

# Decarbonising heat in cities: the potential and challenges of heat networks

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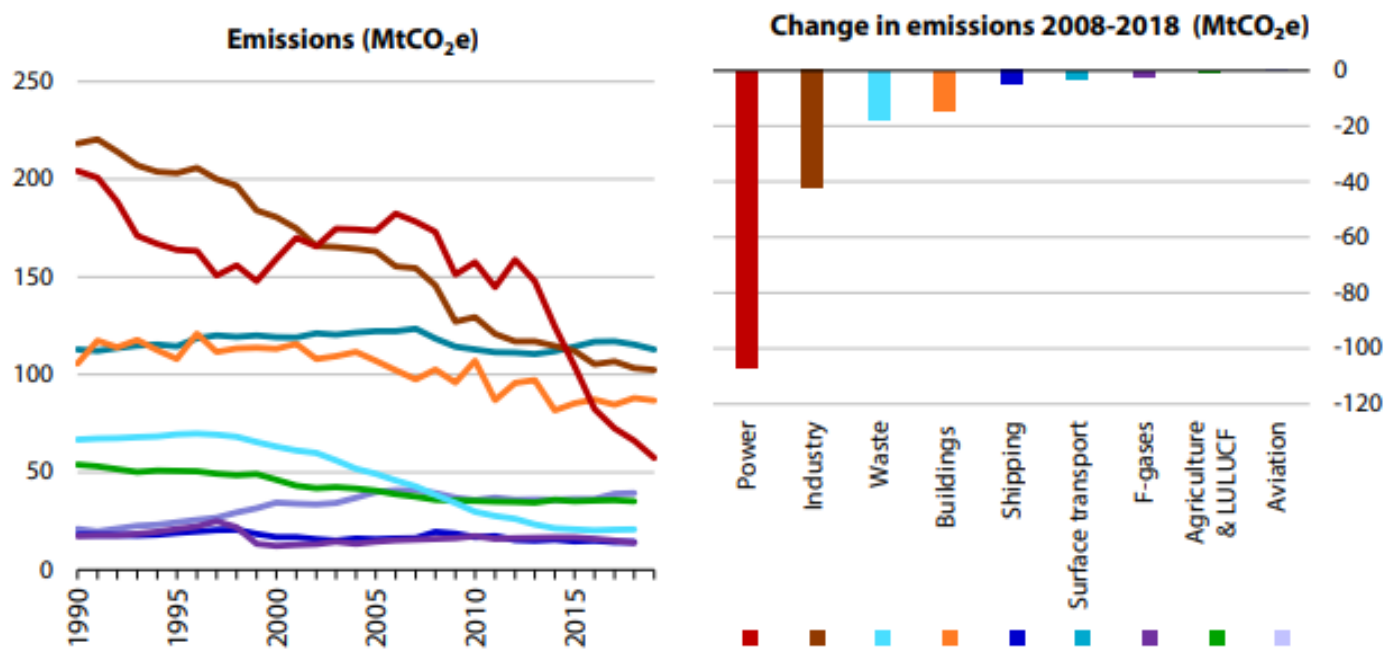
Global Sustainability Institute seminar, ARU, 23<sup>rd</sup> March 2021

# What's coming up

- The challenge of decarbonising heat
- The potential of heat networks
- Barriers to deployment and the evolving policy landscape
- Increasing importance of place-based action
- Heat networks as a 'hinge' in local restructuring of energy system roles
- Centralisation or decentralisation? – (limits of) devolution and still much uncertainty in heat decarbonisation

