

# The challenges of decarbonising dispersed industrial sites: can a place-based approach help, and how?

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With thanks to Peter Taylor and Ahmed Gailani

Decarbonising Zero Carbon Industry

Policy drivers for change

22 November 2022

**IDRIC**

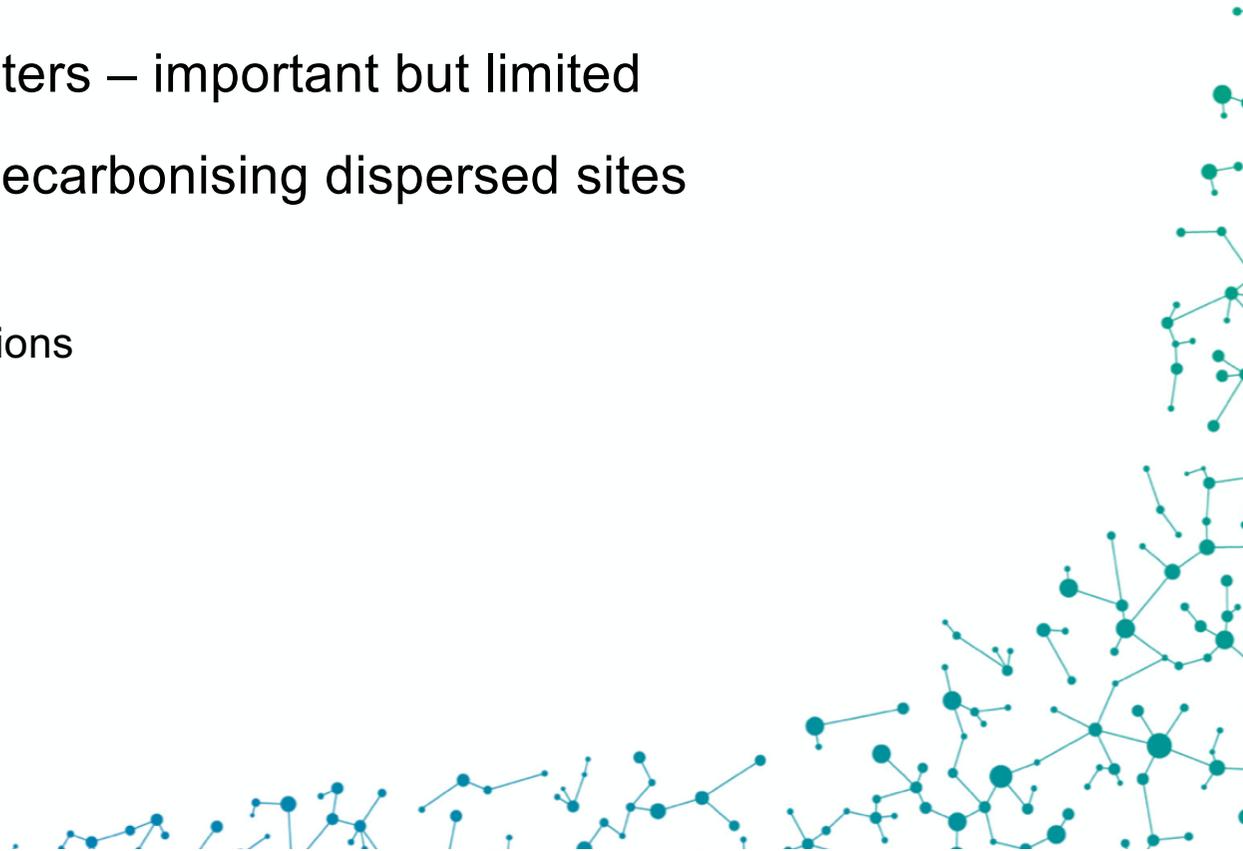
**UKERC**  
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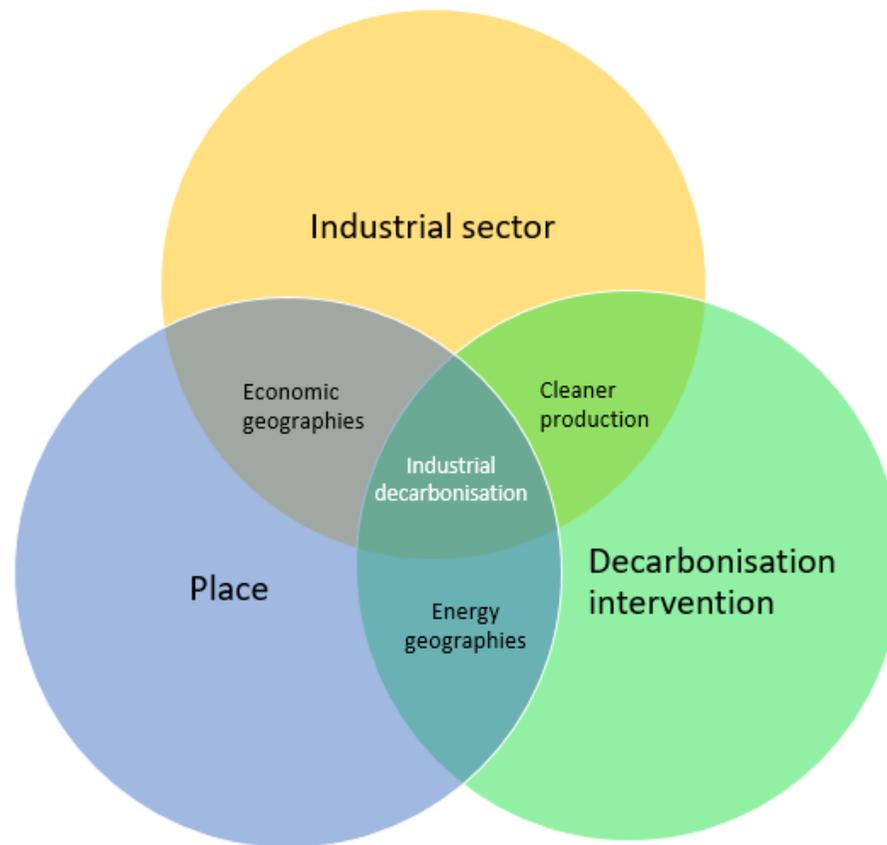


