50	3 to 5 kW
Post-1960 with cavity wall and loft insulation, double glazing	40-65	4 to 6.5 kW
Victorian houses with mixed glazing, limited loft insulation	65-85	6.5 to 8.5 kW
Victorian or older, minimal insulation	95-110	9.5 to 11 kW

Adapted from: <https://www.heatgeek.com/how-to-size-my-heat-pump-or-boiler-heat-loss-cheat-sheet/>

Will I need bigger radiators?

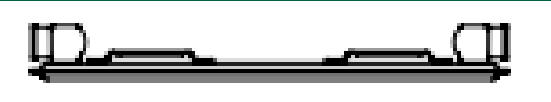
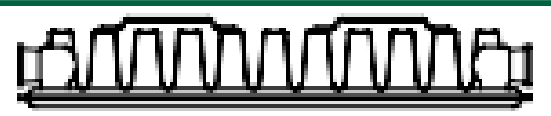
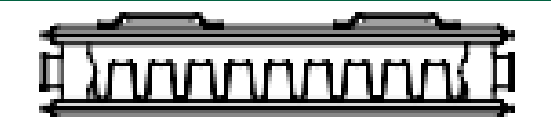


- Lower flow temperature → Larger radiators
- Depends on existing radiators
- Has insulation been added since radiators designed?
- Example house:

Flow temperature at -2 °C	35 °C	40 °C	45 °C	50 °C	55 °C	60 °C
Annual savings over 60 °C	£173	£148	£116	£87	£52	£0
# Radiator changes	7	5	3	2	0	0
Payback on radiator upgrades (years)	12.1	10.2	7.8	6.9	0	n/a

How much bigger?

- Radiators can be deeper rather than wider



P1 or 10	Single panel 40% less than K1	
K1 or 11	Panel with fins	
P+ or 21	Double panel with fins 37% increase over K1	
K2 or 22	Double panel, double fins 77% increase over K1	
K3 or 33	Triple panel, triple fins 145% increase over K1	

Radiator diagrams from
<https://www.stelrad.com/>

Will I need bigger pipes?

More water flowing to radiators → Water returning to heat pump is warmer → Heat pump is more efficient

Larger primary pipes may be needed

Peak demand	1.2 kW	3 kW	6 kW	10 kW	16 kW
Pipe diameter (copper)	10 mm	15 mm	22 mm	28 mm	35 mm

Depends on length of pipework

Do I need a new hot water tank?