# Most emissions reductions have come from electricity sector to date

Figure 2.3. UK greenhouse gas emissions by sector 1990-2019



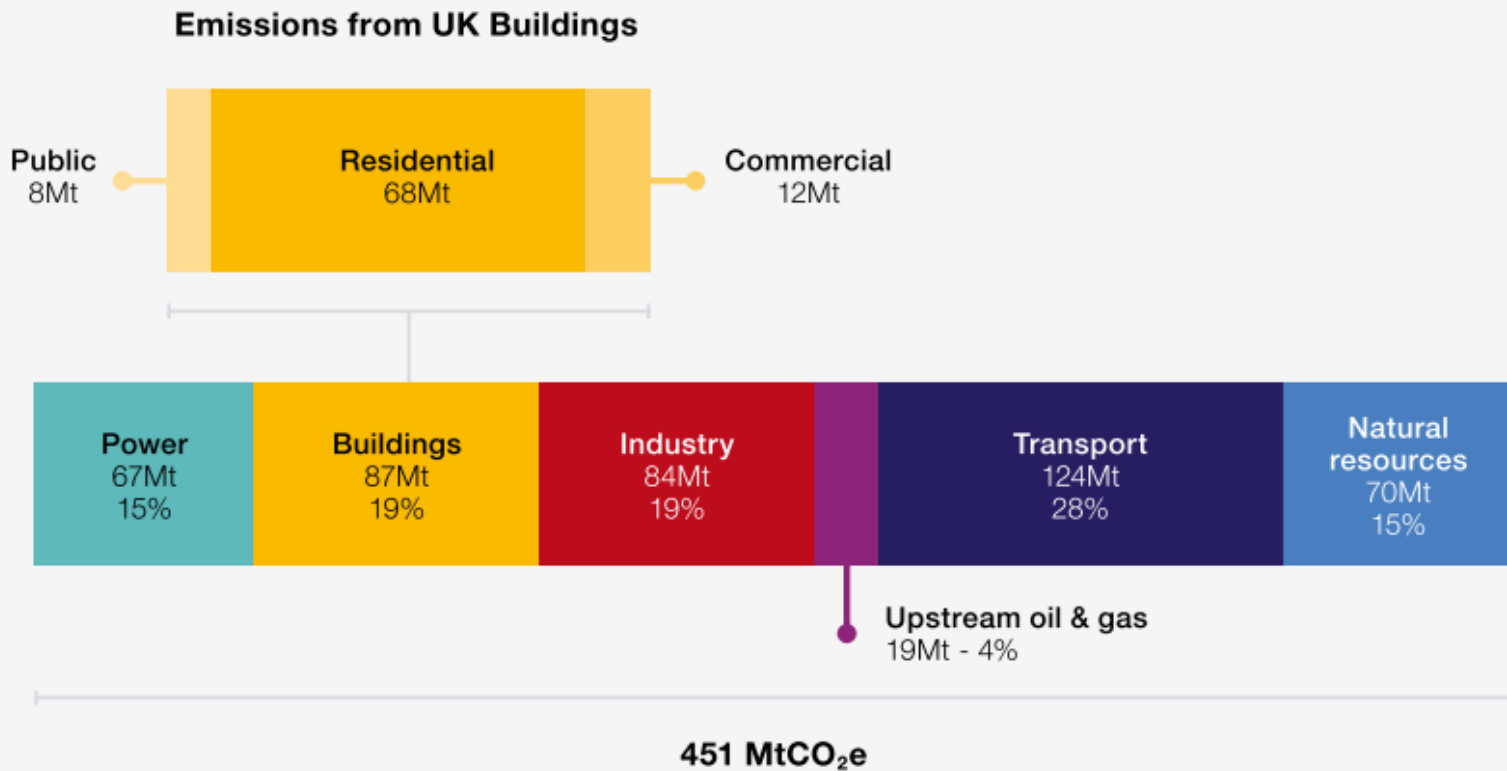
**Source:** BEIS (2020) 2019 UK Greenhouse Gas Emissions, Provisional Figures; BEIS (2020) 2018 UK Greenhouse Gas Emissions, Final Figures; CCC analysis.

**Notes:** The chart on the right-hand side shows changes in sectoral emissions between 2008 and 2018 for all sectors. Data are not temperature-adjusted.

