

# The Future of the UK Gas Network

## A Consumer Perspective

**Richard Hoggett**

Energy Policy Group  
University of Exeter

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### Heat in Homes: customer choice on fuel and technologies

Study for Scotia Gas Networks

Energy Policy Group  
University of Exeter

Richard Hoggett, Judith Ward and Catherine Mitchell

[www.exeter.ac.uk/epg](http://www.exeter.ac.uk/epg)

University of Exeter  
Cornwall Campus  
Penryn, Cornwall TR10 9EZ

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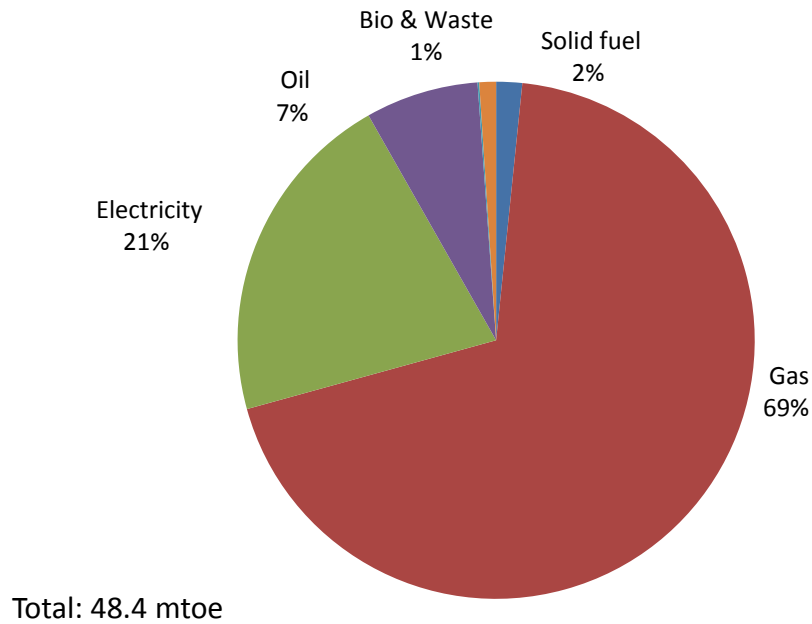
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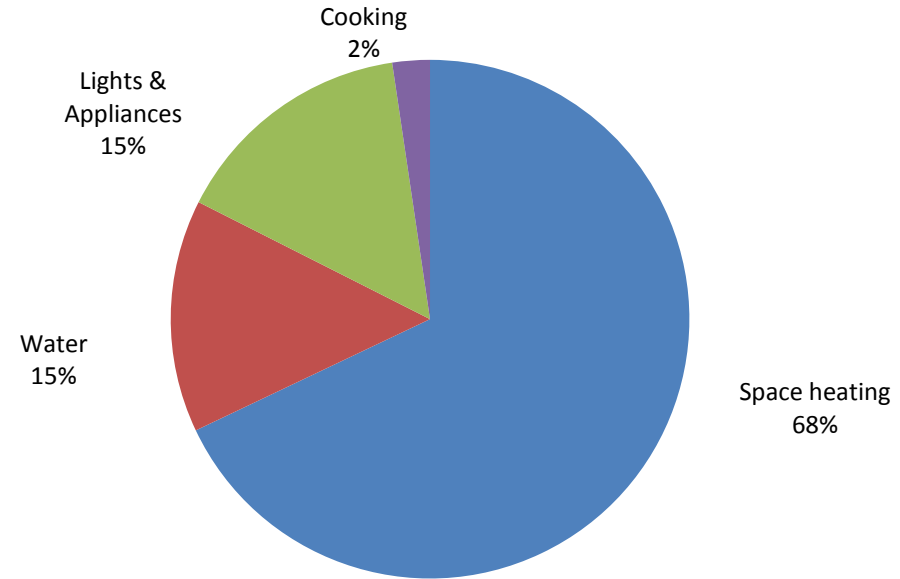
# Summary

- Natural gas use within the domestic sector
- Consumer choice – fuel and technology
- Barriers to change
- Policy and research implications

