

Heat, Incumbency and Transformations

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EXETER
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Project overview

- Funded through the UK Energy Research Centre
- 3 phase project
 - To investigate the idea of incumbency
 - To discover what incumbency is in the UK heat sector
 - To investigate the implications of heat sector incumbency for the UK's transformation to low-carbon heating
- How should governance and policy respond?



What's the big problem?

- Heating is one of the UK's biggest source of GHG emissions (about a third of all emissions) – and going up recently
- UK GHG targets require total decarbonisation of heating by 2050
 - This means no fossil fuels burnt for heat by 2050
- This is a huge social and technological challenge
- One social element of this is associated with the existing heat industry (based on burning fossil fuels)

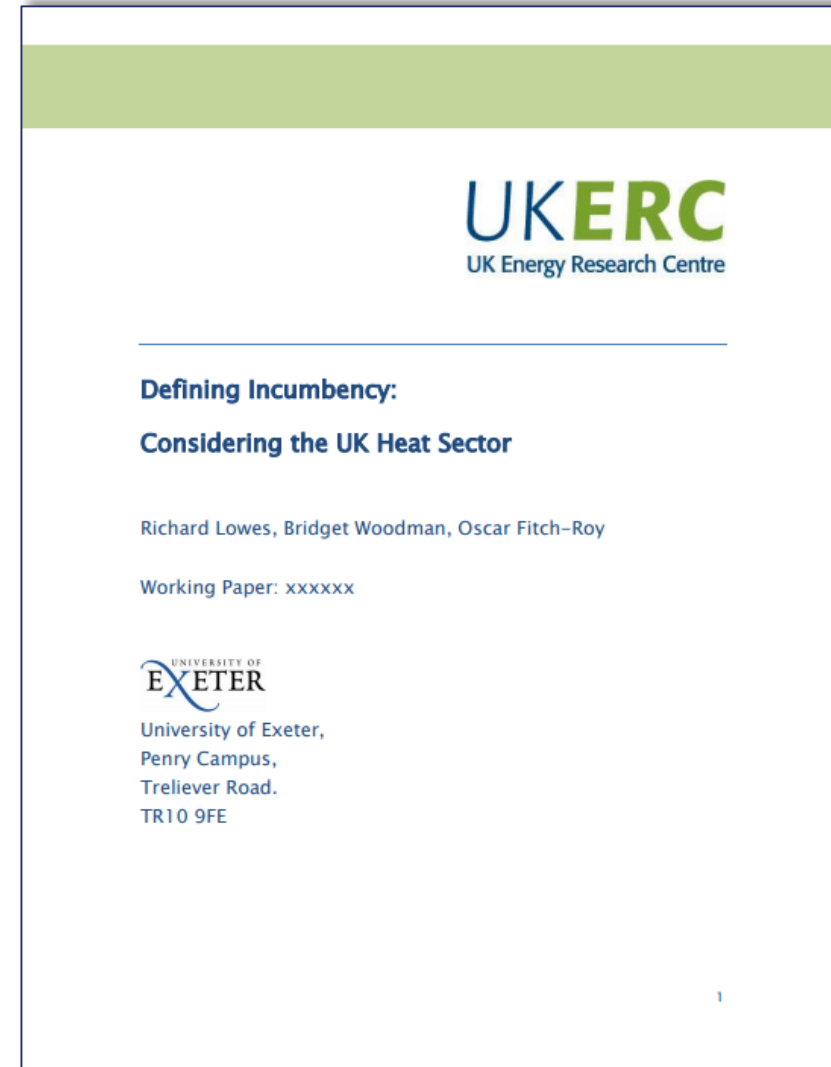
2 Pathways for change?

- **Pathway 1 – Decentralised heat**
 - Significant demand reduction
 - Major growth in heat networks and heat pumps
- **Pathway 2 – Hydrogen conversion**
 - Gas grid converted to run on hydrogen
 - Off grid areas electrified
- Combinations of pathways could occur
- ‘Our decision to consider hydrogen conversion as a potential option for low-carbon space and water heating in the UK reflects its current position in the UK future of heat discourse and does not reflect a belief of the authors that it necessarily represents a realistic low carbon heat scenario’