# Overview

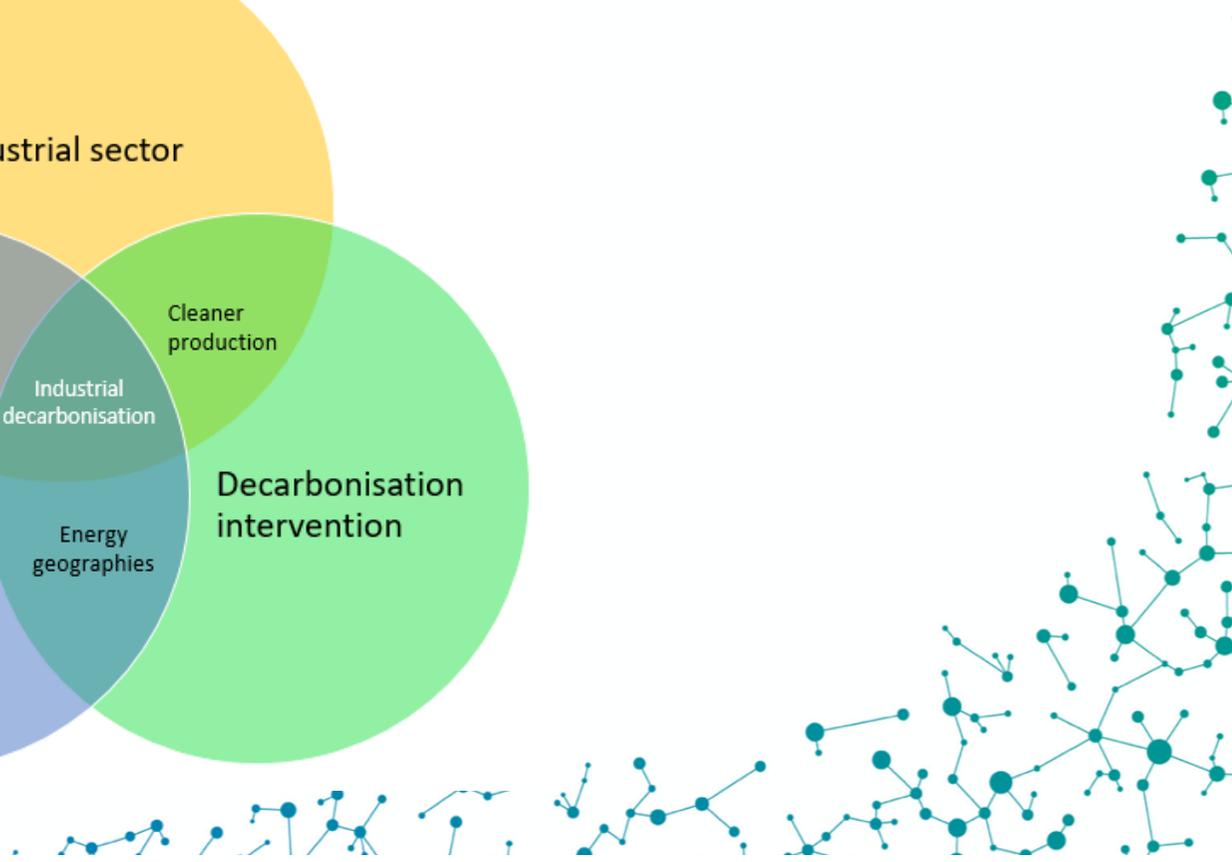
- Approaches to delivering industrial decarbonisation
- Place-based approaches 1: clusters – important but limited
- What about everywhere else? Decarbonising dispersed sites
  - Sectoral contribution to emissions
  - Potential for different abatement options
  - Local institutional capacity
- Role of a place-based approach
- Policy drivers for change