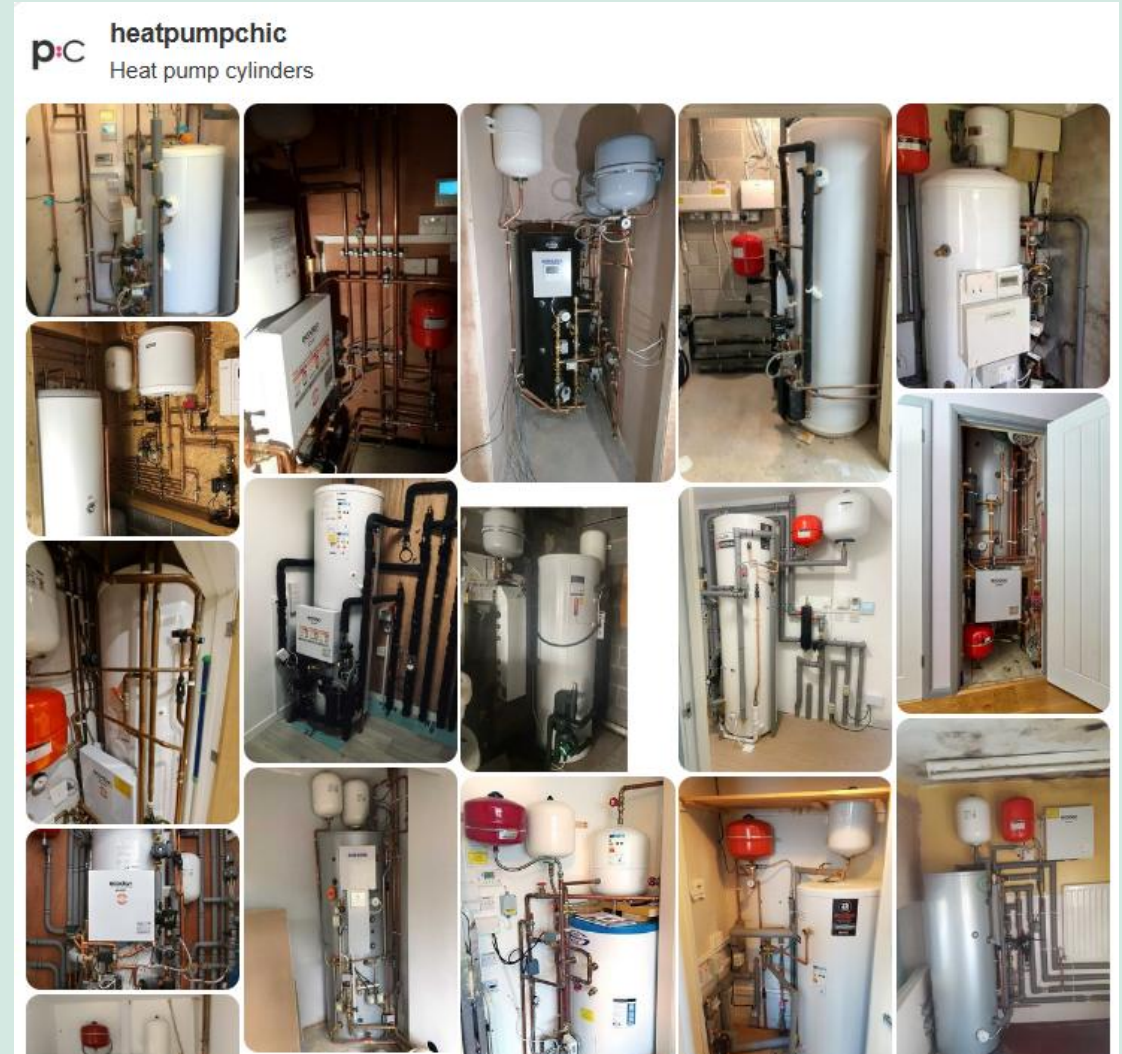
Size of home

Hot water demand



Unvented vs open vented

green
heat



<https://www.pumpchic.com/inside>

Where can I put the outdoor unit?

- Connections to heat, hot water, electricity
- Base and soakaway
- Noise limits
- Air flow



Heat pump install by Libtek: <https://www.libtek.co.uk/>

Thanks!

