Green Heat Coop

Intro to Heat Pumps

Eco Whittlesford

28th November 2023

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About Green Heat Coop

- Start-up community energy organization
  - Non-profit, co-operative company
  - Join as a member to support us in building a local green heating community (£10/year)
- What are we doing now?
  - Consumer outreach and education
  - Heat pump advice and home surveys
  - Developing plans for a community retrofit study for Royston & North Herts villages
  - First AGM – Thursday 7th December, Royston
- The vision
  - Community-led, home energy and retrofit advice service


Sustain-Ability


Heat pump open house


Green Heat Coop

Green Heating Plan

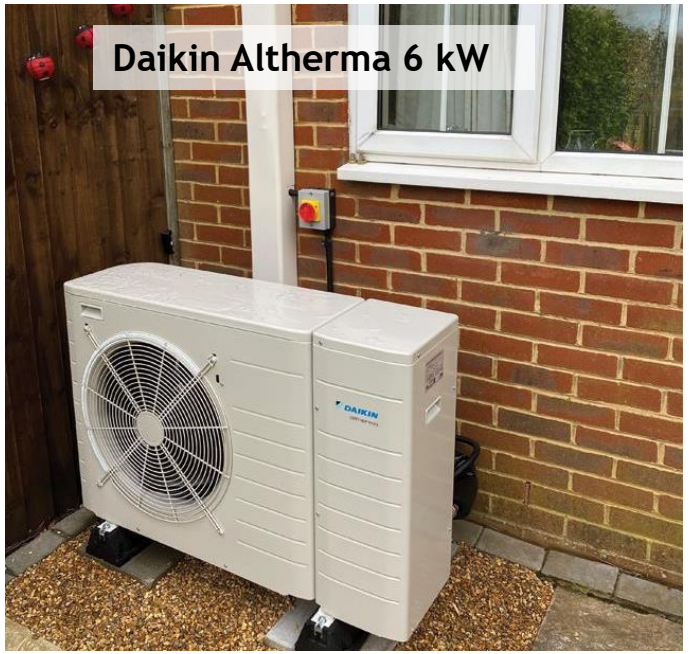
Client:	XXXXX
Address:	XXXXX, Royston, SG8 XXX
Date of survey:	15/05/2023
Date of report:	05/06/2023

What is a heat pump?
Why get a heat pump?
How do I get a heat pump?

What is a heat pump?

- Like an air conditioning unit (if “air source”)
- “Ground source” units use flexi-pipes that go under your garden, or a bore hole
- Air-to-water and ground-to-water systems plug into the central heating system and use a hot water tank
- Air-to-air systems heat the air directly and can also provide cooling, but don’t provide hot water
- Powered by electricity

More air-source heat pumps



https://www.hvpmag.co.uk/images/teaser//W725/11kwdaikinmono_75L.jpg
https://pumpchic.com/rate-pumps/#!gallery/1/image/33/12kw-W
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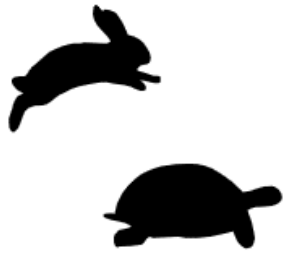
How is a heat pump different from a boiler?

1. **Moving heat instead of making it**

- Heat pumps *move heat* from outside to inside using electricity.
- Efficiencies above 100%, typically 320% to 400%
- Compare with :
  - Boiler efficiencies of 75 – 95%
  - Electric heating efficiency of 100%

2. **Running slow and steady**



- Heat pumps work best when keeping your home at an even temperature.
- Different control method than you may be used to
- Set-back temperatures for overnight and when you’re away

How is a heat pump different from a boiler?

3. **Low flow temperature**

- Heat pumps are most efficient when the water flowing to the radiators is at 50°C or less.
- The whole heating system needs to work together to heat your home with low flow temperatures.
- This may mean making changes to the pipes or radiators.

4. **Hot water storage tank**

- Heat pumps are sized to match your home's heating demand, not your instant hot water demand.
- Typical size 5 to 10 kW
  - vs 18 to 35+ kW for boilers
- Need a hot water tank
  - Other solutions available if this is not possible.

