Retrofitting heat pumps to nondomestic buildings

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Decarbonisation of Heating and Cooling 2025

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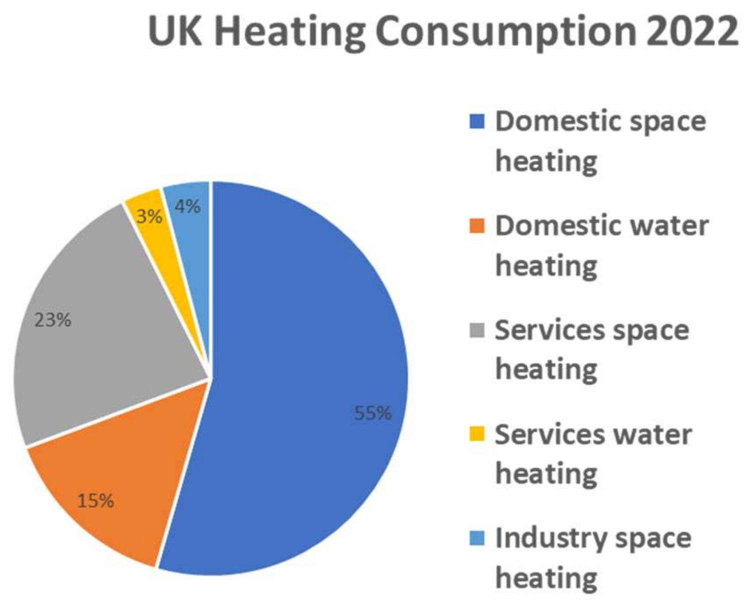
Retrofit of non-domestic buildings is important

- Non-domestic buildings are responsible for about 1/3 of UK heating energy in buildings
  - 2M buildings compared to 30M dwellings – but 7+ times higher consumption per building

- Heat pump penetration is about ½ that for dwellings
  - Annual UK sales about 2K to 3K, of which perhaps 2/3 are retrofit, compared to about 100K domestic



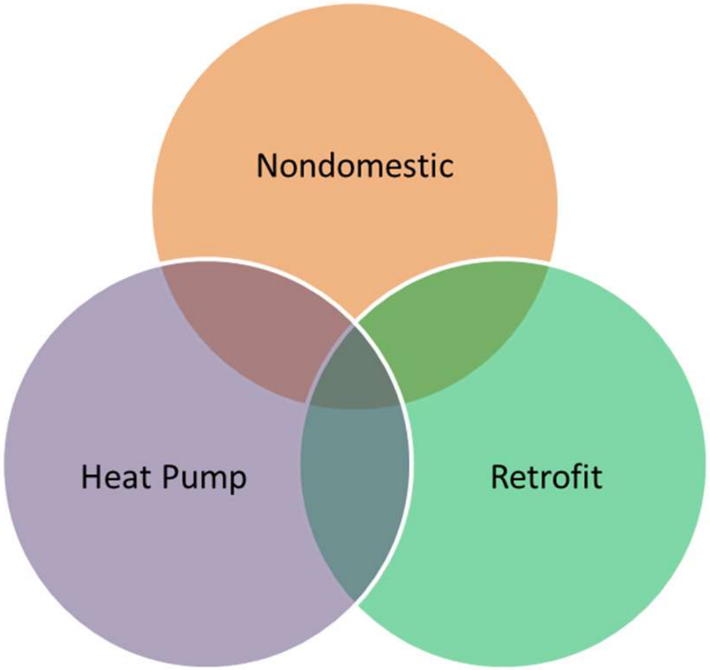
Retrofitting heat pumps in nondomestic buildings is complicated

- Many different:
    - Types and sizes of buildings
    - Existing HVAC systems
    - Heat pump options