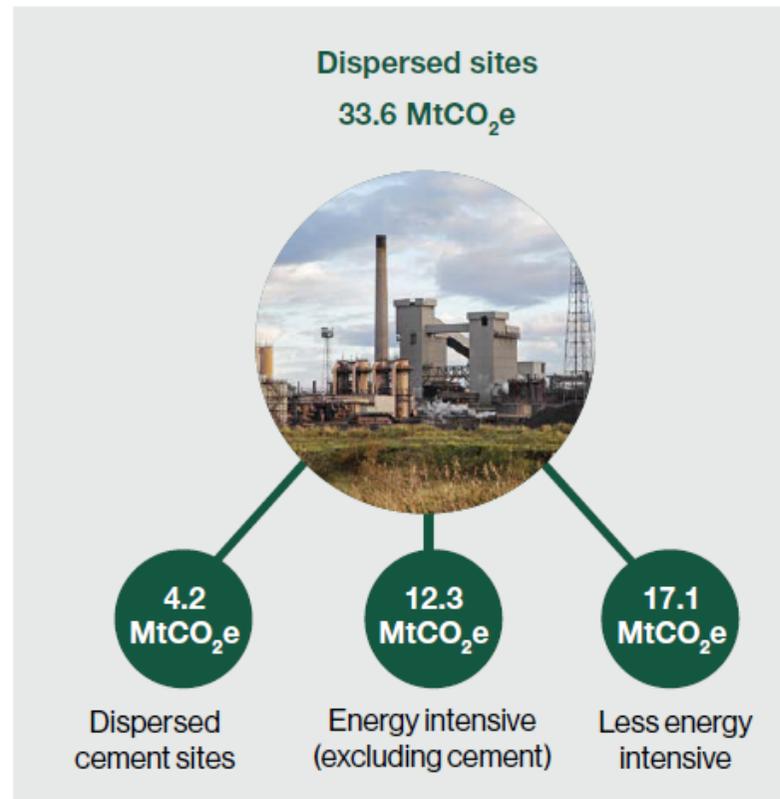
# Delivering industrial decarbonisation



Source: UKERC research



# GHG emissions from UK industry

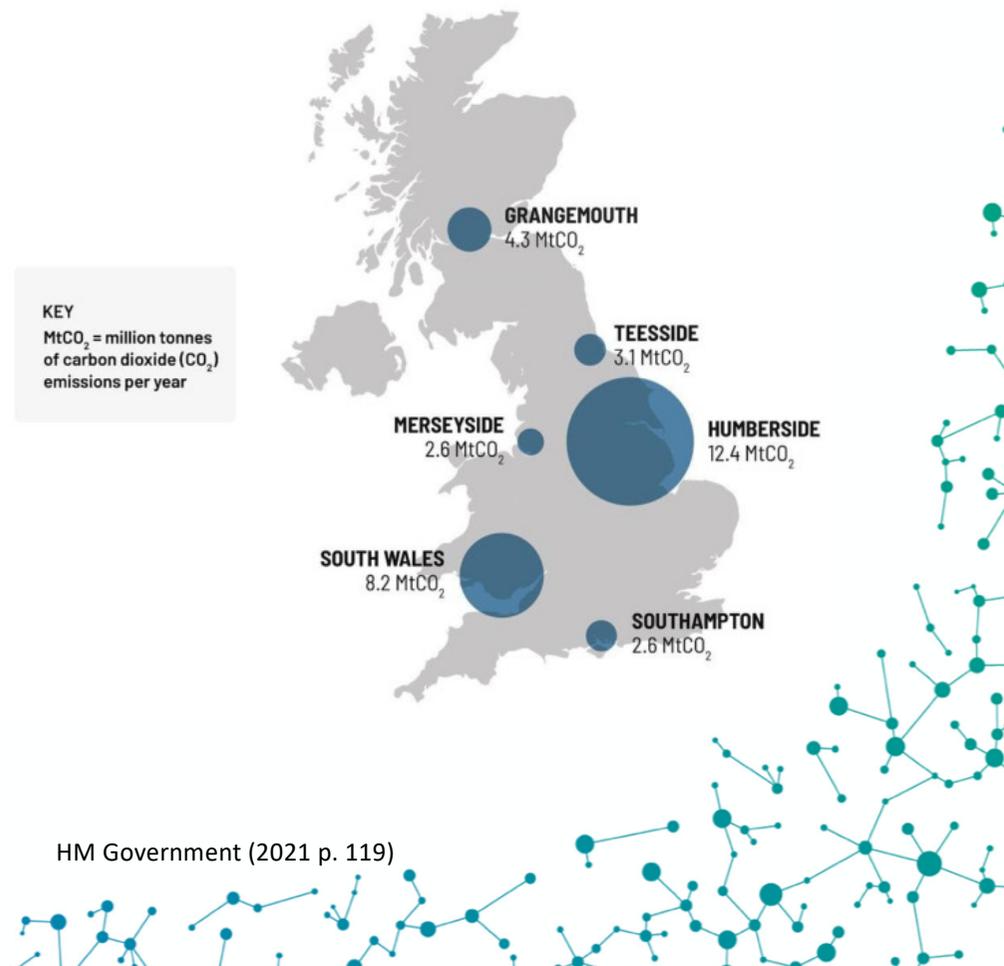


Plus around another 40 MtCO<sub>2</sub> from refineries, other fossil fuel production, offshore installations etc.

# Industrial clusters

- The UK's six largest industrial clusters account for about half of sector emissions
- Current sector ambition is a 63-76% emissions reduction from 1990 levels by 2035
- Aim to deliver four carbon capture usage and storage (CCUS) clusters, capturing 20-30 MtCO<sub>2</sub> across the economy, including 6 MtCO<sub>2</sub> of industrial emissions, per year by 2030.
- World's first net zero industrial cluster by 2040
- Two clusters presently identified as Track-1: East Coast – north east England; HyNet – north west England