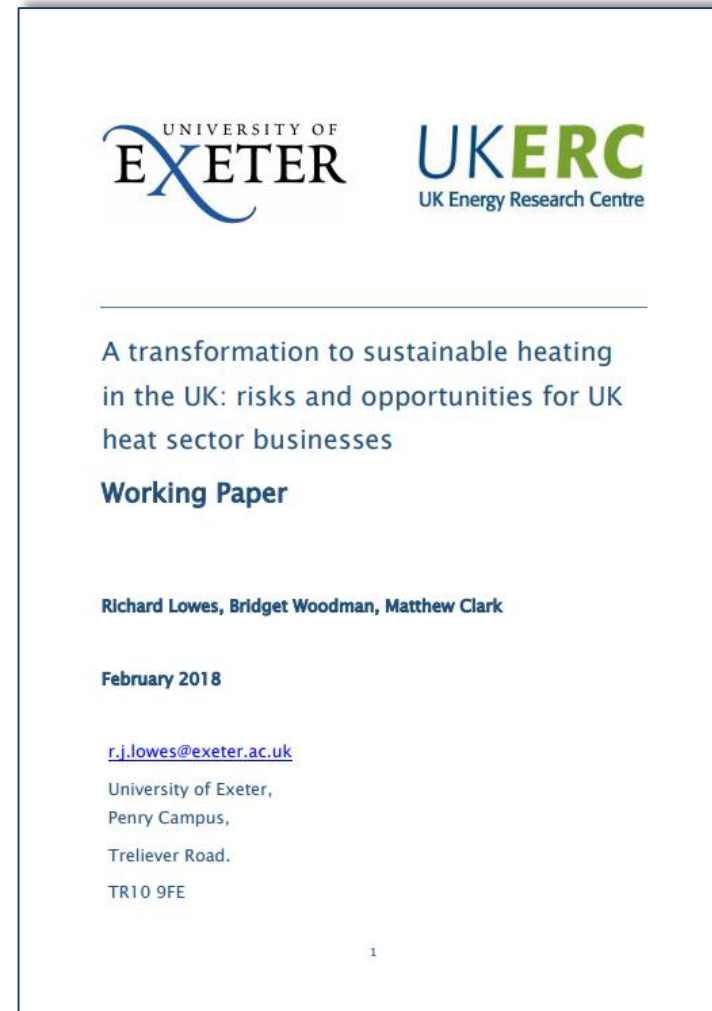
So what is incumbency?