# UK Domestic Energy Consumption 2010 by Fuel and End Use



2001-10 average for gas 68.1%

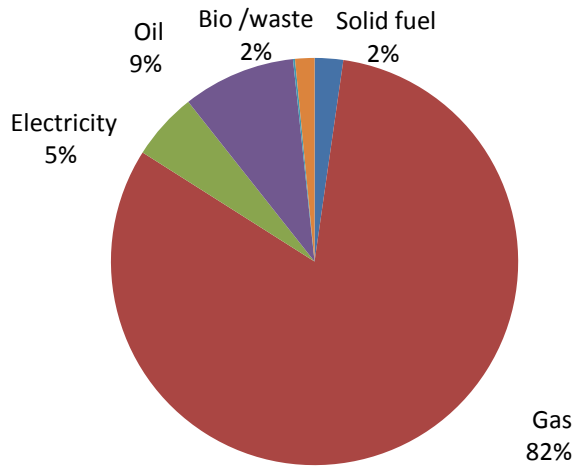


10 year av: Space heating (67.7%);

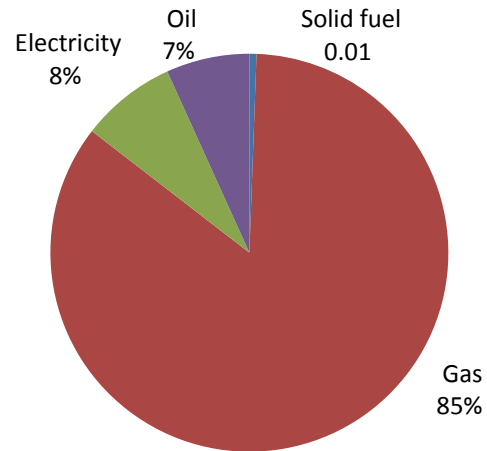
Source: DECC - ECUK 2012 (table 3.7)