# GHG emissions from buildings

**FIGURE 7.1 - UK TERRITORIAL EMISSIONS** <sup>129</sup>

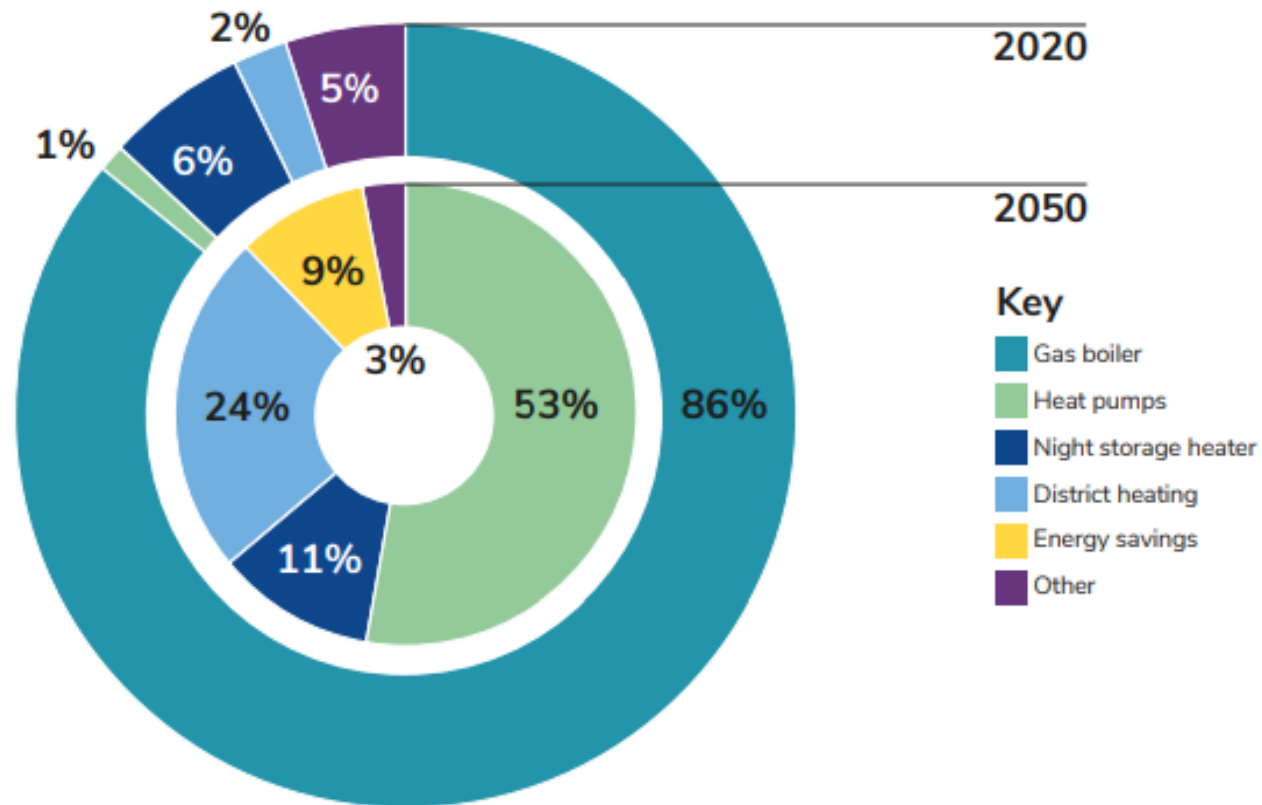
2018



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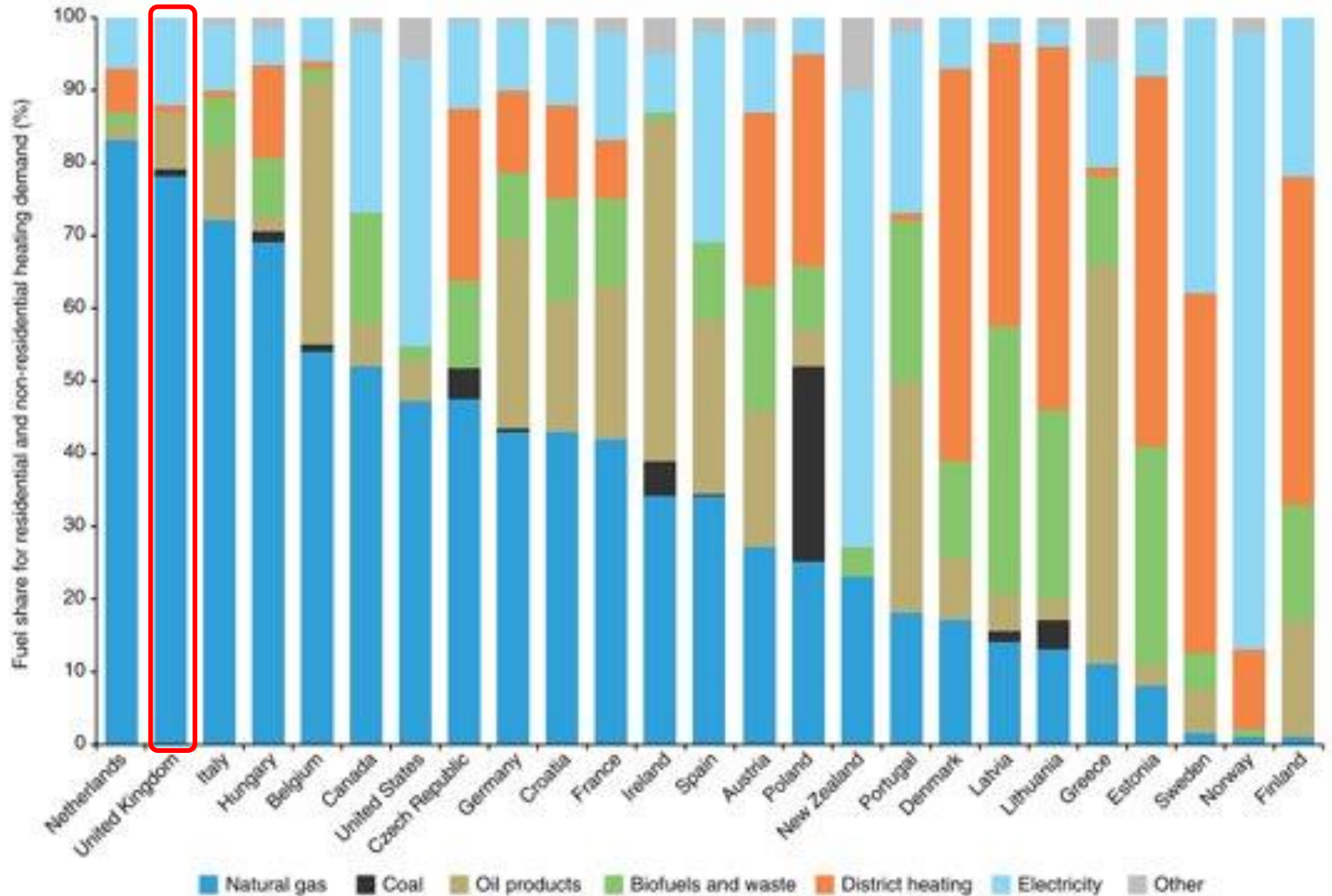
# Residential heating: reaching net zero

## Heating