Fiona Hughes

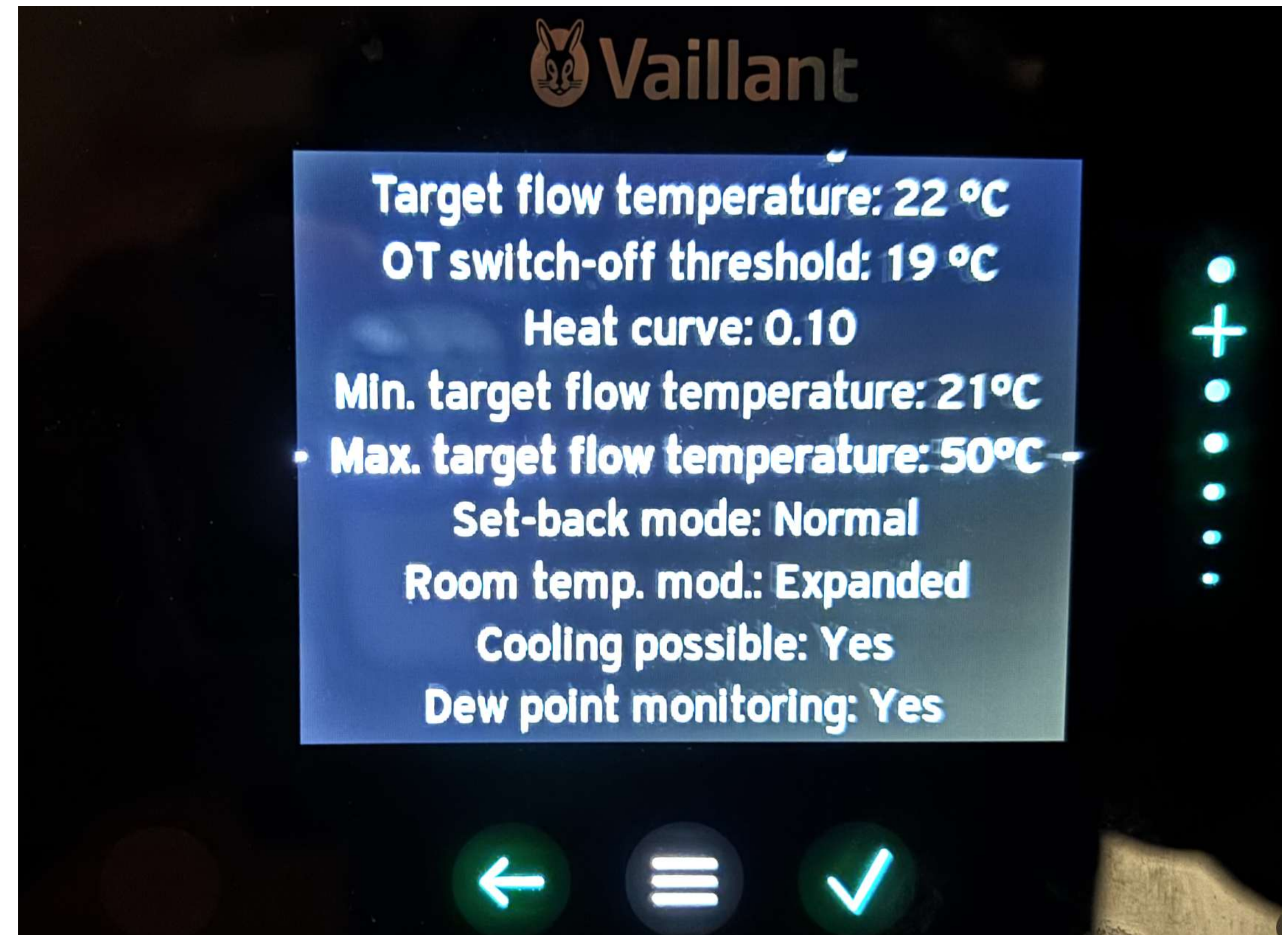
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Tuning

- Lots of settings and adjustments needed get a heat pump working really well and poor control settings can be catastrophic to performance and running costs.
- Typically a separate visit of a few hours into the first heating season after install to get it working optimally.



Cooling

- Heat pumps can easily and cheaply provide mild air conditioning in the summer, as well as heating in the winter.
- Both under floor heating and fan convectors can be used for cooling, but avoid taking water below 18°C to ensure you don't have a condensation problem.
- Radiators are not great but can be replaced as required.



Bathing!

- If a new cylinder is required it can be surprisingly small. Here is a eave space where we are replacing a pair of cold water cisterns with a 120L unvented hot water cylinder.



Bathing!

(Hot water cylinder)

- There is no need to replace an existing cylinder unless it isn't providing sufficient hot water at a sufficient pressure.
- If a new cylinder is needed we typically install a 120-150L unit (530mm diam by 900mm tall) with our rapid reheat unit.



Piping

- Existing 22mm (imperial $\frac{3}{4}$ ") piping is often completely adequate for primary feeds, even for 7kW units if pipe runs aren't too long
- 15mm (imperial $\frac{1}{2}$ ") and indeed piping is fine for 3kW of heat, ie half the output of a typical heat pump
- Micro-bore piping (ie 8, 10 or 12mm external) is often fine for a single radiator.



Siting

- Easy pipe run to current boiler location
- Not too close to neighbours windows
- Protective zone around unit
- Somewhere for cold / hot air to dissipate



Sizing

- Heat requirement typically in range 5-7kW
- Quick take on heat requirement: Take annual gas consumption in kWh. Divide by 3000. For example 15,000kWh for 5kW unit. For oil: divide litres of oil used in year by 300. I.e 2,000 L/h = 6.7kW peak requirement.
- Installer should also do room by room heat loss calculations
- But .. most installers greatly overestimate heat requirement leading to excessive work, higher cost and lower efficiency



- Sizing
- Siting
- Piping
- Bathing!
- Cooling
- Tuning

Heat pump retrofit considerations

Keeping it simple.

Peter Miller. Conga Ltd. Heat pump installer.