THE UK'S LARGEST CLUSTERS BY INDUSTRIAL EMISSIONS ONLY



# What is driving the focus on clusters for industrial decarbonisation?

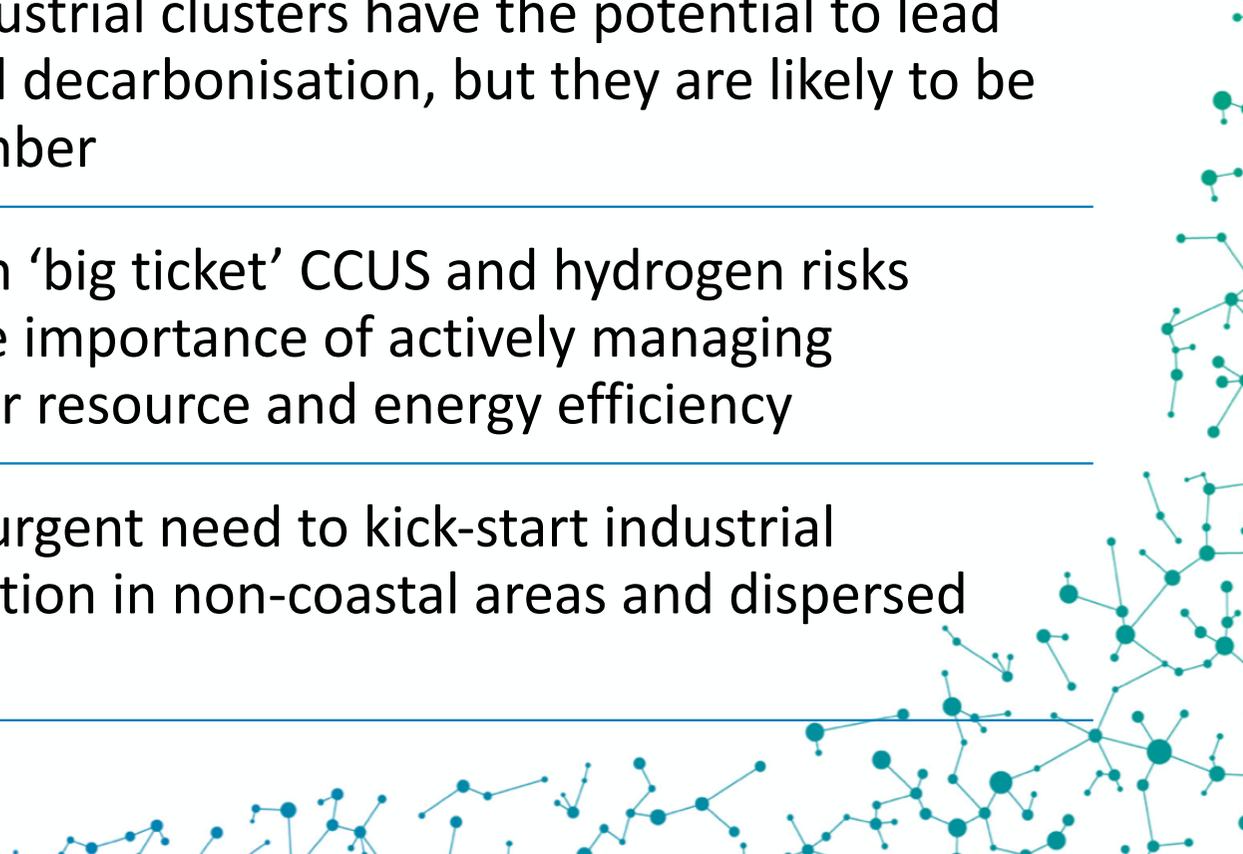
The current business model for industrial cluster decarbonisation is technology driven: CCUS with blue hydrogen as a secondary revenue stream, in a bid to gain first mover advantage in the hydrogen economy

Flagship industrial clusters have the potential to lead on industrial decarbonisation, but they are likely to be finite in number

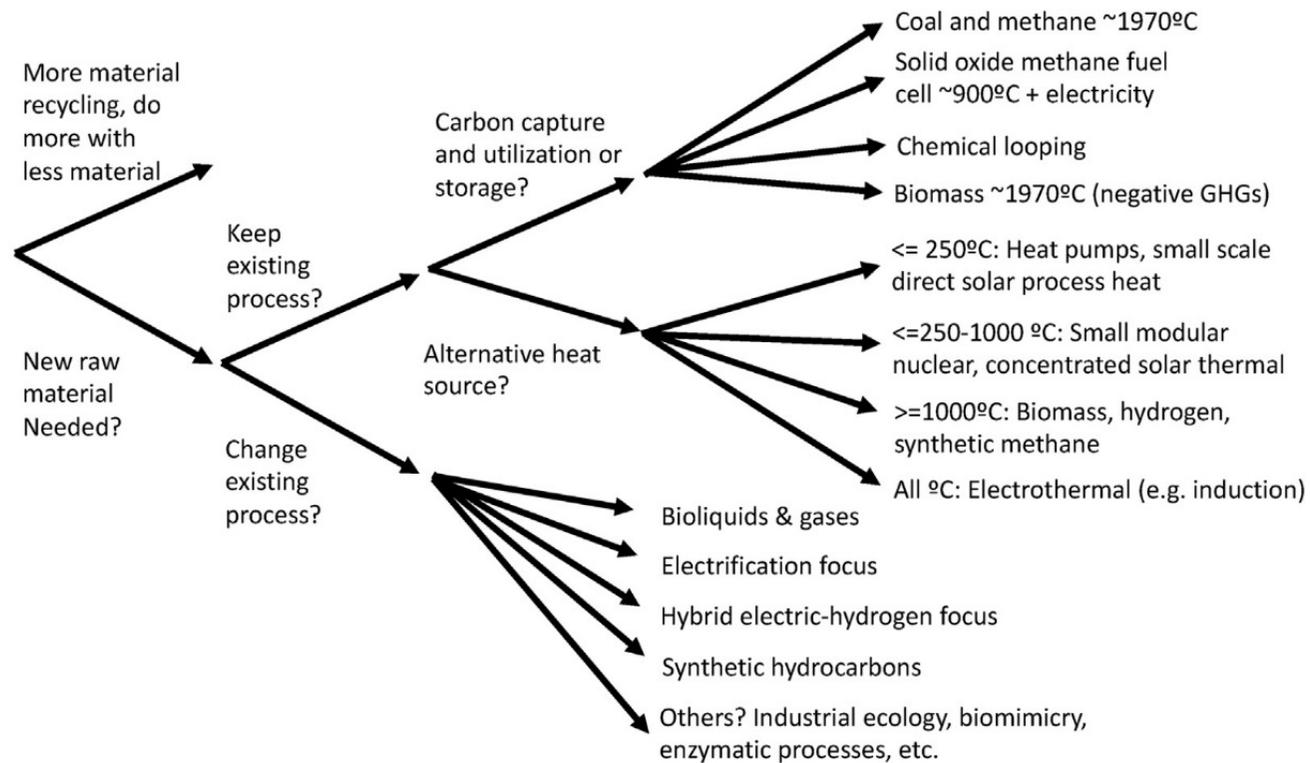
The focus on 'big ticket' CCUS and hydrogen risks eclipsing the importance of actively managing strategies for resource and energy efficiency