system usage

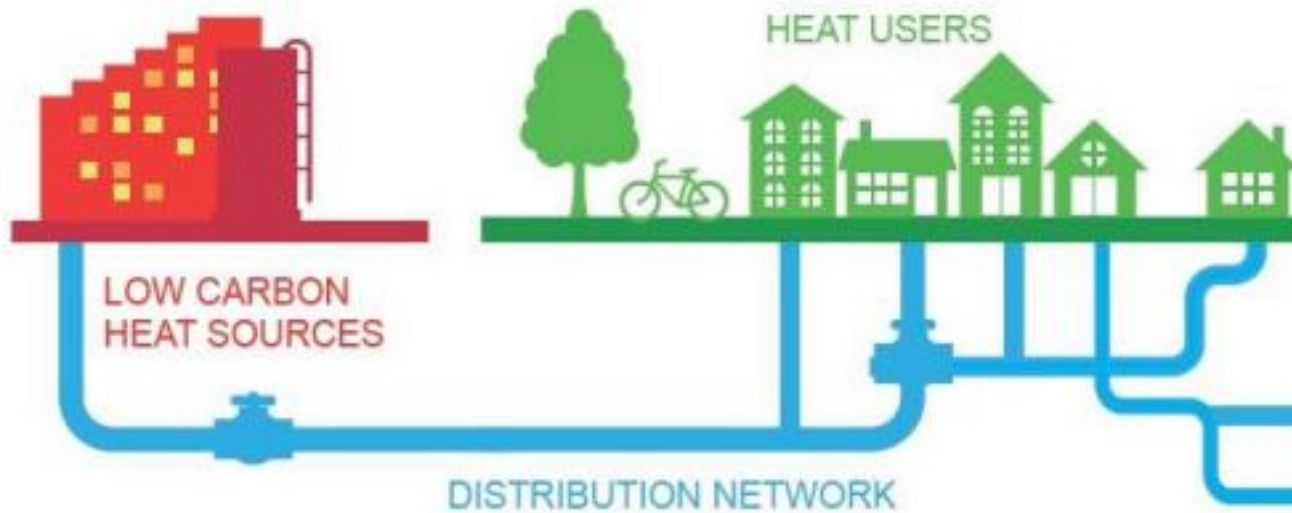


[https://d2e1qxpsswcpgz.cloudfront.net/uploads/2020/09/The\\_pathway\\_to\\_net\\_zero\\_heating\\_UKERC\\_briefing.pdf](https://d2e1qxpsswcpgz.cloudfront.net/uploads/2020/09/The_pathway_to_net_zero_heating_UKERC_briefing.pdf)

