

Incumbency and the transformation towards low carbon heating in the UK – Implications for policy

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Key messages

- The required transformation of the UK's heat system will have major implications for people and organisations involved with the sector. This research has investigated the role and behaviour of heat market 'incumbents' in relation to the decarbonisation of heat.
- We define incumbents as people or organisations currently active in the UK's heat sector. Incumbents have the economic, social or technological capacity to influence the future of the heat system.
- Incumbents in the UK heat market are diverse and the impacts of heat decarbonisation will vary between sectors. A risk and opportunity analysis of the UK heat sector has highlighted that different heat decarbonisation pathways (electrification vs. gas decarbonisation) pose different risks for different sectors.
- Gas network owners and appliance manufacturers are the most active in their engagement with heat decarbonisation. This activity includes attempts to exert political power over policy and regulation as well as innovation activities. The upstream and supply sectors engage less with heat decarbonisation.
- The lobbying and innovation activities constitute attempts to maintain a gas based system for heat in which the gas network is decarbonised, primarily using hydrogen. This approach is unproven and risky but the idea has rapidly gained traction in the policy debate.
- Heat incumbents have also actively resisted change. These efforts include 'talking down' other technologies and framing them as unworkable and developing coalitions of similar interests.
- Because of the ability of incumbents to lobby and innovate, new entrants in the UK's heat sector who may possess the best ideas and technologies may struggle to compete with incumbents.
- Based on our research, we have developed a number of policy recommendations for UK heat policy with implications for regulators and policy makers working on heat decarbonisation, as well as those involved in policy design process.

The need to decarbonise UK heating

Heating of buildings and hot water in the UK is responsible for around 40% of the UK's energy consumption and 20% of greenhouse gas emissions (1). These emissions will need to be almost eliminated by 2050 under the Climate Change Act's 80% greenhouse gas reduction target (1). The Paris Agreement's 1.5 degree scenario implies that this total decarbonisation of heat may need to happen even more rapidly.

Some progress has been made through deployment of energy efficiency measures to reduce emissions from heating. However, progress rapidly stalled in 2012 (1). While efficiency measures have historically reduced some emissions from heating, the deployment of low carbon heating technologies has been very slow and this can be partly attributed to the underperformance of the RHI (2). In fact, more homes connect to the gas grid each year than install low carbon heating technology. Heat decarbonisation can be said to be going backwards.

The Government's 'Clean Growth Strategy' acknowledges the challenge:

'Decarbonising heat is our most difficult policy and technology challenge to meet our carbon targets' (3)

However, while heat decarbonisation may be difficult, it is not impossible. Examples exist around the world where significant progress has been made to decarbonise heat through deployment of energy efficiency, the use of heat networks and electric heat pumps (4). While similar approaches based around energy efficiency, heat pumps and heat networks have been seen as central to the decarbonisation of heat in the UK, more recently, approaches to decarbonise the UK's existing gas infrastructure using low carbon gases such as biogas and hydrogen have gained traction with policy makers (5).



Understanding incumbency

This research has considered the UK's heat decarbonisation challenge with a focus on the idea of 'incumbency'. 'Incumbency' and 'incumbents' are widely seen as very important elements of the transformations of large systems, such as that required for the UK's heat sector.

There is no clear definition of incumbency across academic disciplines¹. However, our first working paper defined incumbency (in the context of sustainable change) as:

'the presence of existing actors within a specific socio-technical system. An incumbent will be currently active in the socio-technical system – or a part thereof – and therefore likely to be or have been involved in unsustainable practices. Incumbents have the economic, social or technological capacity to influence system dynamics' (6).

While there are examples of incumbents having both positive and negative influences on sustainable change (6), fossil fuel incumbents in the energy sector have been seen to resist change and are expected to resist future changes (7).

This research firstly investigated who incumbents in the UK heat sector are and how they may be affected by the move towards low carbon heat (5). We mapped the companies working in the UK heat sector based on company sizes and business interests.

The grouping of companies highlighted the key sectors within the UK heat market and the map allowed us to assess the risks and opportunities of heat decarbonisation for each sector. Levels of opportunity and risk vary significantly between sectors and depend on whether the 'heat electrification' or 'gas grid decarbonisation' pathway is pursued².

¹ In politics, incumbents are those already in power; in business, it is those already operating in a market and in innovation studies incumbency is linked to current technology (6).

² The web link for the interactive map can be accessed here: <https://embed.kumu.io/122bd7e33980257722a649af7a8ec58f?settings=0> and the detailed working paper including the risk and opportunity analysis here: <http://www.ukerc.ac.uk/publications/sustainable-heating-in-the-uk-risks-and-opportunities.html>

The behaviour of incumbents

Our research then considered how incumbents in the UK heat market are behaving in relation to the decarbonisation of UK heating (8). We carried out a large number of interviews with experts across the heat sector and built on these interviews using an array of grey literature. The interviews highlighted a number of ways in which incumbents may be having an effect on UK heat decarbonisation.



