

The transition to low-carbon heat: domestic and commercial

Domestic and commercial heat account for up to a quarter of UK emissions. Over 75% of domestic users have gas boilers, much higher than other countries. The CCC's 5th Carbon Budget suggests by 2032 one in seven homes and over half of businesses will need to be heated by low carbon sources, with around a quarter of suitable homes having solid wall insulation fitted.

The practicalities and implications of decarbonizing heat are becoming increasingly clear, and are challenging the assumptions about deployment rates. Aspects of the various options have been examined but significant gaps remain, particularly understanding of the governance issues. The holistic picture also needs to be addressed.

This project aims to provide insight into the governance and timeframe aspects of the trajectory to 2050 for decarbonising domestic and commercial heat. Building on techno-economic analysis of specific heating technologies it will investigate how top-down and bottom-up aspects join up:

- Implementation: including retrofit practicalities, supply chain development, logistics for customers and utilities, and user acceptance of technologies.
- Systems Implications: including infrastructure requirements, and primary energy demand.

The main options for decarbonisation are broadly classified as:

- Demand reduction
 - Insulation and energy efficiency
 - Behaviour change
- Low-carbon energy supply
 - Decarbonising the gas supply using hydrogen or synthetic methane
 - Decarbonisation of District Heating
 - Electrification with heat pumps and hybrid systems
 - Niche technologies: e.g. biomass & solar thermal

The report will investigate each option in terms of:

Overarching questions

- What is the reach of each option?
- What are the constraints?
- Will different options work together?

Bottom-up - implementation

- What are the practicalities for retrofits and logistics for customers and utilities?
- How quickly can supply chains and skill sets develop?
- What heating appliances and storage are in each home?
- What insulation measures are needed / cost effective?
- How will users respond to and use new technologies?
- How effective will measures be?

Top-down – system implications

- What are the infrastructure requirements?
- How will it affect primary energy demand?
- Are market drivers or intervention needed?

Engineering

- What are the logistics for households, commercial buildings and utilities?
- What resources are required? How long will it take?

The project is scheduled to report to ERP in July 2017, but will also seek to feed into the development of the government's heat strategy.