Our heat pump install

- Detached Victorian 3-bed
- Heavily refurbished:
 - Wall insulation
 - Loft insulation
 - Heat recovery ventilation
 - Draft proofing
 - Upgraded windows & doors
 - Solar PV 4kWp
 - Heating:
 - Gas boiler - old style vented
 - Air to Air mini split heat pump
 - 4kW Woodburner

System:

- Vaillant aroTHERM Plus 5kW
- Heatgeek 230L tank (HG230B6)
- Open energy monitor monitoring



We decided to get a heat pump for comfort & climate

We had a patched together heating solution that was pretty good on cost & carbon but:

- Relied on small number of heat sources so always had warmer & cooler rooms
- Were never totally happy with the gas or immersion to heat the hot water
- Got an electric car that soaked up our excess solar PV

Wanted:

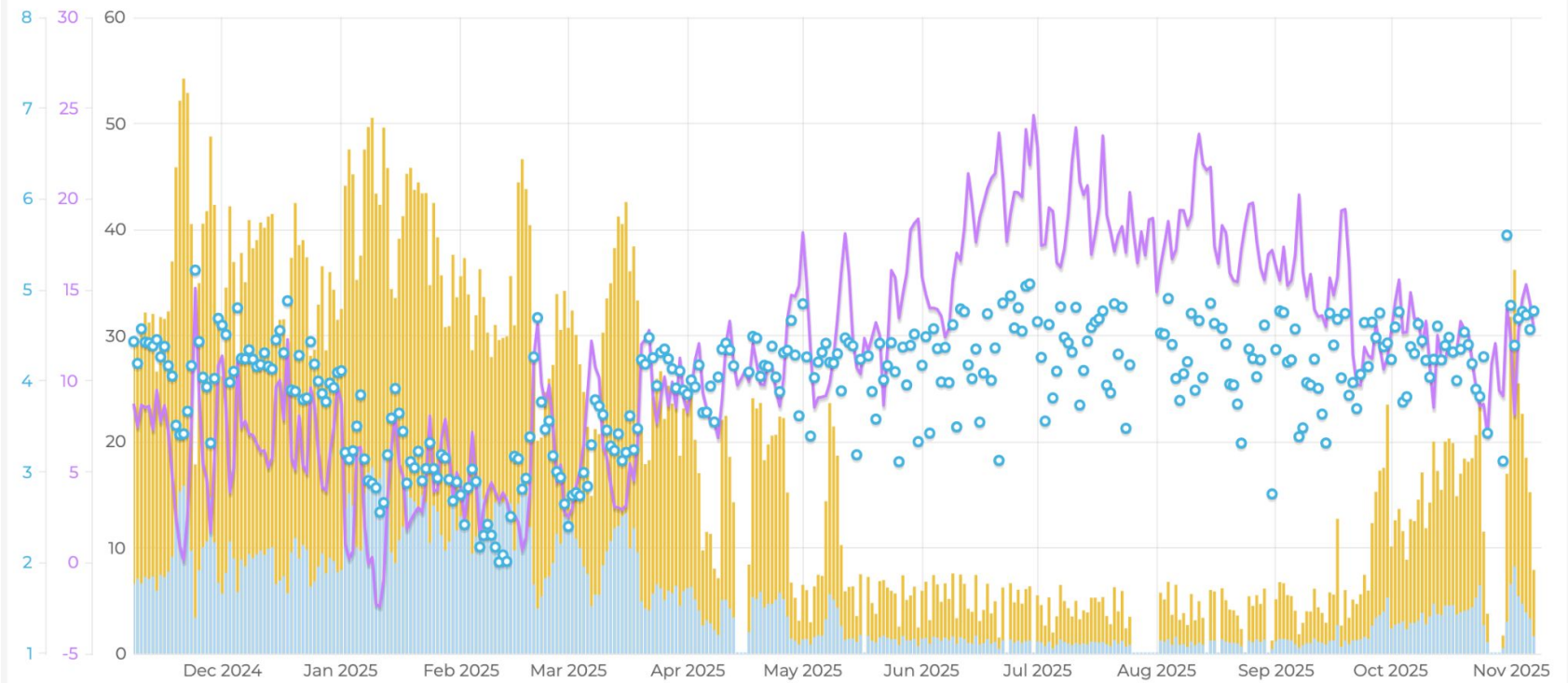
- To go from low-carbon to carbon-negative
- To get off gas entirely
- Single easy to control heating solution, stable temperature and easy operation

What sort of install do you want?

