



Implementing Net Zero Carbon Heat

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Why Focus on Energy for Heat?

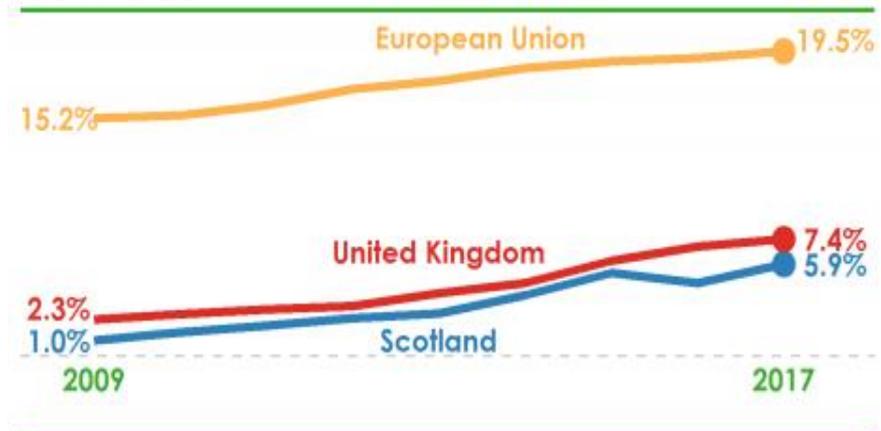
- Essential to Scottish 2030 target and Net Zero 2045 BUT lack of progress
 - Around one third UK CO_{2e} emissions/half of energy consumption
 - Reliance on fossil fuel gas

Over ten years after the Climate Change Act was passed, there is still no serious plan for decarbonising UK heating systems and no large-scale trials have begun for either heat pumps or hydrogen.

UK CCC, 2019

Trend of renewable heat share in gross final energy consumption

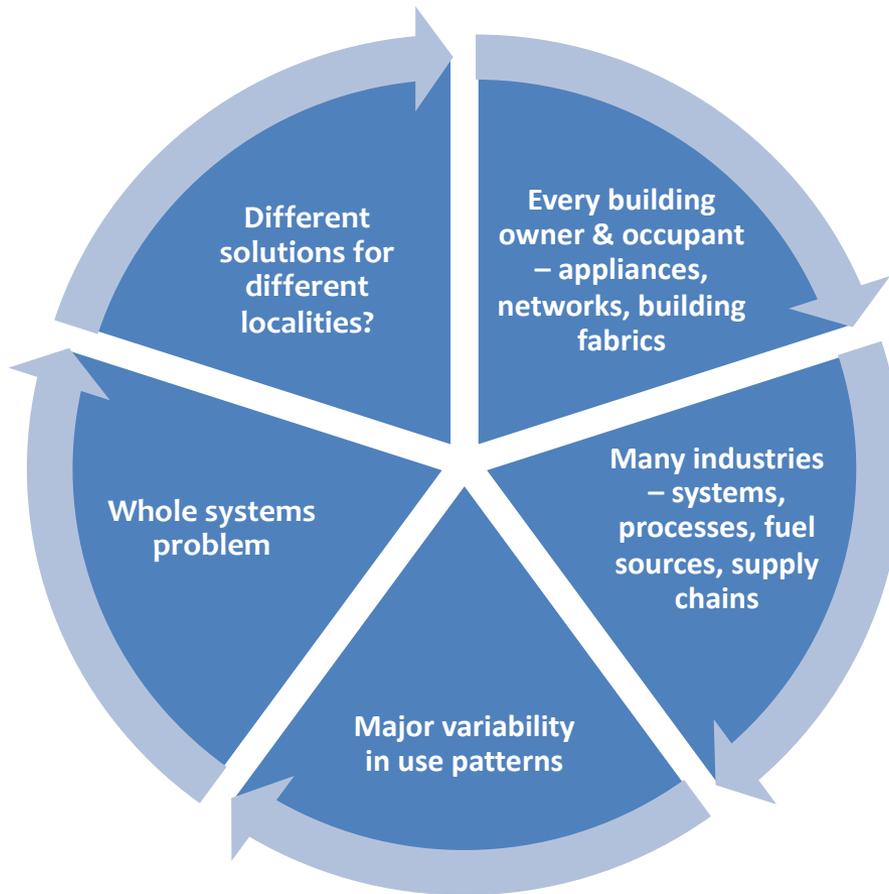
2009 - 2017



Source: Eurostat, BEIS



Inter-woven technical, material, cultural, economic, political dimensions



Change of this scale and breadth will require a level of coordination beyond most public policy change programmes

UK Gov BEIS, 2018



No straightforward replicable solution

Heat supply and heat demand, there are so many local considerations; it's about countries, locations, behaviours; it's a bigger beast. And you can't just build up a modelling tool and sell it, or build a new bit of kit and solve the problem

UK Gov Official

- Options outside 'tried and tested'
- Comparing technological alternatives is value-laden
 - Contested performance and cost
- Political champions and economic interests slow to emerge
 - Reproduces sense of intractability
- Whose problem?
 - Multi-level governments, role of markets, civil society

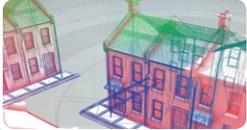
Common start point: solutions should cost same or less than fossil fuel
Modelling - cost optimal pathways
All options generally assessed as more expensive

What is Useful Knowledge for Decarbonising Heat?