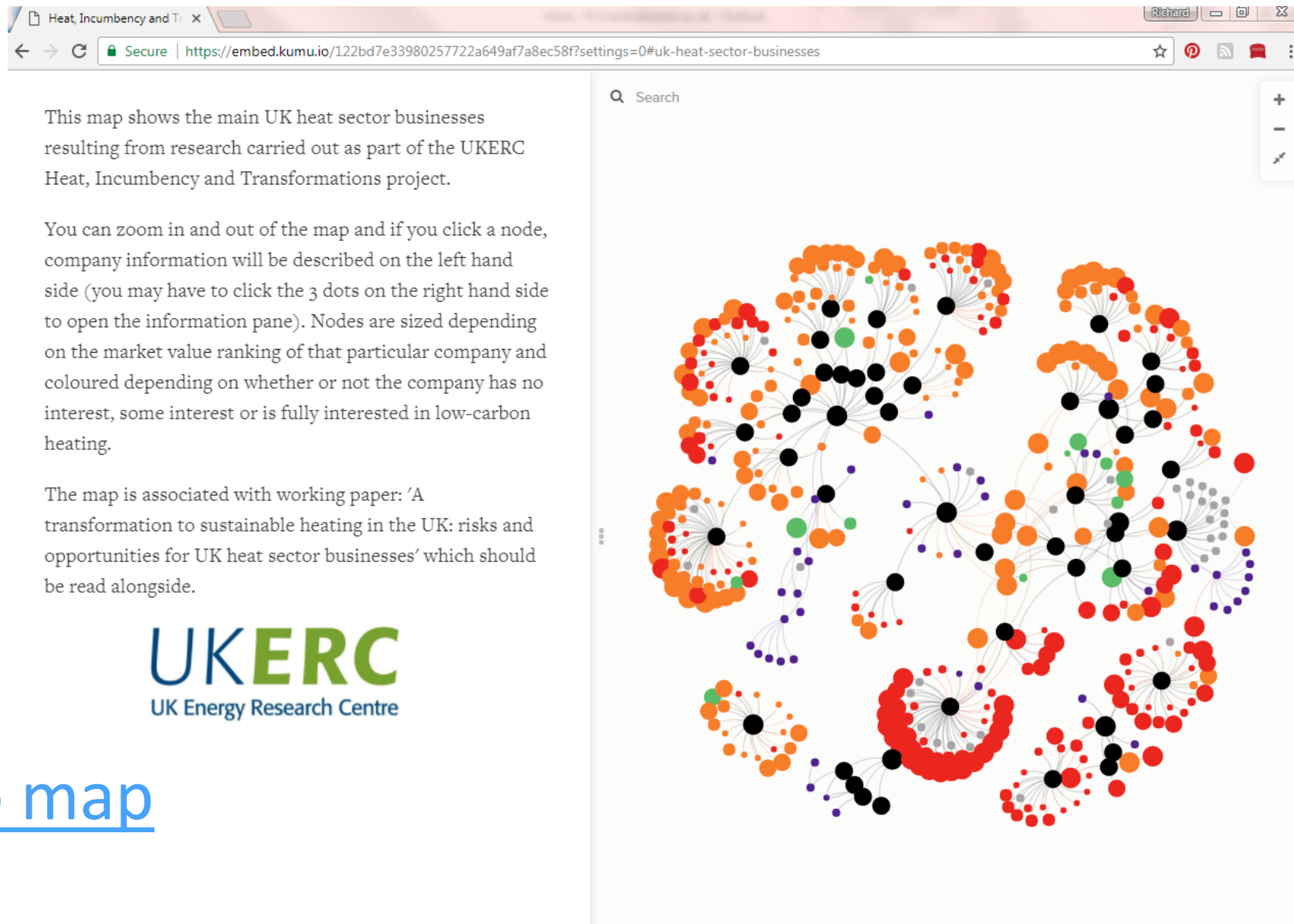
- *'We define incumbency in the context of sustainable transformations as the presence of existing actors within a specific socio-technical system. An incumbent will be currently active in the socio-technical system or a part thereof and therefore likely to be or have been involved in unsustainable practices. Incumbents have the economic, social or technological capacity to influence system dynamics particularly through the inhibition of change'.*



Understanding incumbency in the UK heat sector

- We developed a database of companies active in the UK heat market
- Mapped these companies to show key sectors and sub-sectors
- Considered the risks to each sector posed by heat decarbonisation





Heat, Incumbency and Tr x

Richard

Secure | <https://embed.kumu.io/122bd7e33980257722a649af7a8ec58f?settings=0#uk-heat-sector-businesses>

Search

This map shows the main UK heat sector businesses resulting from research carried out as part of the UKERC Heat, Incumbency and Transformations project.

You can zoom in and out of the map and if you click a node, company information will be described on the left hand side (you may have to click the 3 dots on the right hand side to open the information pane). Nodes are sized depending on the market value ranking of that particular company and coloured depending on whether or not the company has no interest, some interest or is fully interested in low-carbon heating.

The map is associated with working paper: 'A transformation to sustainable heating in the UK: risks and opportunities for UK heat sector businesses' which should be read alongside.

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[Link to map](#)

Sectoral risks and opportunities



Sector	Sub-sector	Risks and opportunities under pathway 1 – decentralised low-carbon heat	Risks and opportunities under pathway 2 – centralised hydrogen production
Consultancy	N/A		
Fuel producers	Biomass producers		
	Coal producers		
	Electricity generators		
	Oil producers		
	Upstream gas and gas storage		
Heating appliances and technology	Biomass boilers		
	Cookers/kitchen appliances		
	Controls		
	Cylinders		
	Data and communications		
	Demand reduction		
	Electric heaters		
	Fire places and stoves		
	Gas boilers		
	Heat pumps		
	Metering		
	Micro-CHP		
	Non-domestic heating products		
	Oil boilers		
	Plumbing and heating supplies		
	Radiators		
	Solar thermal		
Water heaters			
Installation and maintenance	Low-carbon heat installers		
	Plumbers and engineers		
LPG	N/A		
Suppliers	Domestic supply including Big 6		
	Non-domestic supply		
	Oil supply		
Transportation	District heating and district heat generation		
	Electricity networks		
	Electricity network products		
	Engineering and construction		
	Gas networks		
	Pipeline products		