• **Lobbying:** We found evidence of significant levels of policy, and regulatory engagement by some incumbents associated with the promotion of ideas of gas grid decarbonisation and maintenance of the gas system despite clear uncertainties associated with the option. In particular, the idea of hydrogen grid conversion has emerged extremely rapidly, partly due to promotion by incumbents. This lobbying behaviour was primarily associated with appliance manufacturers, gas network owners and their representative associations. The research also showed that coalitions of gas interests

are developing and promoting a gas-grid decarbonisation narrative. The so-called 'Decarbonised Gas Alliance' is one such organisation and our research highlighted the strong links of this group to the shale gas lobby.

- **Innovation:** While we found evidence of innovation around heat decarbonisation, much of this was linked to innovation carried out by gas networks under the regulatory consumer-funded innovation schemes. The research produced does not appear to be critically reviewed and some of it contains unlikely assumptions, particularly on costs. It also appears strongly aligned to particular companies' interests. Further still, the lack of innovation around non-gas technologies means that there is a natural lean towards gas innovation because innovation around non-gas options is limited.
- **Investment:** There was limited evidence of investment in low carbon heat, an approach that incumbents could potentially use to drive change. There has been some investment in biomass combustion on a site by site basis and also growth in biomethane production (some of which is linked to a gas network owner). This investment is primarily linked to the Renewable Heat Incentive and does not appear to have been particularly driven or supported by incumbents. There has been some delivery of new district heat networks by energy suppliers linked to the 'Energy Company Obligation' policy. This lack of investment in low carbon heat is primarily due to a lack of a market for low carbon heat in the UK.

New ideas and new entrants

A number of the largest incumbents in the UK's heat sector are involved with low carbon heat technologies. For example, some appliance manufacturers are part of multi-national groups who already produce low-carbon appliances as opposed to gas boilers. Some gas networks also have ownership connections to energy suppliers and electricity networks. There are also integrated companies which operate across supply chains and networks with potential links to low carbon technologies. Encouraging a low carbon heat market could encourage these incumbents to diversify and build on existing connections.



However, because of the UK's very small low carbon heat market, incumbent voices dominate policy discussions and the innovation space because these incumbents have the resources to fund policy engagement and have access to capital for innovation. As we have shown, these incumbents have been promoting gas over other technologies despite clear uncertainties around optimal technology options for low carbon heating in the UK. We have also discovered evidence of incumbents talking down non gas technologies and framing them as unreliable or unworkable despite significant deployment of these technologies at a global level.

The best ideas and technologies for heat decarbonisation may not be with incumbents but with small or new companies who struggle to be heard because they do not have the capacity to compete with incumbents. Growing a low carbon heat market around existing technologies would support new ideas and new technologies. However, policy makers should also be actively encouraging and listening to new voices and new entrants who may have expertise that incumbents, and their representatives, do not.

Policy recommendations

Regardless of the technological approach to meeting the UK's heat decarbonisation goals, our research suggests that incumbents will not spontaneously drive transformation without clear incentives and appropriate regulation. In the course of our incumbency research, we made a number of preliminary recommendations for UK heat policy (8). We invited heat experts to challenge these recommendations at a workshop in London in May 2018, leading to further refinement. The revised recommendations below should be of interest to those working on heat decarbonisation policy, energy network regulation and policy design.

- 1. Support low carbon gas RD&D:** Government should support careful demonstrations of, and research into, technologies with the potential to decarbonise the gas grid, to develop understanding of their social, environmental and economic performance. Performance metrics should be robustly benchmarked against established low carbon heat technologies.
- 2. Maintain the roll out of proven technology:** The focus on decarbonising the gas grid in the long term is not an alternative to supporting other technologies in the short term. Current policy must support the rapid deployment of low carbon heat technologies such as heat pumps, district heating and demand reduction, which are proven at scale around the world. Levels of deployment of low carbon heat need to be commensurate with the decarbonisation challenge of the Climate Change Act and the Paris Agreement.
- 3. Help businesses into low carbon:** Government should engage closely with the UK heat industry, offering guidance to those sectors particularly at threat from decarbonisation in order to support the diversification of fossil fuel interests to low carbon heat interests.
- 4. Consider new network business models:** Government and Ofgem should jointly consider supporting the diversification of gas network companies into district heat networks in urban areas. This is expected to require legal and regulatory changes potentially including modifications to the 1986 Gas Act and to Ofgem's approach to network price control reviews.
- 5. Regulate for the future of heat:** Throughout the Ofgem price control review process for gas networks post 2021, the future of heat must be a central theme. Ofgem will need to devote significant resources to the issue, to ensure that they are basing decisions on objective and independent evidence.
- 6. Bring in new players, new ideas:** Ofgem must ensure that any future consumer funded innovation work is reviewed before finance is allocated and final outputs should also be reviewed. Network innovation funding should actively encourage new entrants and new ideas. These funds should also be allocated to themes rather than to specific networks to encourage whole system thinking.
- 7. Engage critically:** When designing policy, policy makers and regulators must always use information from the private sector in the knowledge that it is produced by vested interests and that it should be handled with care. Independent or peer reviewed data should be used when available.
- 8. Look to the periphery:** Policy makers should give special attention to views from outside the 'mainstream', such as those from new entrant companies linked to specific ideas or technologies. Novel, transformational ideas are more likely to come from the margins than from incumbents or the organisations representing them.

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