There is an urgent need to kick-start industrial decarbonisation in non-coastal areas and dispersed sites

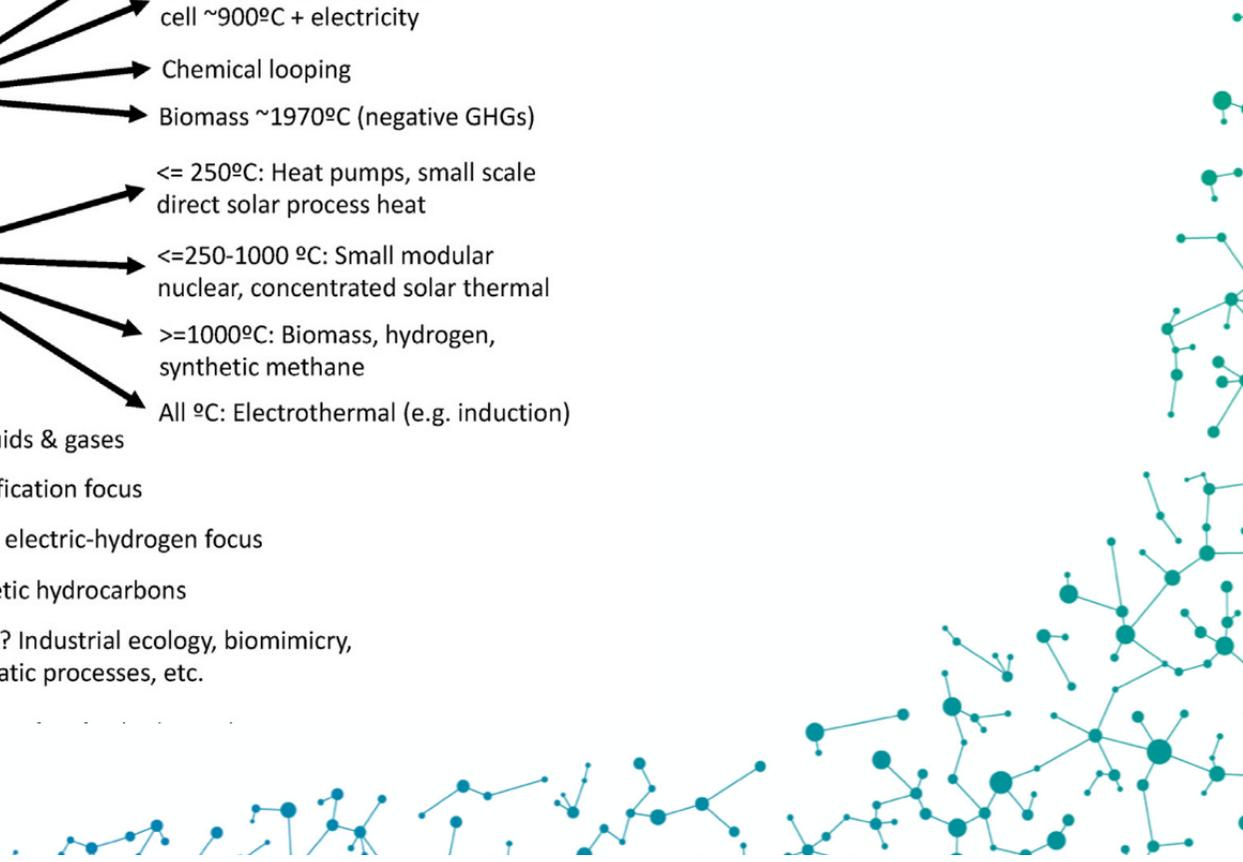
(Rattle and Taylor, 2022)