# 2010 End Use by Fuel

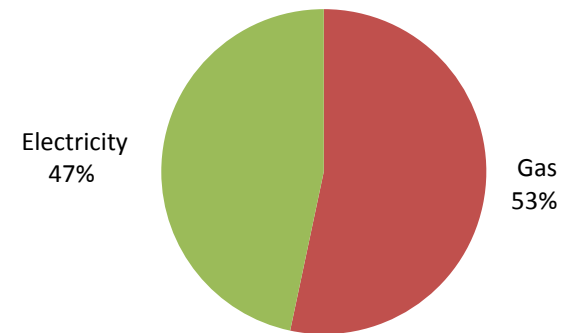
## Space Heating



## Hot Water

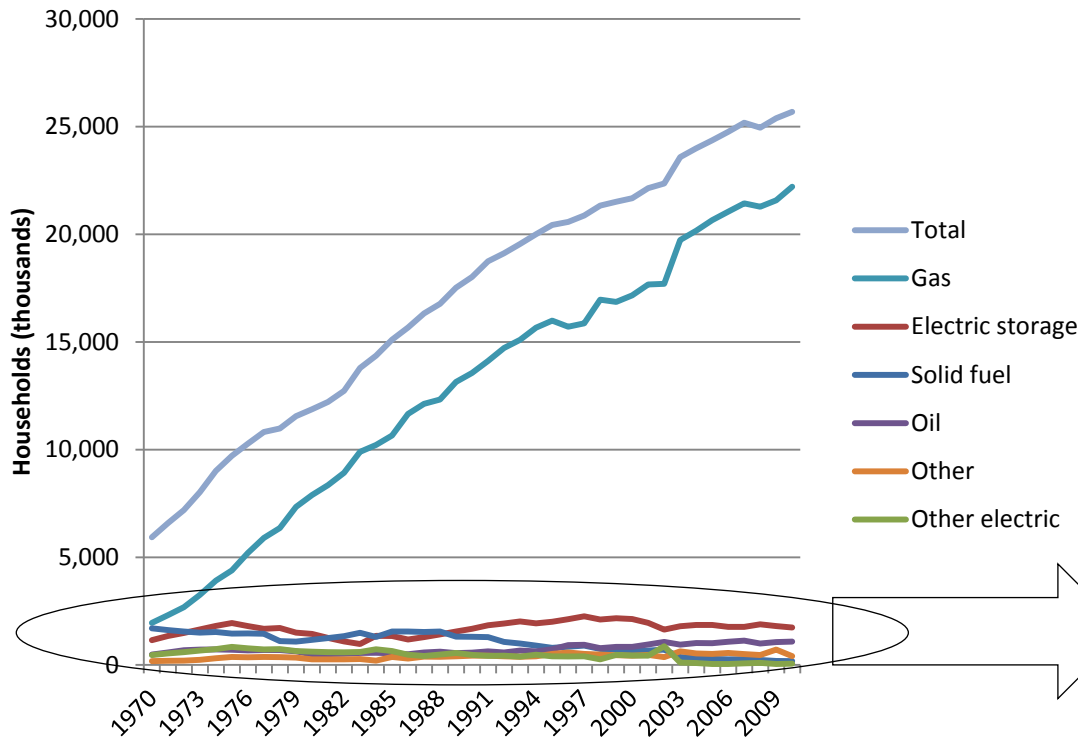


## Cooking



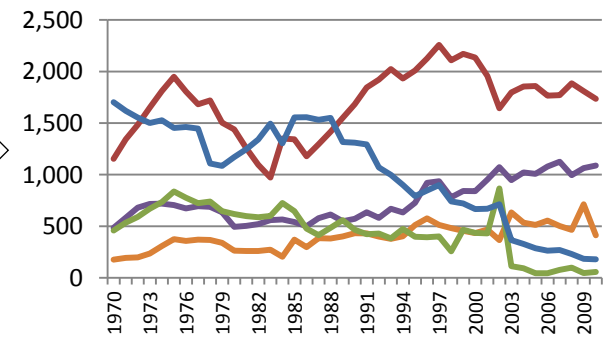
Source: DECC ECUK 2012 (table 3.7)

# Space Heating = Central Heating

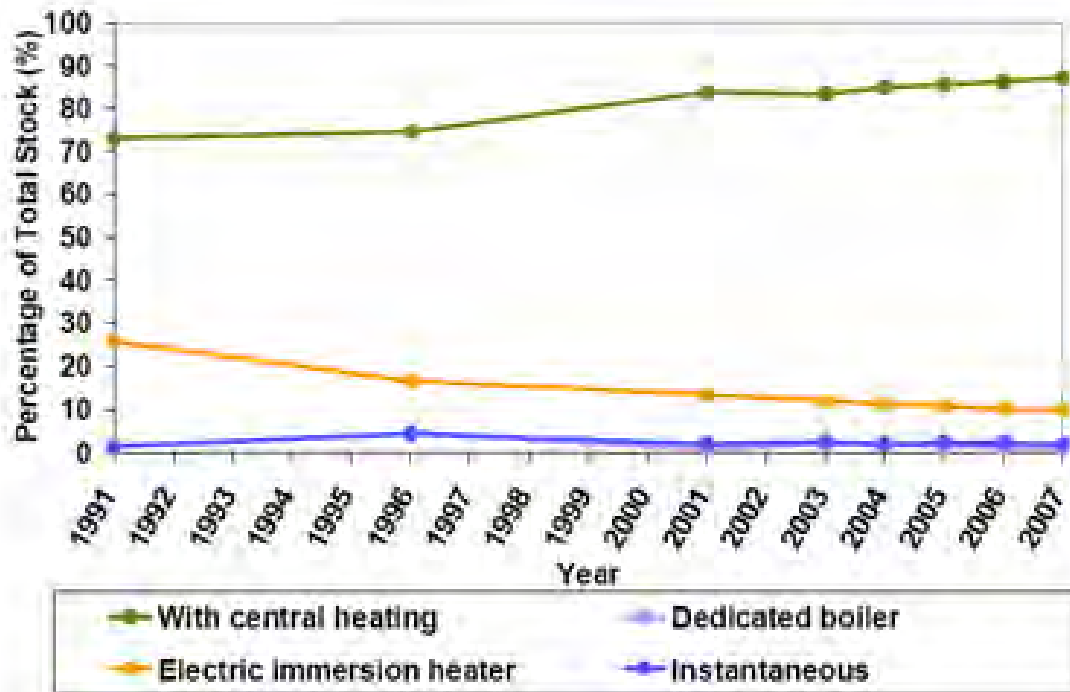


Primary heating system	Percentage of total stock (%)
Boiler system with radiators	86.8
Storage radiators	7.0
Warm air systems	1.1
Room heater	3.3
Other systems	0.1
Communal	1.5
Potable heaters only	0.2

Distribution of primary heating systems (England 2007). Source: BRE (2007:1)



# Hot Water is Linked



Water Heating System	Percentage of Total Stock
With central heating	86.9
Dedicated boiler	1.2
Electric immersion heater	9.9
Instantaneous	2.0

Figure 10: Timeline of water heating systems – England

Source: BRE (2007:14)

# Influencing Factors

- A number of factors influence consumer choice of fuels and technologies
- complex interactions , difficult to unpick details and limited research to date
- Some important ones include:
  - Structural (access to the gas network, tenure, household size, dwelling characteristics, etc)
  - Economic (income, energy costs, etc)
  - Social (status, meaning, identity) inc everyday consumption practices & habit –