# Fuel shares for residential and non-residential heating



# Heat networks

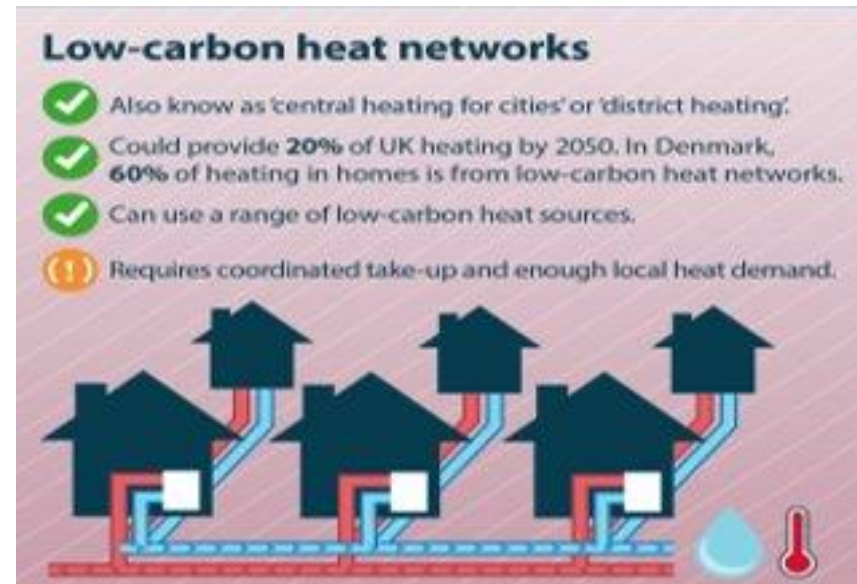


[https://www.theade.co.uk/assets/docs/resources/New\\_Short\\_Report.pdf](https://www.theade.co.uk/assets/docs/resources/New_Short_Report.pdf)



# Why heat networks?

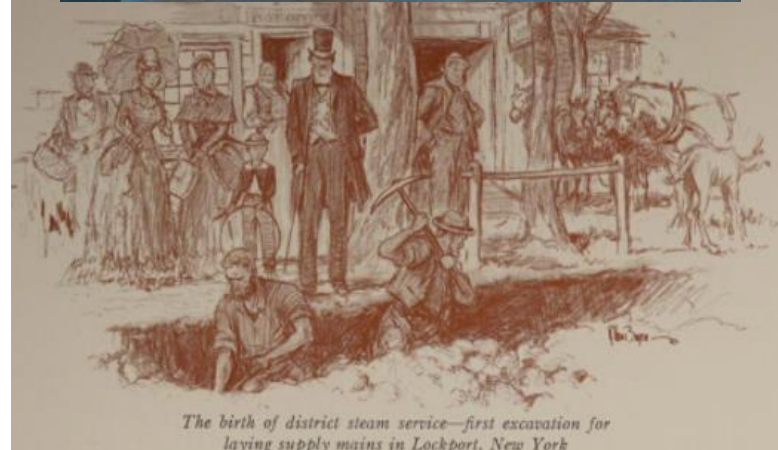
- Ability to integrate range of generation technologies – including in areas where heat pumps are less viable
- Increasing awareness of wider benefits (system flexibility, renewable integration, multiple objectives)
- Necessarily local infrastructure and monopoly characteristics.
- Local authorities are key actors but could take numerous roles
- Evolving policy environment in England





# Not new or sexy?

- Long history of networks – early schemes were high temperature and often high carbon
- But trend towards lower temperatures and higher efficiencies
- 5th generation schemes now low temperatures and integrating renewables, waste heat, storage, flexibility.