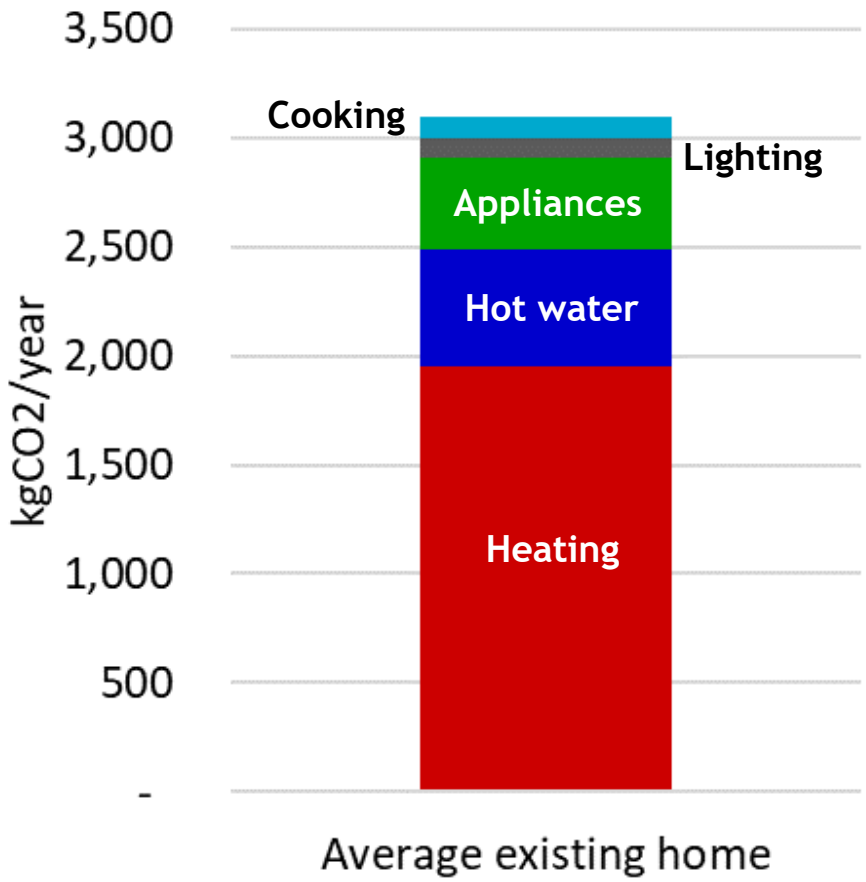
Why get a heat pump?

The biggest savings on your home's carbon emissions

- 60% to 100% reduction
- More savings than:
  - Solar PV – 12%
  - High efficiency boiler – 5%
  - Wall insulation – 30%
- Comparable to switching to an EV or active travel

	Petrol Car	Natural gas heating
CO2 emissions	2.4 kg/L	185 g/kWh
Use/year	700 L 7500 miles	12,000 kWh
Emissions/ year	1.7 tonnes	2.2 tonnes

(Roundtrip flight to New York from London: ~1.8 tonnes CO2)



UK Housing: Fit for the Future?, CCC, 2019
https://www.theccc.org.uk/publication/uk-housing-fit-for-the-future/

Why get a heat pump?

For moderate savings on running costs

Running costs for average home	Air-source heat pump (ASHP)	Ground-source heat pump (GSHP)	Gas boiler
Annual efficiency (SCOP) at 40°C flow temperature	370%	400%	87%
Annual heat demand	11,000 kWh	11,000 kWh	11,000 kWh
Annual energy demand	2975 kWh electricity	2750 kWh electricity	12,600 kWh gas
Annual cost	£830	£770	£905

Green Heat Coop experience / Current and upcoming energy price caps

Further cost savings are possible with:

- Smart tariffs
- Solar PV
- OVO heat pump tariff

Upfront costs	Air-source heat pump (ASHP)	Ground-source heat pump (GSHP)	Shared loop GSHP
Mean installation cost	£13,200	£25,000	£15,500
Boiler Upgrade Scheme	-£7,500	-£7,500	-£7,500
Upfront cost to pay	£5,700	£17,500	£8,000

High-end boiler installation: approx. £4,000

Boiler Upgrade Scheme: Monthly statistics, September 2023

How do I get a heat pump?