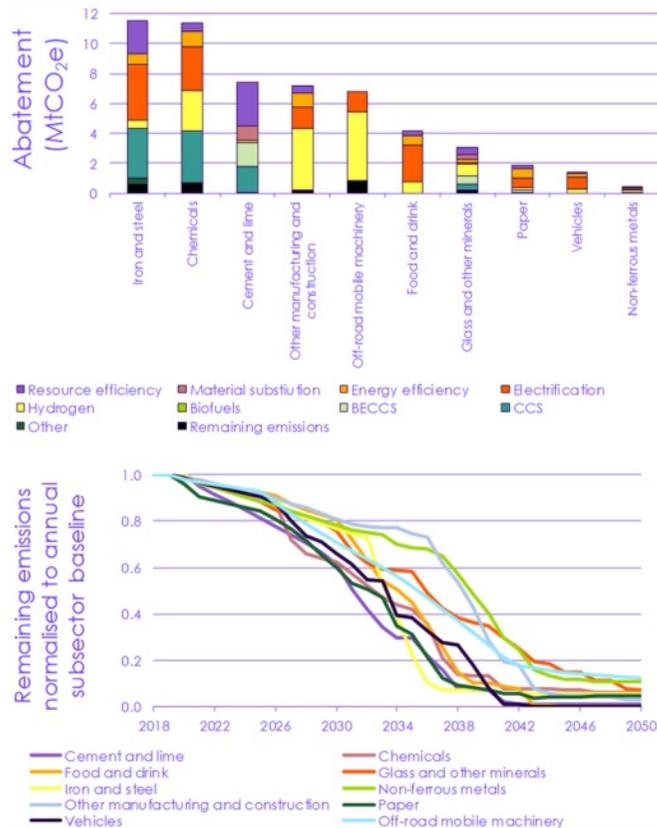
# Abatement options for industry



Bataille et al, 2018

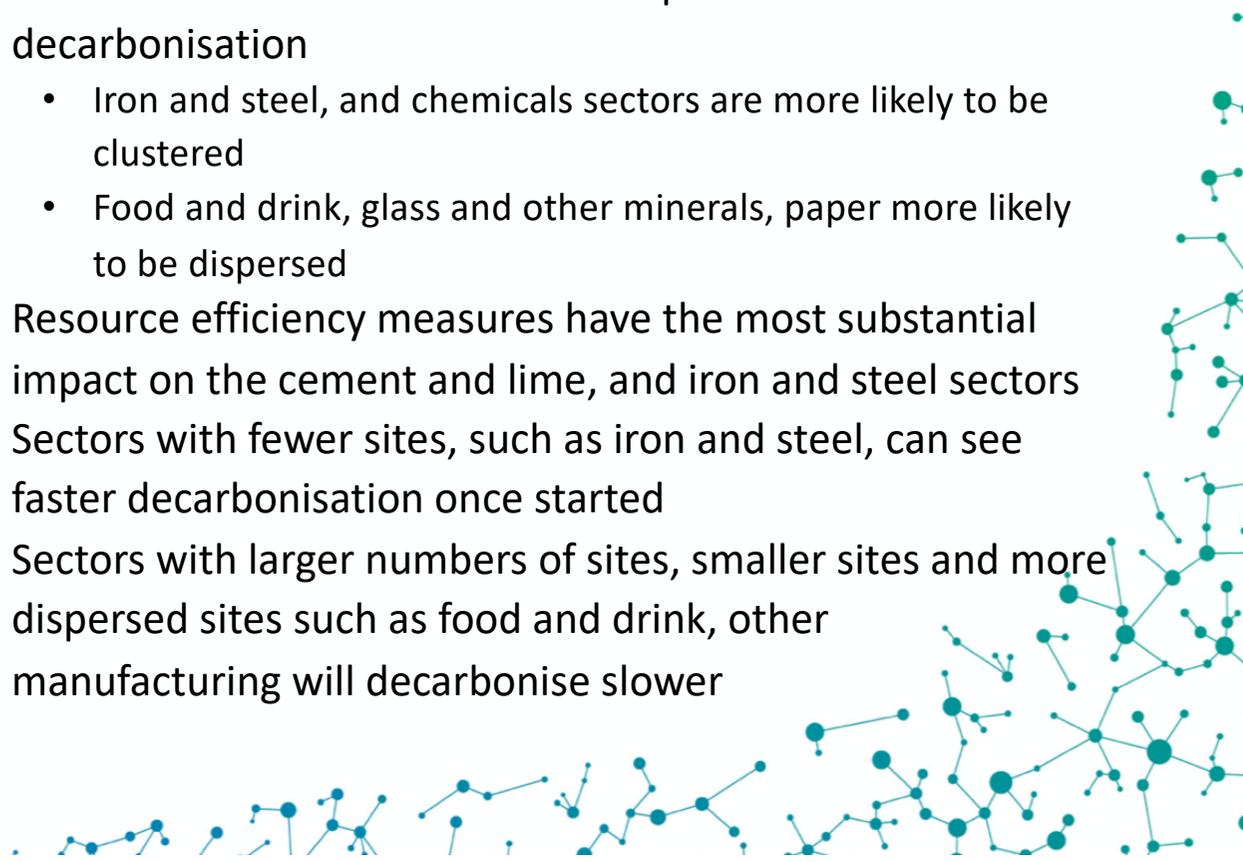


# Mitigation potential of abatement options for different sectors

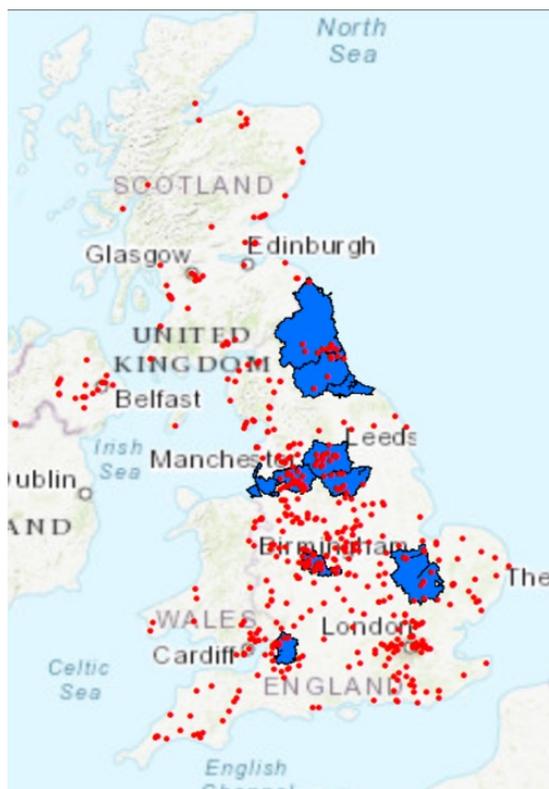


Climate Change Committee 2020, p.30

- Different sectors of industry have different mixes of abatement measures and different paces of decarbonisation
  - Iron and steel, and chemicals sectors are more likely to be clustered
  - Food and drink, glass and other minerals, paper more likely to be dispersed
- Resource efficiency measures have the most substantial impact on the cement and lime, and iron and steel sectors
- Sectors with fewer sites, such as iron and steel, can see faster decarbonisation once started
- Sectors with larger numbers of sites, smaller sites and more dispersed sites such as food and drink, other manufacturing will decarbonise slower