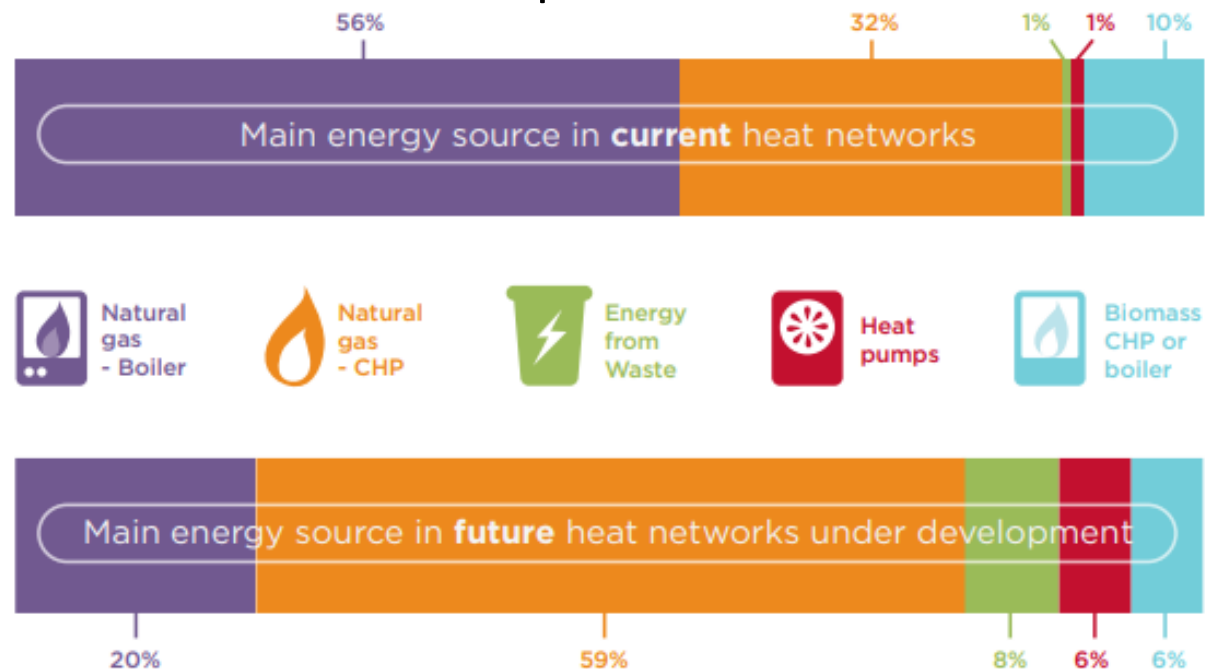
# But deployment is challenging

- Multiple market failures and barriers
  - high upfront costs, low + long-term returns
  - requires local knowledge and coordination: local governments central but multiple actors
  - demand risk and uncertainty
  - policy uncertainty and lack of regulation
  - lack of skills and knowledge
    - lack of 'fit' with energy system norms: monopoly characteristics, local planning, multiple (social and env) benefits



# Significant policy activity but partly overtaken by events?

- Central role for gas-CHP initially envisioned but:
  - the electricity grid has rapidly decarbonised
  - net zero legislation
  - increasing need for cooling in summer
  - political focus on urban air pollution



# Increasing policy focus: more transformative things coming?

- Heat Network Delivery Unit: advice and feasibilities (2013- current)
- Scope to access to Renewable Heat Incentive and Energy Company Obligation funding
- Heat Network Investment project: £320m grants/loans (2019-2022)
- Green Heat Network Fund £270m (2022 – 2025). Focus on large, low-carbon heat networks using heat pumps and waste heat recovery.
- Heat Network Transformation Fund £122m (allocated – details tbc)
- Heat and buildings strategy expected later in 2021, Future Homes Standard (from 2025), changes to building regulations.
- Carbon regulation and zoning due in late 2020s (consulting this Spring).