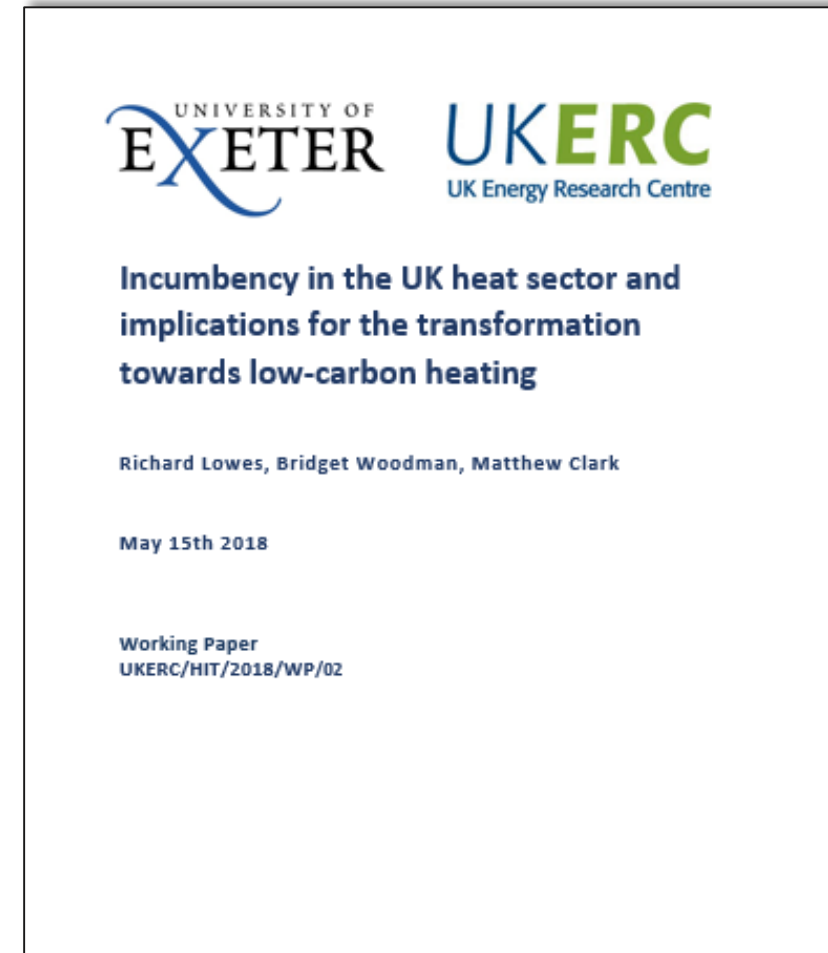
Working hypotheses



- **H1:** Incumbents put at risk by Pathway 1 are expected to be opposed to this pathway.
- **H2:** Incumbents who see reduced risk as a result of Pathway 2 are expected to be supportive of this pathway.
- **H3:** Incumbents put at risk by both pathways are expected to be opposed to both pathways.
- **H4:** The largest sectors put at risk by decarbonisation are expected to be the most active in their engagement around heat decarbonisation policy, innovation and investment.

Phase 3 – Implications of incumbency for the UK's move towards low carbon heat

- Carried out and analysed around 60 interviews with heat sector actors and experts
 - Incumbents
 - New entrants
 - Non-business heat experts
 - Trade associations
- Developed a third and final working paper linking in wider grey literature



Key themes and issues

- Incumbents say they see **low carbon gas** as central to the decarbonisation of UK heat, non-incumbents are not convinced
 - Lots of uncertainty and no agreement - even between networks
- A number of interviewees link incumbency to ideas of **inertia**
- The incumbent sectors most involved in behaviours around heat decarbonisation are:
 - Appliance manufacturers
 - Maintenance of market positions
 - Much linked to Energy and Utilities Alliance (which is also HHIC) and Bosch
 - Gas networks
 - Most at risk and with limited ability to respond (long term assets) – ENA vocal but networks have their own ideas
 - Notably limited engagement by suppliers and upstream gas interests

‘There’s a lot of work to do to prove that it is achievable, but it is by far the best option that’s on the table if you want to decarbonise the gas grid.’

Vs.