- Install cost versus running costs
- Quite different to a boiler - lots you can optimize (if you want to)?
- Monitoring & controls & App hard to add later
- Can be good to coordinate with other house upgrades at the same time

Are you an optimiser or a fit & forget?

High standard or low cost install?



COP in window: 3.59

TOTAL SINCE: 25 Oct 2024

Total Electricity input
1963 kWh

Total Heat output
7123 kWh

SCOP
3.63

The installation process - In advance

- EPC & Planning
- Can you get used to running your rads at low temperatures?
- Heat loss report
 - Design temperature - running costs
 - Radiators that need changing
 - How do you use your house (esp ventilation)
- Hot water tank - Various options
 - Run tank at lower temperature
 - Only run once every 24 hours
 - Can be cheaper with Smart tariffs/Solar
- Smart meter
 - Smart tariffs can save a lot with a heat pump
- Where do all the pipe runs go?



The installation process - Preparation & disruption

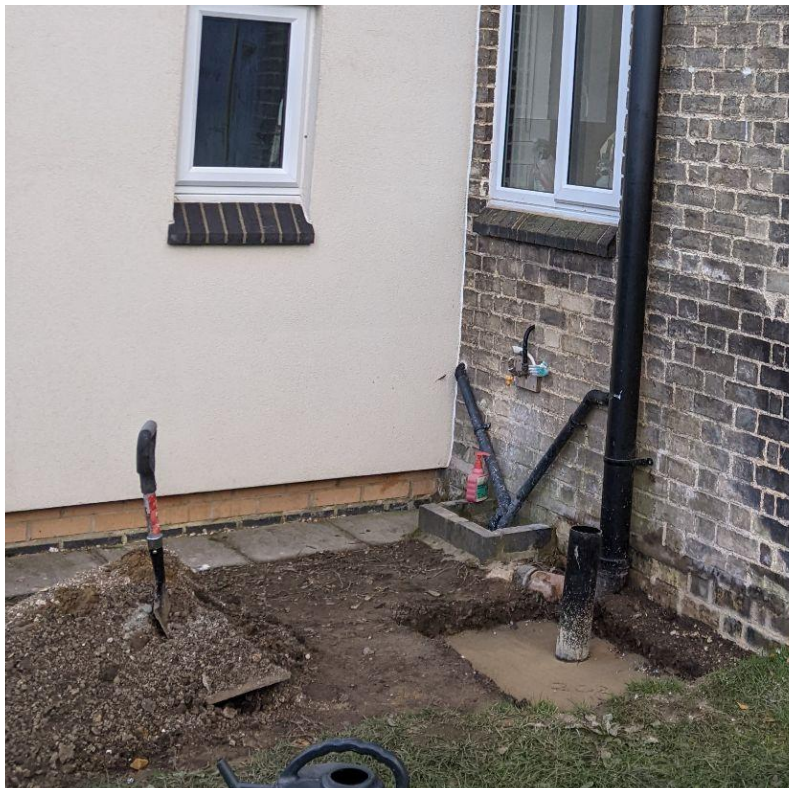
- Clear everywhere the fitters will need access too:
 - Boiler
 - External unit location
 - area round radiators to be changed
 - airing cupboard
- Worked from home to be on hand for any important decisions
- Our original boiler pipe runs needed modifying
- Hard to get electrics from consumer unit to external unit
- House in state of upheaval for a week