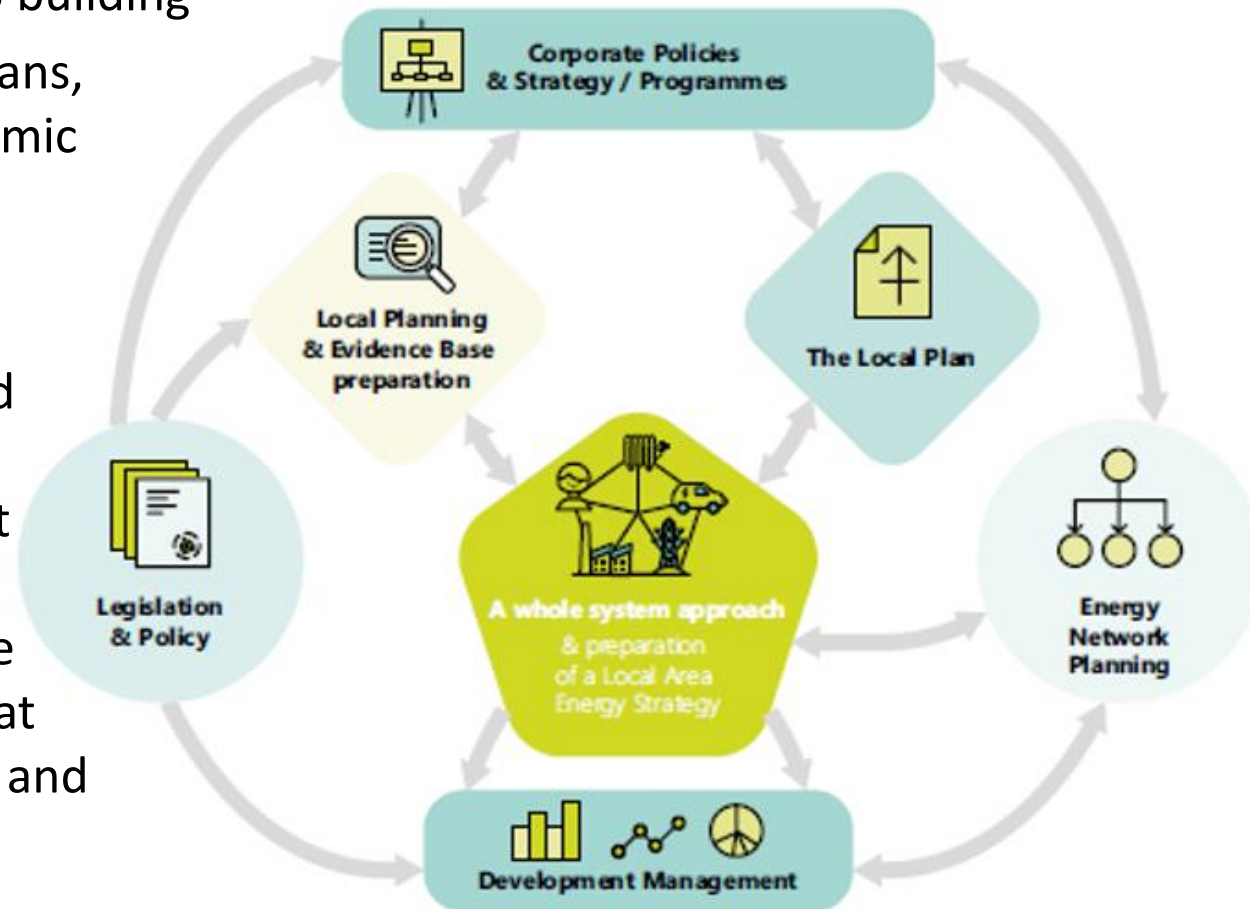
# But also an increasing focus on 'local energy' more broadly

- Heat and transport: not just decentralised but also more situated technologies: configured, governed, and implemented locally
- Rise in local interest in climate planning – CE declarations, Assemblies etc
- Also parallel changes in local authorities and wider governance and funding structures (austerity and devolution)
- Future energy system likely to look different in different places and the speed may vary across and between locations