‘The policy looks like its gearing up for something that doesn’t exist in technology’

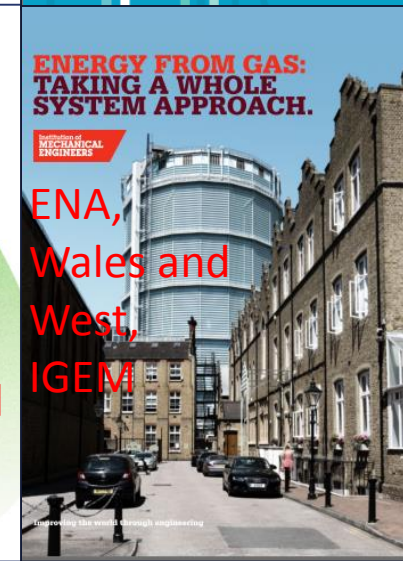
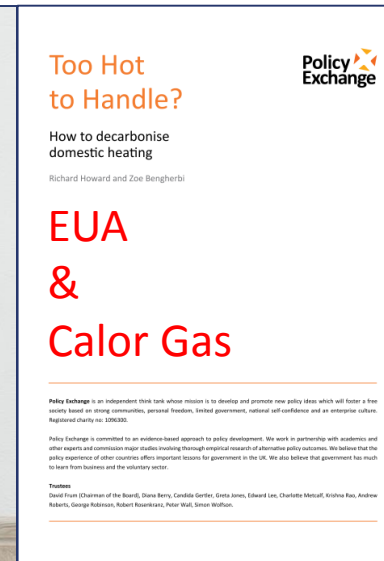
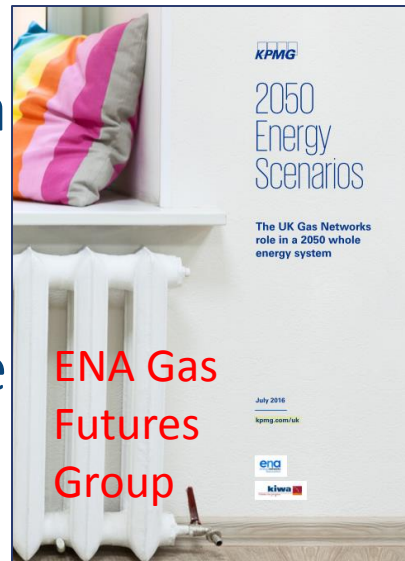
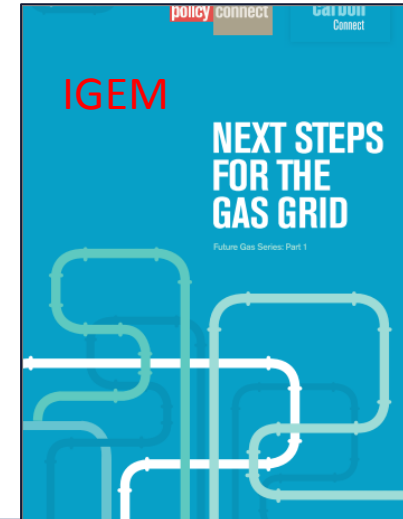
What are incumbents up to around heat decarbonisation?

- Lobbying and regulatory pressure (lots) and very clear evidence of this
- Fingerprints of gas industry on lots of work
 - Linked to maintaining the gas system, decarbonising the gas grid
 - Hydrogen conversion has emerged rapidly as an idea
 - Clearly linked to gas networks and appliance manufacturers
 - The large incumbents have the capital to fund this work
 - New entrants struggle

‘Respondent: ‘there’s an opportunity there if you’ve got the money, and the technology and if hydrogen works in the way people might hope.

Interviewer: Hope is an interesting word.