- “Retrofit” can be boiler replacement to deep refurbishment

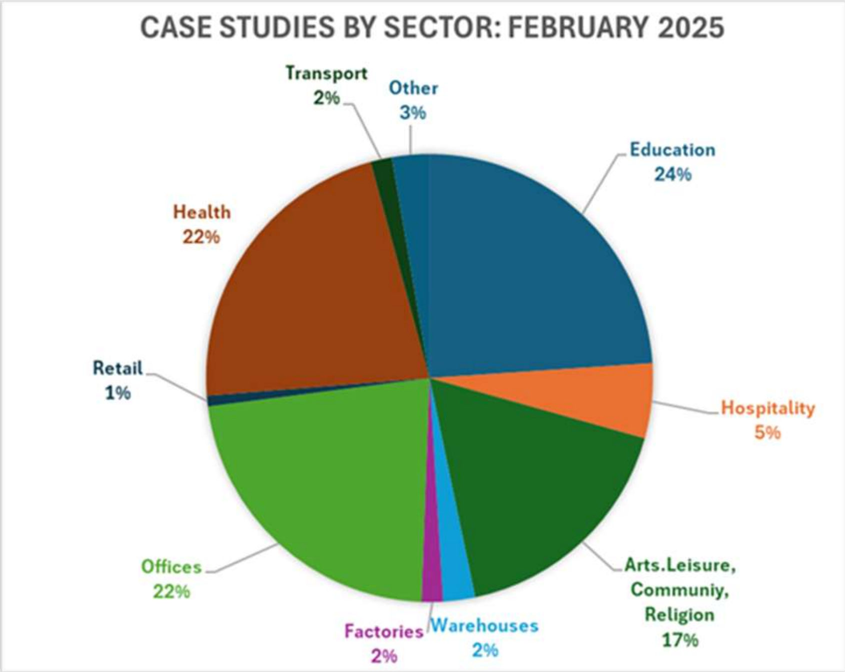
- Client motivations differ

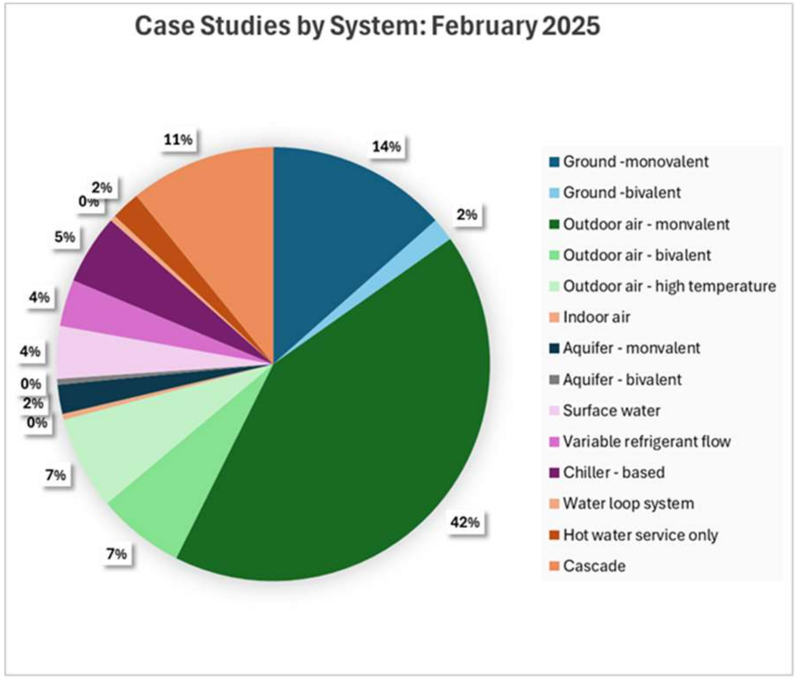
- Little specific guidance:
    - AM17, PAS2038, some overseas



Distribution of reported retrofits

by number *(Source: IEA Annex 60)*





PSDS (brown, blue, dark green sectors) is a major influence: refurbishments of selected offices (light green) are driven by increased rental value