Systems engineering models

- Perceived validity and usefulness depends on assumptions, data sources, accessibility – authority/power relations/'ownership' and trust



Local and specific knowledge

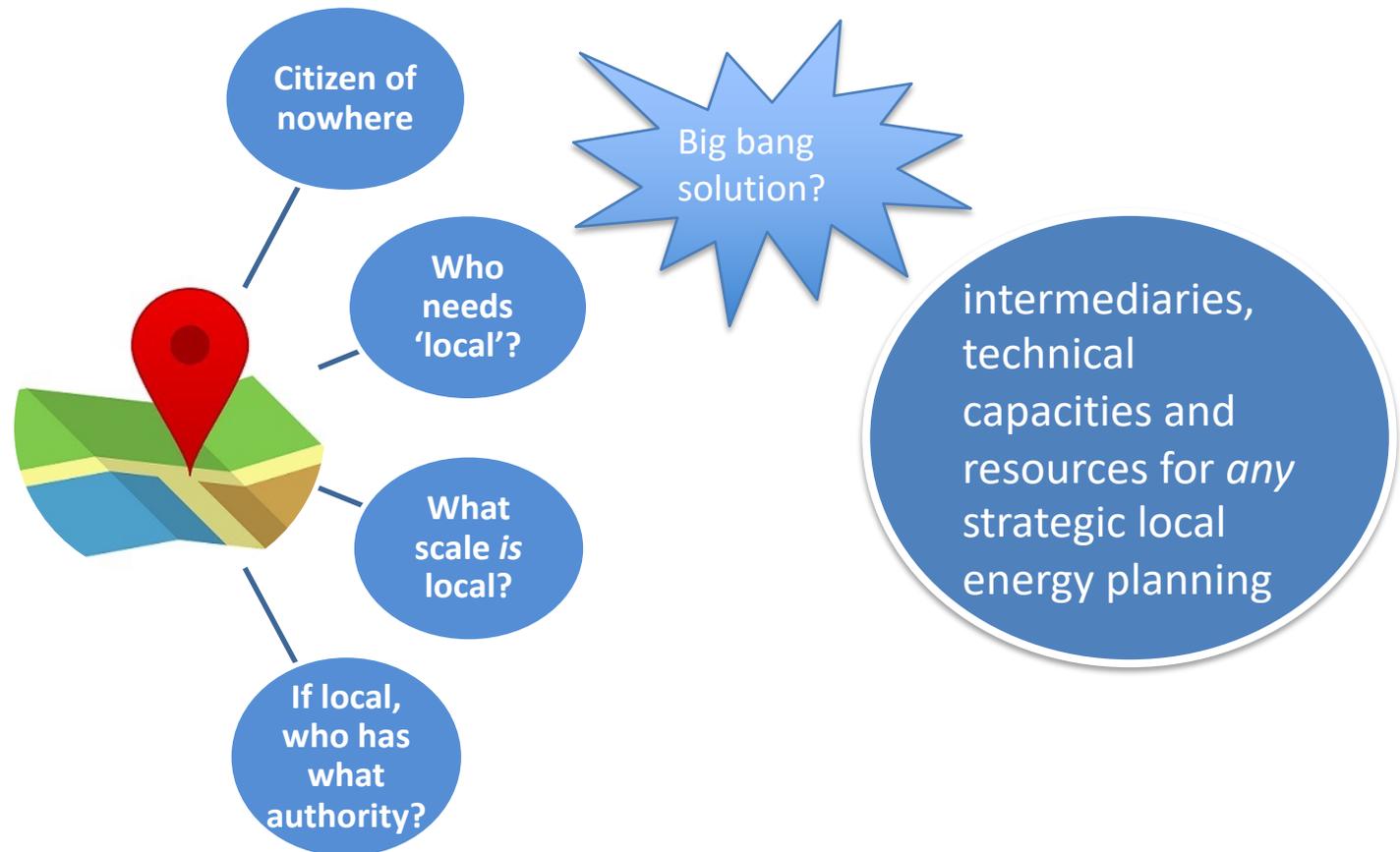
- Building stock, development planning, geography, inequality, regeneration
- Politics and £££



Knowledge Uses

- Informing, influencing, innovating
- Symbolic and political and improvisatory
- All need champions

What place for *local* planning & decision making?



R&D Agenda – as much societal as technical?

Institutions, political economy & policy innovation

- UK, devolved and regional Governments
- International comparators & partners
- Market dynamics, skills and supply chains

Data & data sharing frameworks

Balance of technology innovation v application & improvement

Larger scale socio-technical demonstrators

- Tech, networks, markets, property & business owners, finance & regulatory frames
- Open access evaluation

Conclusions – Decarbonising Heat: on the To Do List?

Need working consensus about future of heat

- Cross sector, civil society & intra-government
- Financing & cost sharing principles

Who pays for what, when?

- To what extent should infrastructure costs be socialised, given differential rates & forms of benefit in different places?

Creating trust

- Independence of any coordinating body
- Advisory, Standards, Quality Assurance, Enforcement

Two starting points to develop workable consensus

- *Building stock retrofit*
- *Larger scale whole system demos*



HEAT AND THE CITY



District Energy Vanguards
 Scottish Heat Network Partnership
 IEE Stratego heating and cooling plans