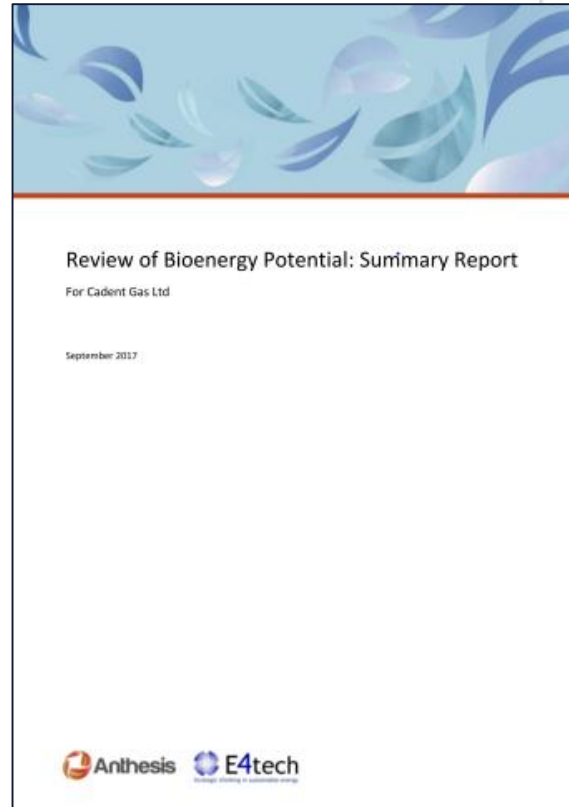
Respondent: I mean it’s often the gas networks who are leading this charge for quite obvious reasons’



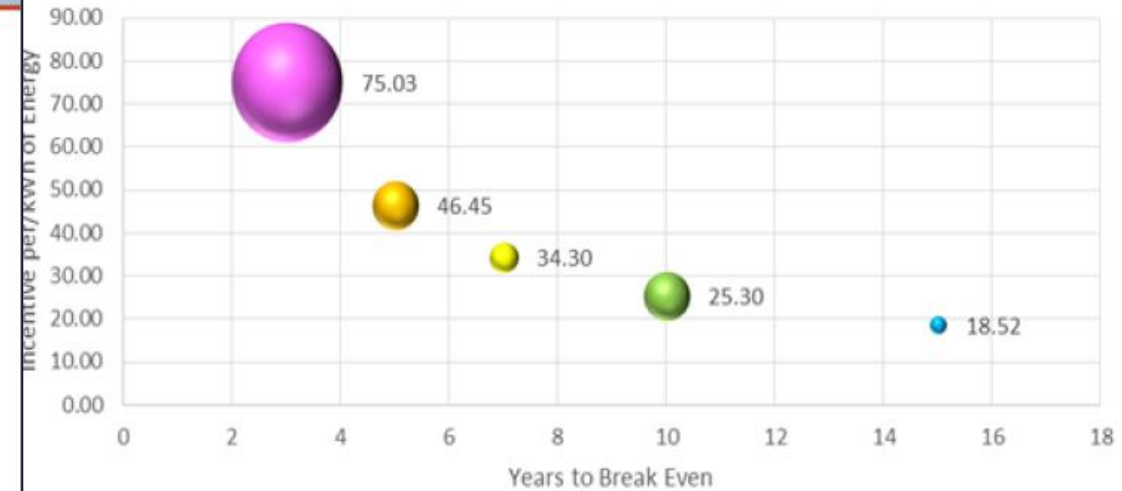
Other key incumbent behaviours

■ Innovation

- Much innovation linked to gas networks through consumer funded schemes
 - A clear gas lean as a result
 - More detailed analysis required
- Big questions over costings
- Levels of carbon savings
 - High emissions under Leeds proposal
 - Ignored in other situations e.g
 - Work on SNG by Cadent
 - Hybrid work by WWU



Heating Networks - 'Break-Even' Scenarios
Possible Incentives to Influence Different Types of Energy Consumers to Invest £10,000 in a new heating system e.g. Heating Network (£0 Upfront Subsidy)



Gate



'we have found evidence of networks using innovation funding to produce research of questionable quality with apparently vested results which appears to be being used for lobbying purposes.'

Further interesting findings

- Ideas of **resistance, maintenance of market positions, delay tactics and talking down other technologies**
 - **E.g. heat pumps don't work**
 - *'You know, people have been ripped off; this is a future PPI, I reckon, when people find that they've been ripped off through putting heat pumps in - which is costing them more, and isn't saving the planet'*
 - *'they're literally trying to muddy the waters, so that everybody is, "Maybe we'll do this, maybe we'll do that." And slow it down.'*

- Development of networks and coalitions
 - Hydrogen consortium
'Decarbonised Gas Alliance'
developed by shale gas group UKOOG
 - Links to trade unions visible e.g. gas and GMB
- Power in supply chains e.g. Centrica
- But also disagreements within companies and industries