Whitmarsh et al 2011

# Space Heating Preferences

- Number of reasons for inertia:
  - Central heating gives the consumer what they want i.e. thermal comfort
  - High levels of satisfaction shown for wet-based central heating systems (EHCS)
  - Capital and running costs low in comparison to alternatives
  - Established technology, seen as reliable, familiar, easy to control
  - Supported by mature market – suppliers, boilers, installation and maintenance contractors



# Hot Water Preferences

- Closely links to central heating
- Again, high levels of satisfaction with systems linked to heating
- Although some divergence:
  - Technology
    - Growing preference for instantaneous hot water – combi's
    - Space saving through removal of hot water tanks
  - Fuel
    - Bigger role for electricity (electric showers and immersion heaters)

# The Challenge for Change

- Unlike electricity, consumers take many of the decisions that matter
- Reasons for considering switching heating system – insufficient capacity, unreliable, hassle, maintenance
- But there are also barriers – cost, hassle, lack of interest, lack of knowledge
- Distress purchases
- Intervention and trigger points may not work for heat
- Combined impact = high level of inertia in domestic heat – a ‘default to gas’

# The Policy Context

- CCC, DECC, UKERC modelling suggesting significant electrification of heat to reach 2050 carbon targets
- Aim to virtually eliminate GHG emissions from built sector by 2050
- Implication is a big transformation from where we are now
- Initial focus off-gas housing and new build
- Post 2030s push will be in on-gas housing

# Issues for Renewable Heat

Technology	Issues found	Additional barriers to uptake
All	<ul style="list-style-type: none"> <li>disappointment in the level of fuel savings achieved</li> <li>issues with the amount of disruption caused during installation</li> </ul>	<ul style="list-style-type: none"> <li>high upfront capital costs and long payback periods and a risk of projected declines in cost not being achieved</li> <li>hidden and missing costs</li> <li>lack of awareness or understanding of different options</li> <li>lack of suitability, particularly in terms of energy efficiency of housing</li> <li>consumer confidence to new technologies</li> <li>lack of credible installers and suppliers and other supply chain constraints</li> <li>hassle factors associated with having work done, or for ongoing operation</li> <li>concerns about ease and costs of maintenance</li> </ul>
Heat pumps	<ul style="list-style-type: none"> <li>concerns over running costs, although this in part may reflect the switch to one heating fuel or heating the whole home</li> <li>mixed views on their ease of use and ability to control</li> <li>concern over noise for ASHPs</li> <li>lower temperatures than desired</li> </ul>	<ul style="list-style-type: none"> <li>uncertainty over improvements in COPs</li> <li>poor installation standards</li> <li>high levels of maintenance</li> <li>the need for high levels of energy efficiency</li> <li>the potential need for new heat distribution</li> <li>the need to dig up gardens for GSHPs</li> <li>failure to meet hot water demands</li> </ul>
Biomass	<ul style="list-style-type: none"> <li>difficulties in control</li> <li>securing reliable fuel suppliers</li> <li>perceived concerns over maintenance and hassle for fuel and cleaning</li> </ul>	<ul style="list-style-type: none"> <li>space requirements for fuel and equipment</li> <li>uncertainty on future fuel prices</li> <li>sustainability of fuels</li> <li>air quality issues</li> </ul>
Solar Thermal	<ul style="list-style-type: none"> <li>mixed views on their visual appearance</li> <li>actual and perceived integration problems</li> </ul>	<ul style="list-style-type: none"> <li>limited suitability – roofs and integration</li> </ul>

- Costs – capital, running and hidden
- Hassle
- Knowledge and understanding – for choice, operation, maintenance
- Perceptions – visual, noise, social, confidence, etc
- Supply chain & skills
- Suitability

# Policy & Research Implications

- Given central role for consumers in heat, they need to be directly involved and convinced about the need to change
- Research gaps – esp with on-gas households in terms of technology, but also behaviour change and practices in relation to heat
- No single route - need policy attention across different areas
  - heat, electricity and energy efficiency
  - network solutions – bio/hydrogen and heat networks
  - building solutions – heat pumps, biomass, solar thermal, etc
  - As well as efficient gas options (existing and new)
- All require heat demand to be reduced
- Will need imaginative policies, sustained political support, effective financial support and communication
- Otherwise consumers will be a major barrier to low carbon future