# Local Area Energy Planning: heat networks as a 'hinge' for more strategic local role?

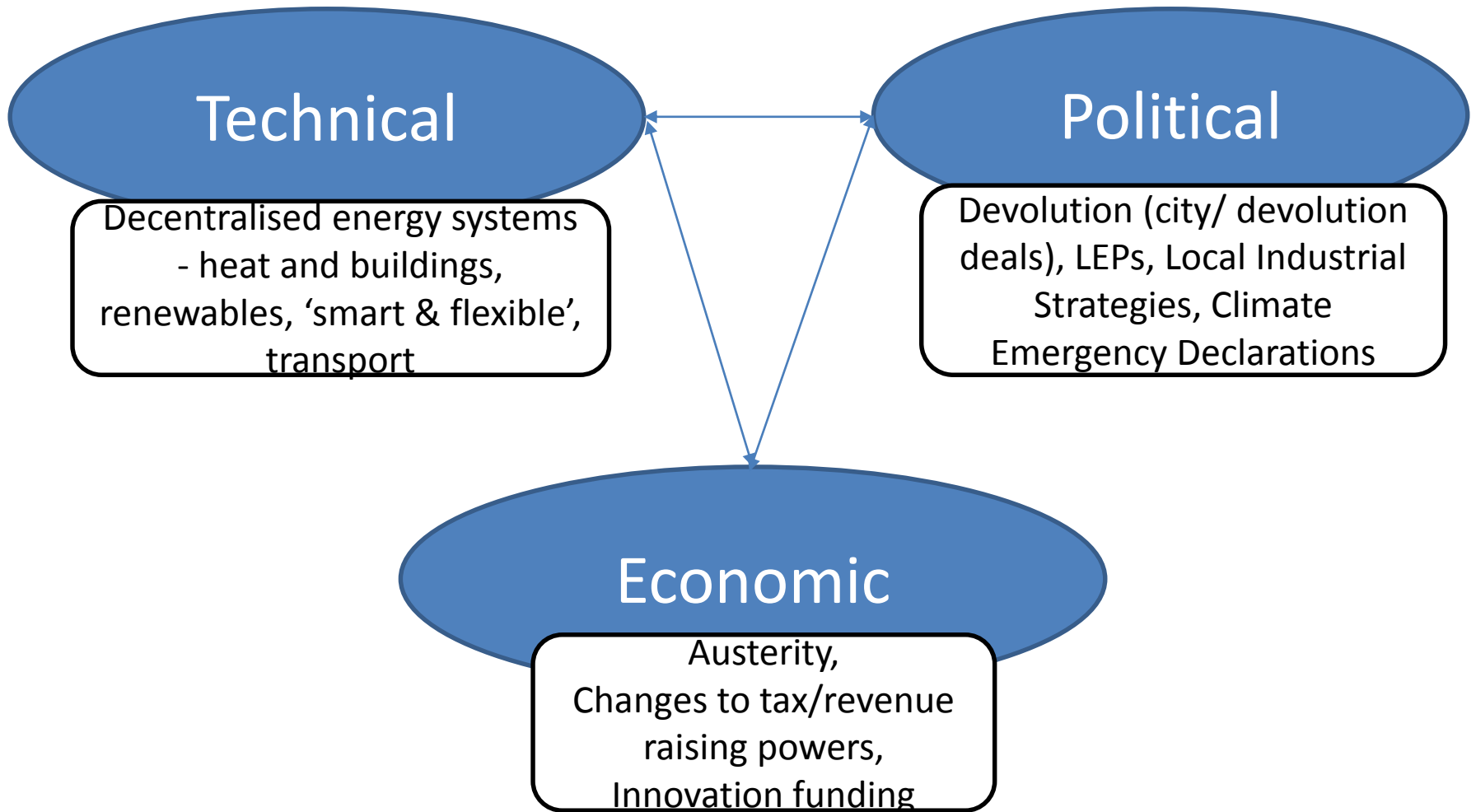
- Requires: Data, skills, understanding of local priorities, long-term approach, relationship building
- Links to local spatial plans, transport plans, economic strategies...etc
- Particular role in heat decarbonisation – to manage uncoordinated uptake risks for heat pumps, hydrogen, heat networks
- Increasingly likely to be linked to zoning for heat
- Scotland going further and faster



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# But beyond technical planning: interlinked decentralisation trends





# Interactions between energy and wider decentralisation trends

- Statutory planning role for municipalities and ability to zone/mandate connection key but...
  - The UK is still one of most centralised states
  - Mixed reports on the realities of devolution and localism (Copus et al., 2017)
  - Limited local resources and capacities could lead to varied outcomes (Kuzemko and Britton, 2020)
- Ongoing integration and post-Covid challenges.



# Conclusions

- Heat networks likely to play an important role in net zero but need to be considered as part of wider local energy systems
- Decarbonisation and scalar politics increasingly intertwined
- Unclear (yet) what powers and responsibilities will be held at the local level
- Significant support for more local decision-making in recent UK climate assembly
- But wide criticism of extent of ongoing devolution and localism reforms in England
- Next 2-3 years are critical for decarbonisation of heat



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