# Local institutional capacity



Location of point source dispersed industrial sites and MCAs derived by UKERC from the NZIP model

Type of region	Main barrier to innovation	Emissions MtCO <sub>2</sub> e
Old industrial regions (clusters)	Lock-in	37.6
Metropolitan regions (MCAs)	Fragmentation	7.4
Peripheral regions	Organisation thinness	26.2

Derived from Tödtling and Tripl, 2005

- Academic literature unanimous on the importance of local capacity in driving regional innovation
- Most dispersed industrial sites do not fall within MCAs and may face issues of institutional thinness
- Implications for levelling up

# Role of a place-based approach

*Decarbonising manufacturing SMEs is a fundamentally different challenge to decarbonising traditional large industrial sites (such as oil refineries and steelworks).*

*The approach needs to be more about efficient mass engagement, risk hedging and shared infrastructure, and less about single large capital investments.*

*Our model is to stimulate and support large-scale commercial investment in infrastructure and appropriate low carbon industrial developments by targeted public policy and infrastructure interventions.*

*We reduce transaction costs and risks for SMEs by working together and tailoring expert support locally to the diverse needs of different sectors.*

Globally competitive manufacturing for decarbonised supply chains:

## The Black Country Industrial Cluster

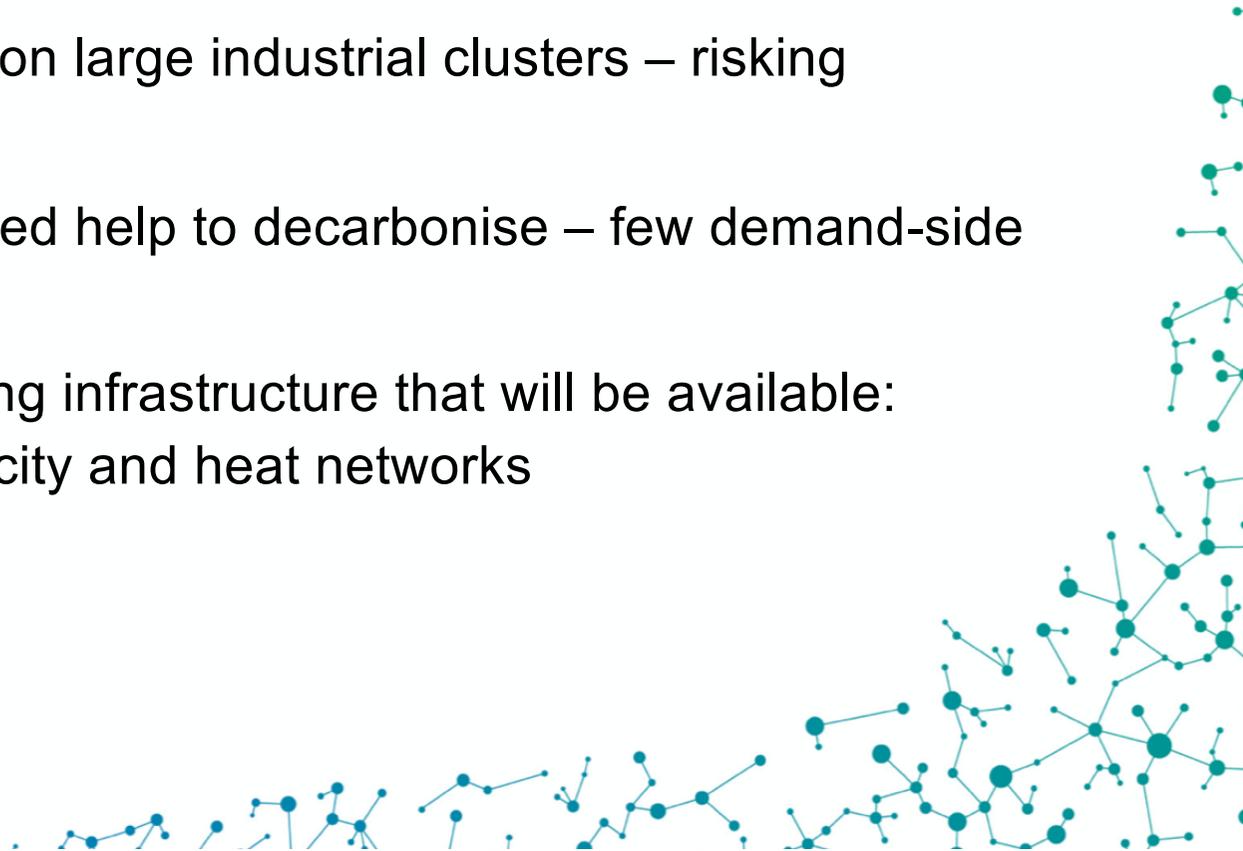


 Repowering the Black Country



# Key challenges

- Tough economic climate – Brexit, high energy prices, political uncertainty
- Government support is focused on large industrial clusters – risking sectoral inequalities
- Dispersed industrial sites will need help to decarbonise – few demand-side incentives
- Uncertainty around the supporting infrastructure that will be available: hydrogen, CO<sub>2</sub> pipelines, electricity and heat networks



# Policy drivers for change

- Net zero 2050 commitments have focussed minds
- Location will help determine the most appropriate decarbonisation options – place-based approaches are therefore important
- We see examples of place-based initiatives emerging, however:
  - Local institutional capacity is generally poor and highly variable
  - How to combine top-down and bottom-up approaches?



