

Project proposal on The transition to low-carbon heat: domestic and commercial**Overview**

The project aims to provide insight into decarbonising domestic and commercial heat and the trajectory to 2050. Building on techno-economic analysis of specific heating technologies, and with an emphasis on governance and timeframe aspects, 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.

Context

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 indicates that meeting the 5th Carbon Budget – 2028-2032 – will require about one in seven homes and over half of businesses 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 buildings 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 the governance issues. The holistic picture has also not been addressed. The main options are:

- Demand reduction
 - Insulation and energy efficiency
 - Behaviour change
- Low-carbon energy supply
 - Decarbonizing 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

Aims & objectives

This project aims to advance the debate on low-carbon heat by exploring the governance issues of delivering the various options. Building on techno-economic studies for specific heating technologies it 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?



ERP contribution												
<p>ERP’s breadth can bring a cross-sector, whole-system perspective, to provide an informed, but non-partisan, assessment of the technical, commercial and economic aspects of the issue. The project will also need to draw on the wider community to inform discussions about the socio-economic aspects.</p> <p>Collaboration with other parties will inform the report, promote discussion and to disseminate the findings.</p>												
Output and Key Deliverables												
<p>Early input to Government Heat Strategy. Main report and executive summary</p>												
Project Impact												
<p>Revised Government Heat Strategy due in late 2016/early 2017. ERP can seek to inform this and provide insights into the challenges that need to be addressed.</p>												
Communications & Activities												
<p>Initial project launch linked to outputs from ERP Hydrogen and Buildings projects, to raise awareness of project and attract input.</p> <p>Workshops and roundtables will be used to inform the report.</p> <p>Project findings will be disseminated in 2017 via ERP members and networks, links with policy organisations, and speaking opportunities at events.</p>												
Approach & project schedule												
<p><i>Stakeholders - sources of information:</i> DECC / BEIS Heat Strategy, Committee for Climate Change, ETI / Energy Systems Catapult Smart Systems and Heat, National Grid Future Energy Systems, Leeds H21, Energy Networks Assoc, European Climate Foundation, Kiwa-Gastec, Delta-ee, University of Strathclyde, Heating and Hot water Industry Council</p> <p><i>Relevant ERP Projects:</i> Buildings, Cities, Community Energy, Hydrogen, Storage, Managing Flexibility</p> <p><i>Project Timetable:</i> Approved in principle in July 2016, aim to report to ERP June / July 2017</p>												
Staffing and ERP member contribution												
<p>Analysis Team – Richard Heap & Simon Cran-McGreehin</p> <p>Members</p> <table border="0"> <tr> <td>Carl Arntzen (Bosch) <i>Steering Group Chair</i></td> <td>Mahmoud Abu-ebid (Ricardo)</td> </tr> <tr> <td>Mark Thompson (Innovate UK)</td> <td>Simon Messenger (Energy Saving Trust)</td> </tr> <tr> <td>Janet Mather (National Grid)</td> <td>Chris Jofeh (Arup)</td> </tr> <tr> <td>Amber Sharick (UKERC)</td> <td>Hiroyuki Kishira (Hitachi)</td> </tr> <tr> <td>Kathleen Robertson (Scottish Govt)</td> <td>Jeff Douglas (Energy Systems Catapult)</td> </tr> <tr> <td>Keith MacLean (Independent)</td> <td>Andy Davey (BEIS) - <i>observer</i></td> </tr> </table> <p>Awaiting response: HMT, Alstom Suggested: ENA</p>	Carl Arntzen (Bosch) <i>Steering Group Chair</i>	Mahmoud Abu-ebid (Ricardo)	Mark Thompson (Innovate UK)	Simon Messenger (Energy Saving Trust)	Janet Mather (National Grid)	Chris Jofeh (Arup)	Amber Sharick (UKERC)	Hiroyuki Kishira (Hitachi)	Kathleen Robertson (Scottish Govt)	Jeff Douglas (Energy Systems Catapult)	Keith MacLean (Independent)	Andy Davey (BEIS) - <i>observer</i>
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Budget												
<p>Workshops, steering group meetings, travel, conference and meeting expenses</p>												