- Home survey
  - Room-by-room heat loss estimate
  - Heat pump and hot water tank size and location
  - Changes to heating system
- Fuse upgrade / planning permission
  - Not needed in many cases
- Installation over ~5 days
- Not sure where to start? Green Heat Coop can help with:
  - Early-stage advice
  - Heat pump open home visits
  - Home surveys
  - Finding an installer
  - Snagging after installation

- Do I need more insulation?
  - Comfort and efficiency with a heat pump depend on flow temperature, not level of insulation
  - Insulation will reduce heat demand, no matter the heat source
  - Worth considering:
    - Cavity wall insulation
    - Loft insulation

    } Required for Boiler Upgrade Scheme

    - Draught-proofing
    - Further measures if flow temperature <50°C not possible with radiator upgrades

Useful links from Green Heat Coop and elsewhere

- Heat Pump Test Drive
  - Use your phone to see and hear a heat pump in your garden
- Running cost calculator
  - Compare annual energy costs for a heat pump and a gas boiler
- Join the Green Heat Coop mailing list
  - Keep up to date about our events and projects
- Interactive heat pump advice tool
  - From Nesta
  - Note this tool is still being refined
- Visit a Heat Pump
  - Sign up to attend or to host heat pump open home events
  - Also from Nesta
- Heat Pump Monitor
  - Real-time monitoring data of heat pumps around the country

Thank you!

Q & A

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Find us on social media:

First AGM:
Thursday 7th December, 8pm
Coombes Community Centre
Royston

How does a heat pump work?

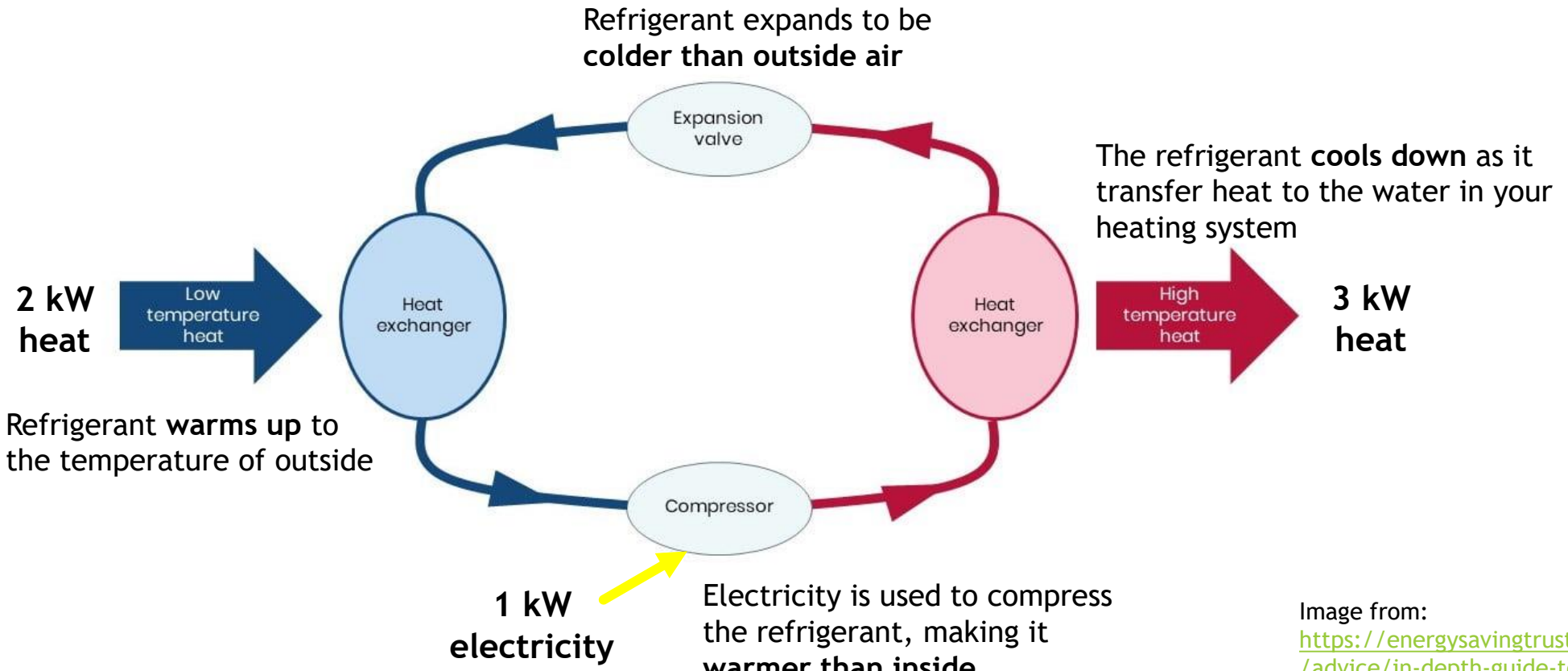

Image from: https://energysavingtrust.org.uk/advice/in-depth-guide-to-heat-pumps/

- Coefficient of performance = $\frac{heat\ from\ outside + electricity}{electricity}$