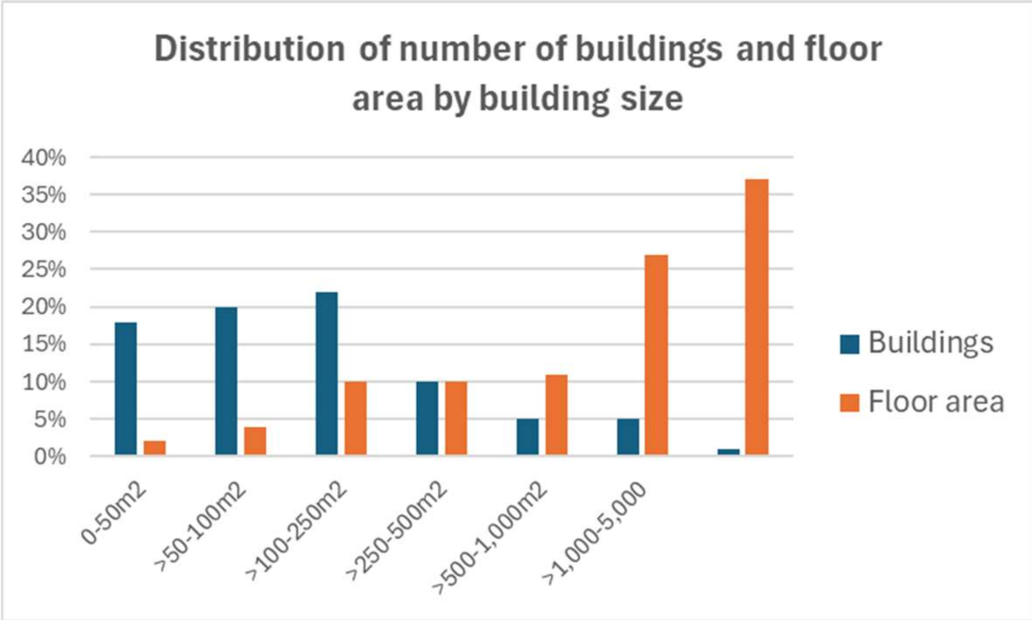
Air source including hybrid and high temperature (green) dominate. Ground source systems (blue) are bigger than air source

Constraints on nondomestic heat pump retrofit

- **Price.** No strong “unique selling point” to add value
  - PSDS shows that financial incentives can be effective
- **Complexity of choice.** Customers have little knowledge of an unfamiliar product. Installers have variable levels of experience.
  - Consideration of other operational and refurbishment options
- **System design quality**. Manufacturers report significant number of examples of poor system design
  - Limited guidance available for nondomestic retrofit
- **Supply chain complexity.** With a few exceptions, the supply chain is fragmented: manufacturer, system designer, installer

Potential nondomestic customers by size

- Most **heating energy** is used by a small number of large users
  - Who probably have formal design and procurement procedures.
- Most **potential retrofits** are in smaller buildings
  - Who may use less formal procurement routes?

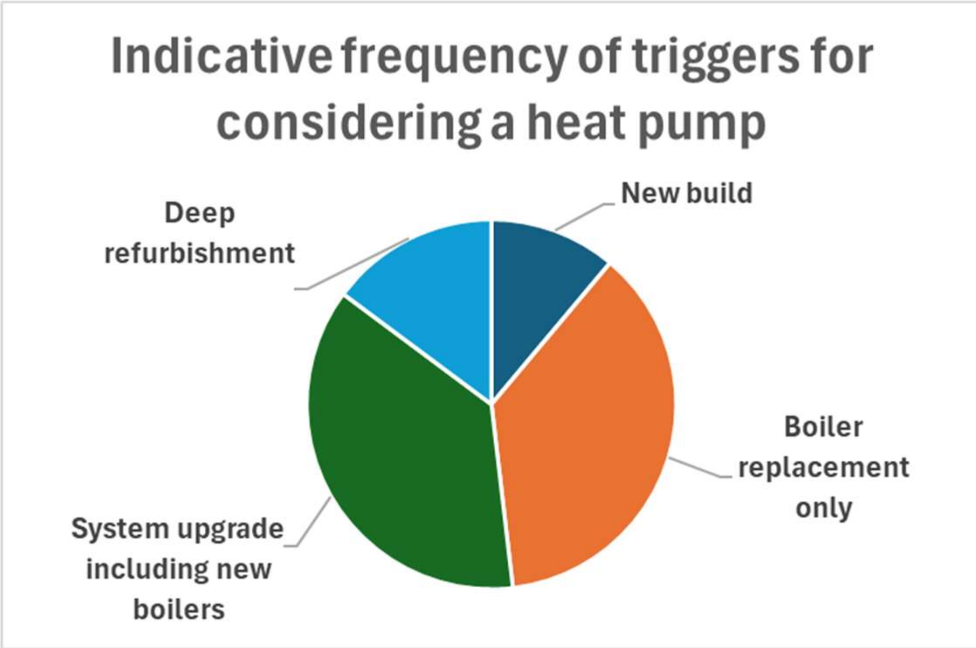


- Most potential interest is from small or medium sized enterprises.
  - **7%** of nondomestic gas customers have considered a heat pump
  - **34%** of large businesses have done so

Source: Ofgem Non-Domestic Consumer Research 2022

What policies could trigger heat pump retrofit?