The installation process - Internal work



Adapting pipe runs

The installation process - External preparation



Solid base

John Somerville ©2025



Pipes through wall

November 2025

Open EcoHomes

The installation process - Boiler removal



Boiler

John Somerville ©2025



Boiler gone

November 2025



Extra cupboard

Open EcoHomes

The installation process - Airing cupboard



Old 130L tank - vented



New 230L tank - mains pressure

The installation process - Lounge radiator upgrade



Before



After

The installation process - Kitchen radiator upgrade



Before



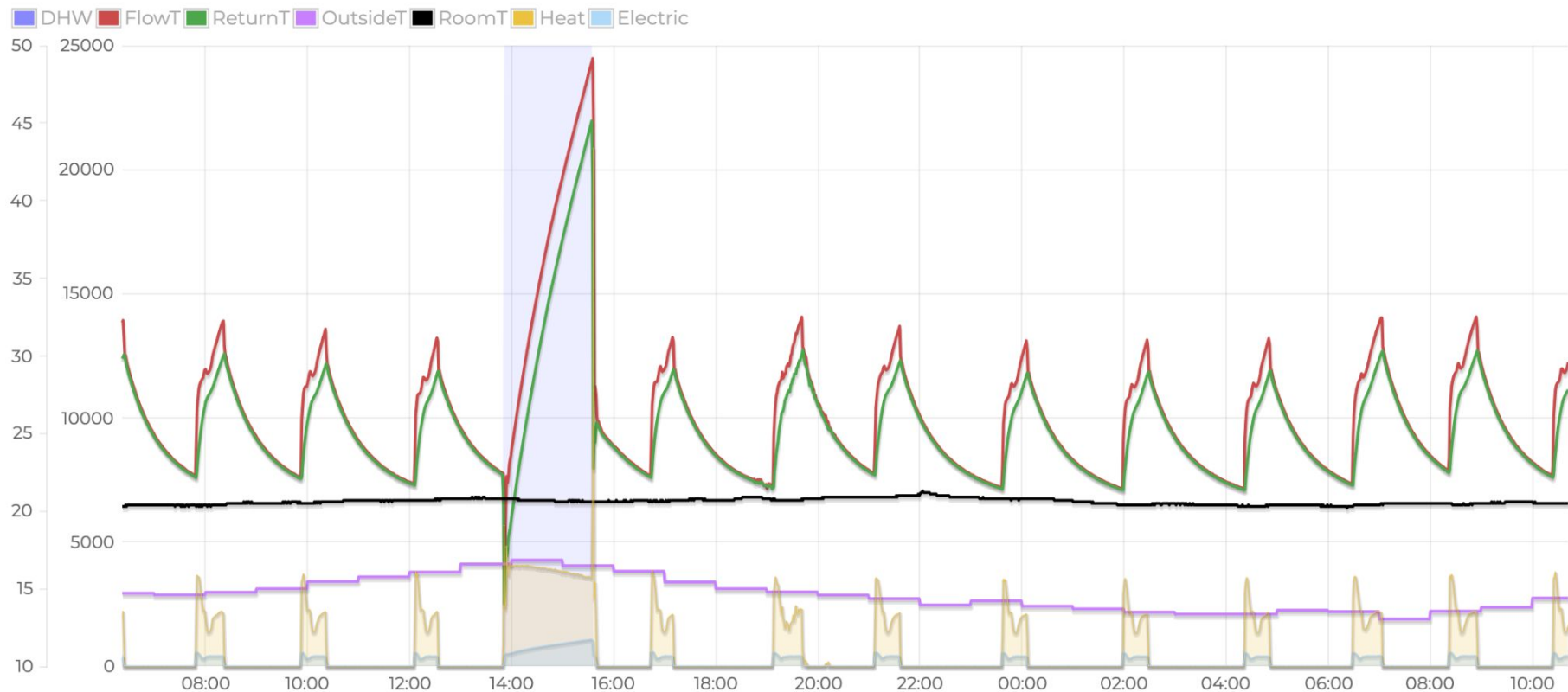
After

Outcome/thoughts after the first year

- Incredibly **comfortable stable temperature**
 - **Winter 2024 temperature 20-22C the whole time**
- Much **Quieter** than boiler
- CoP 3.6 - £470 nominal annual heating & hot water cost
 - With smart tariff, solar PV & battery about £250/year
- **Free of gas** (and the standing charge)
- **Nice radiators**
- **Mains pressure hot water** feels like a great house upgrade
- Enjoy having an **extra kitchen cupboard** space now the boiler's gone