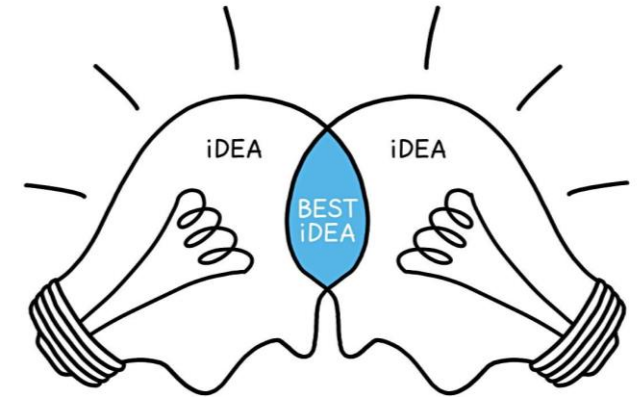
Across all actors, policy seen as the most important required driver of change

So how did our hypotheses hold up?

- **H1:** Incumbents put at risk by Pathway 1 are expected to be opposed to this pathway.
 - *Yes, but the most effort and noise is coming from gas networks and appliance manufacturers*
- **H2:** Incumbents who see reduced risk as a result of Pathway 2 are expected to be supportive of this pathway.
 - *Absolutely, the gas networks and appliance manufacturers are in general very behind the idea of decarbonising the gas grid, some support for hybridisation*
- **H3:** Incumbents put at risk by both pathways are expected to be opposed to both pathways
 - *Yes. The off gas grid sectors e.g. oil and LPG are particularly at risk from heat decarbonisation. We have discovered efforts by both sectors to promote the use of bio oil and bio gas (biopropane) and oppose heat pumps*
- **H4:** The largest sectors put at risk by decarbonisation are expected to be the most active in their engagement around heat decarbonisation policy, innovation and investment.
 - *No, the biggest sectors, upstream have had some very limited involvement (that we have seen) through the shale gas lobby (e.g. Shell) but very quite otherwise. Suppliers have been very quiet. Networks seem to be responding to the level of threat and appliance manufacturers looking to maintain market positions.*

But what about new entrants and new ideas?

- Incumbents clearly have the capacity to promote ideas, fund innovation (and potentially invest)
- While they may have expertise in what they do, they do not necessarily have expertise in low carbon heating
- The best ideas are in fact unlikely to be with the incumbents yet incumbents have the capacity to promote and develop ideas
- Therefore, the policy community must engage with, support and encourage new entrants and ideas
 - There may be a capacity issue here for policy makers who struggle for time to engage
 - A growing low carbon heat market should help this and we also support widening access to innovation funding



Some concluding thoughts

- Some incumbents are clearly promoting the maintenance of a gas based system including the gas grid
 - We fundamentally question whether this approach is viable, particularly in the context of Paris/net zero emission levels
 - We have not discovered any incumbents investigating or promoting a truly transformative approach to sustainable heating i.e. renewable and low demand – which we know exist elsewhere in the world
- Behaviours of incumbents include lobbying, innovating, investing, resisting, coalition building – all to maintain the gas system
- This is a snapshot in time in the context of Ofgem's RII02 and the Government's evidence *gathering* around heat decarbonisation
 - Behaviours and interests may shift but we think we've produced an interesting case study

References

- Lowes, R., Woodman, B., Fitch-roy, O. (2017) *Defining Incumbency : Considering the UK Heat Sector*. Falmouth. <http://www.ukerc.ac.uk/asset/175A3A09-8AFF-43E7-898D3BE1846C07E9/>
- Lowes, R., Woodman, B., Clark, M. (2018) *A Transformation to Sustainable Heating in the UK: risks and opportunities for UK heat sector businesses*. Falmouth. <http://www.ukerc.ac.uk/publications/sustainable-heating-in-the-uk-risks-and-opportunities.html>
- Lowes, R., Woodman, B., Clark, M. (2018) *Incumbency in the UK heat sector and implications for the transformation towards low-carbon heating*. Falmouth. <http://www.ukerc.ac.uk/publications/incumbency-in-the-uk-heat-sector.html>
- Lowes, R., Woodman, B. (2018) *Incumbency and the transformation towards low carbon heating in the UK – Implications for policy*. Falmouth. <http://www.ukerc.ac.uk/publications/incumbency-in-the-heat-sector-implications-for-policy.html>