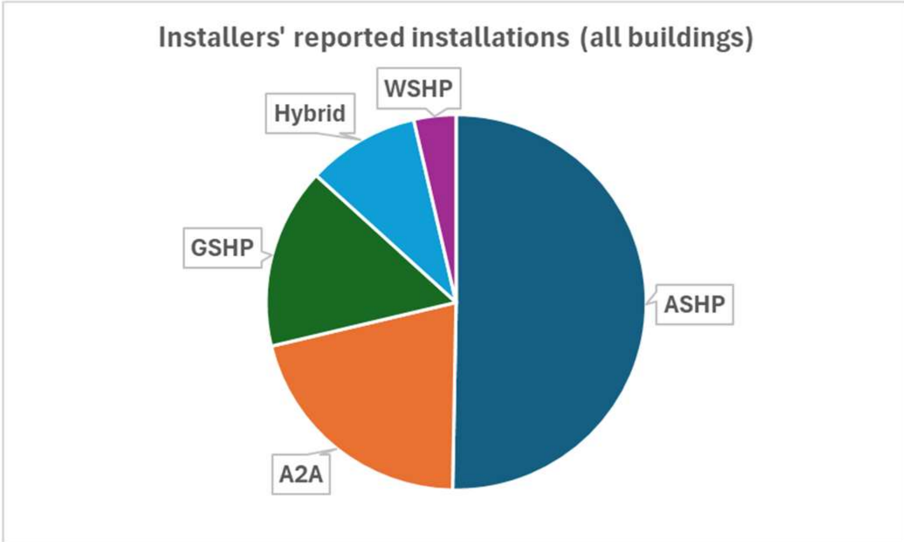
- Ban on fossil-fuel boilers
  - About 7% of boilers replaced each year
  - And 3%? of distribution systems
  - Deep refurbishments <1%?
- More demanding MEES
  - Potentially impact about 20% of nondomestic buildings, depending on allowable exemptions
  - Over a 10-year period



Supply Chain: installers

- Survey results show:
  - 25% of HVAC installers offer heat pump installation
  - 40% of them work in existing commercial buildings
    - 30% of small and 68% of larger businesses
- Implying about 2000 businesses offering nondomestic retrofit
  - Mostly businesses with less than 11 employees

Source: BEIS Heating and Cooling Installer Study 2023



- Heat pumps are only a small part of their business
- At this stage of the market, experience is bound to be uneven

Supply Chain: issues

- Fragmentation of the customer journey
  - There are joined-up “one stop shop” businesses
  - But often separate manufacturers, system designers, installers, aftercare
    - Specialists in particular areas
- Uncertain reliability of design and installation quality
  - There are good refurbishment specialists who understand heat pumps
  - But apparently many installers with limited experience
- Little real-life information on costs and performance
  - The IEA project has revealed that cost, performance and market data are in very short supply worldwide

Guidance and Training

- **Current guidance**
  - CIBSE AM17. Heat pump installations for large non-domestic buildings: includes useful references to retrofit
  - CIBSE Training “The Electrification of Heat”: includes example schematics
  - PAS 2038 “Retrofitting Non-Domestic Buildings for Improved Energy Efficiency”: fabric issues
- **On the way**
  - CIBSE supplementary technical guidance: work about to start
  - CIBSE Training “Mastering the Application of Heat Pumps” starts in June

BUT

- How do we ensure that knowledge reaches the people who need it?
- Do we need certification?

Summary

- Low market penetration of nondomestic heat pump retrofit

- Significant potential but substantial challenges
  - Still an immature market

- There are knowledgeable, experienced suppliers
  - But generally, the supply chain is fragmented

- Little real-life feedback

- **Much still to do (and not only in the UK)**

Thank you
Any questions?

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