Operation in Autumn/Spring

10-15C outside; house @ 21C; radiators occasionally at 30C



COP in window: 4.70

John Somerville ©2025

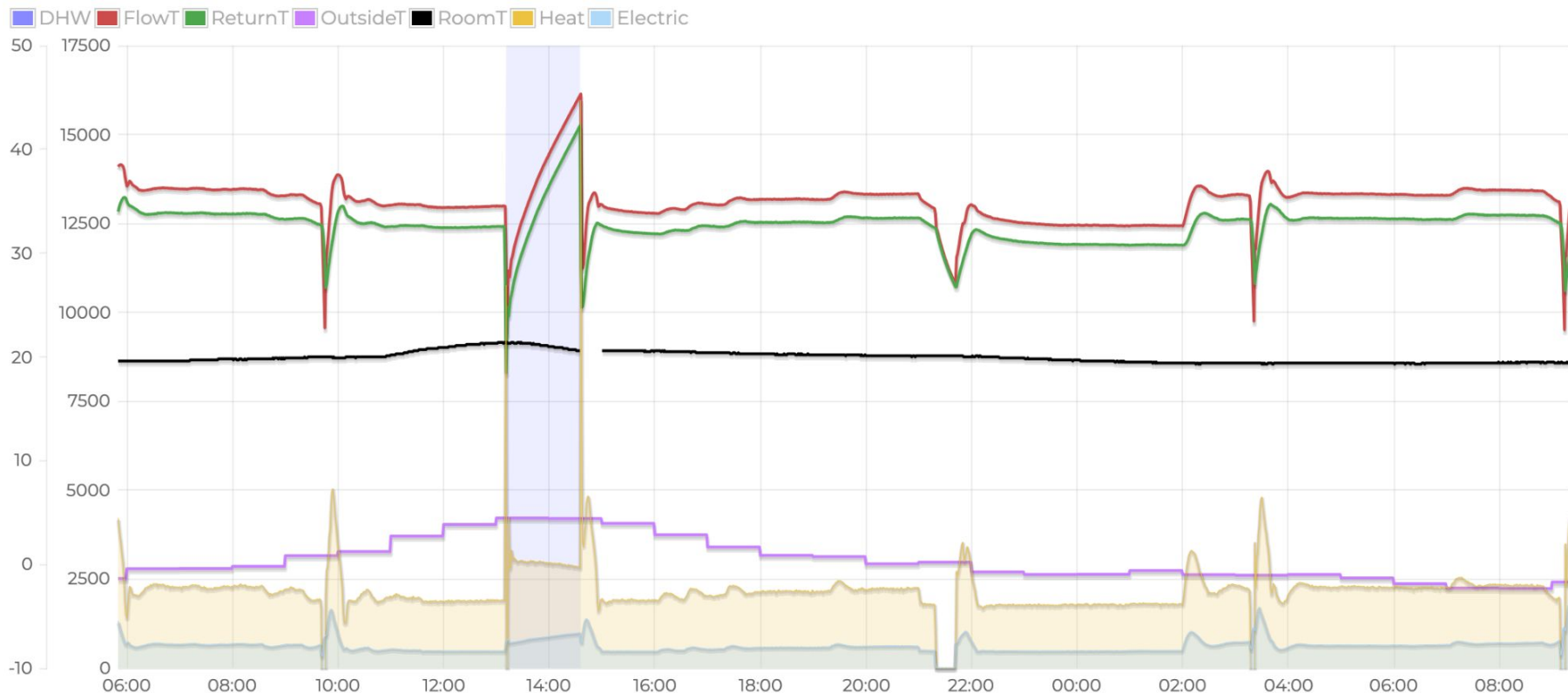
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HIDE DETAIL

Open EcoHomes

Operation in Winter

5 to -5C outside; house @ 21C; radiators at 35C



COP in window: 3.41

[HIDE DETAIL](#)

Tips for people thinking about a heat pump installation?

- The installer matters
- Fit a **temperature sensor** - so quiet you wonder if it's working
- Consider **nice radiators** & oversize **hot water tank**
- Can you **get off gas** at the same time?
- **Open Energy Monitor**(ing) equipment was a really helpful:
 - Training aid
 - When we had an issue the installer was able to fix it remotely
- Specialist **forums** can be useful for research (especially for optimisers)
- **Visit a property** (like yours) with a heat pump <https://app.visitaheatpump.com>
- Don't forget **making good**, painting pipes, filling holes etc.





Your next steps

- Find out how you can get started with your retrofit
- Book another tour or talk
- Research our past case studies
- Book a training session and borrow a thermal imaging camera
- Use Transition Cambridge's personalised home energy advice tool

Please complete the event feedback when you leave this talk

Can you help us?



Make a donation to help us run more Open Eco Homes tours:

cambridgecarbonfootprint.org/donate

Share your experiences on social media: **#OEH2025**

Give us feedback to help improve

Thank you for your support!