# Further information

Blog: The impact of increased energy costs on decarbonising UK industry (UKERC)

<https://ukerc.ac.uk/2021/12/16/research/industry/>



Briefing paper: Decarbonising industry through industrial clusters: lessons from international experience (IDRIC)

[https://idric.org/wp-content/uploads/Decarbonising-industry-through-industrial-clusters\\_lessons-from-international-experience\\_briefing-report.pdf](https://idric.org/wp-content/uploads/Decarbonising-industry-through-industrial-clusters_lessons-from-international-experience_briefing-report.pdf)



# References

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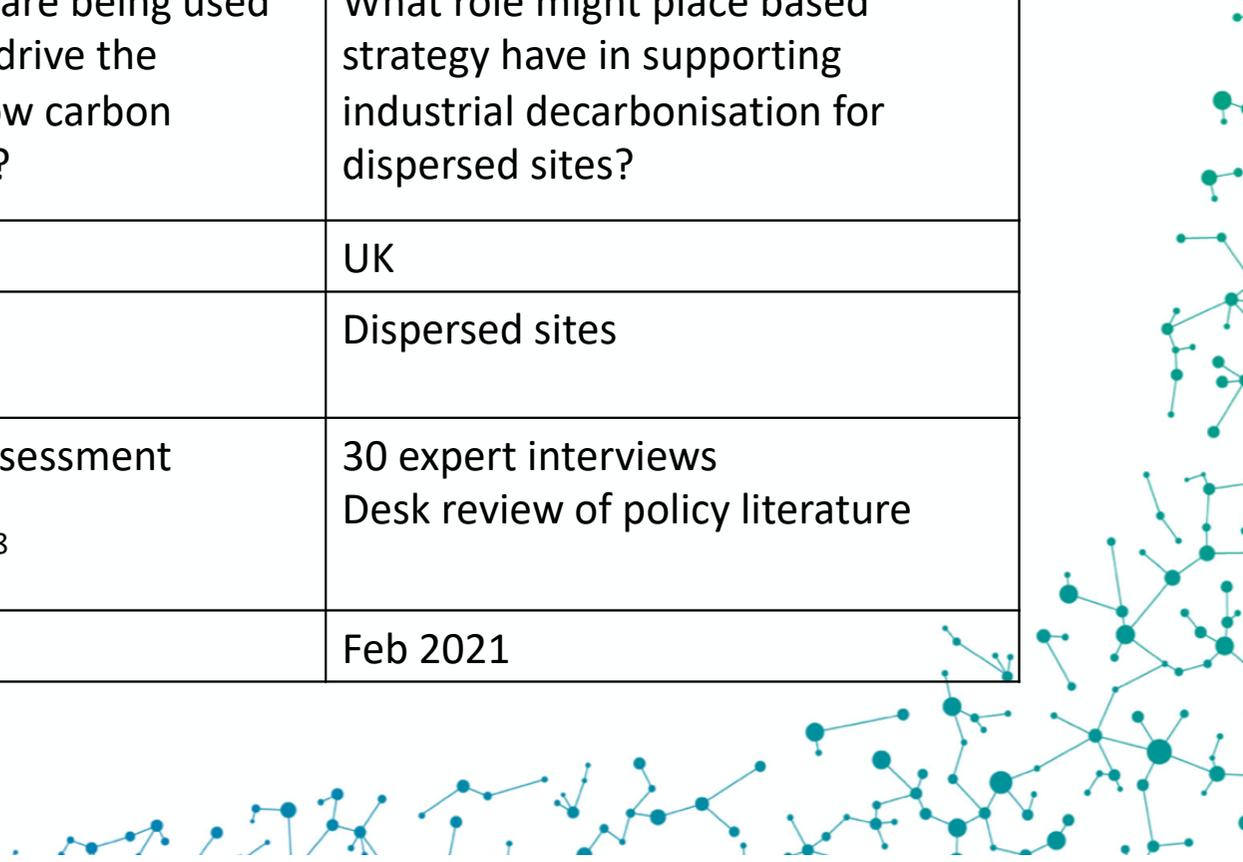
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# Outline of research

	IDRIC	UKERC
Research question	What approaches are being used internationally to drive the development of low carbon industrial clusters?	What role might place based strategy have in supporting industrial decarbonisation for dispersed sites?
Geographical focus	International	UK
Analytical focus	Clusters	Dispersed sites
Data collection	Rapid Evidence Assessment <ul style="list-style-type: none"><li>• 124 documents</li><li>• Academic literature 58</li><li>• Grey literature 66</li></ul>	30 expert interviews Desk review of policy literature
Starting date	Oct 2021	Feb 2021



# Local institutional capacity

- You have some local authorities who just by their nature are interlinked with their industry, because it's such an important part of the local economy that they have that data, whereas there are other areas who although they have industry, it's not really part of their list of priorities if you like. So, it just varies...

Energy systems catapult

- On the combined authority side, traditionally, and I'd say very much still, we are a transport organisation... If you look as an organisation on our spend, I wouldn't know the figure but a massive proportion of that would be big transport projects. And there just aren't the links, as you mentioned, or the resources to focus on industry

Net zero hub

- We're very far away in this country from having local authorities which do more ambitious things, as opposed to local authorities which basically are trying to deliver their statutory services without going under. So it probably requires investment in the local state: maybe not creating new bodies but finding ways to give local governing actors the capacity to do this thinking

Policy think tank

