

The UK Industrial Decarbonisation Research and Innovation Centre IDRIC

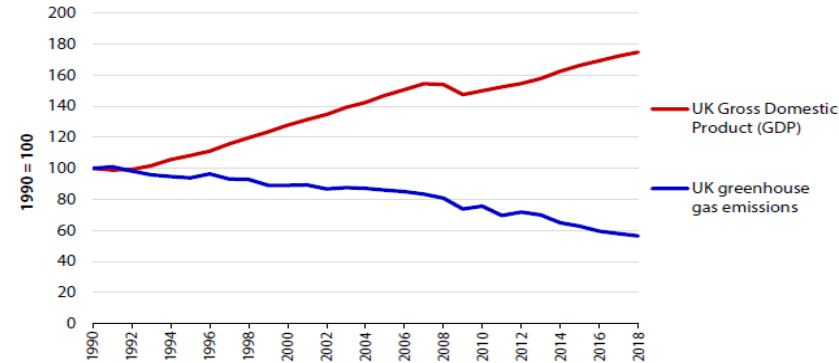
*Prof Mercedes Maroto-Valer
IDRIC Champion and Director*



The UK's net zero target

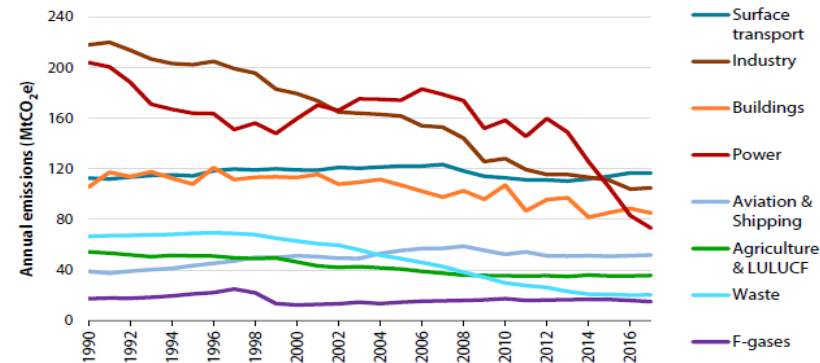
NetZero, CCC, May 2019

Figure 1.3. The UK as a positive exemplar – falling emissions in a growing economy (1990-2018)



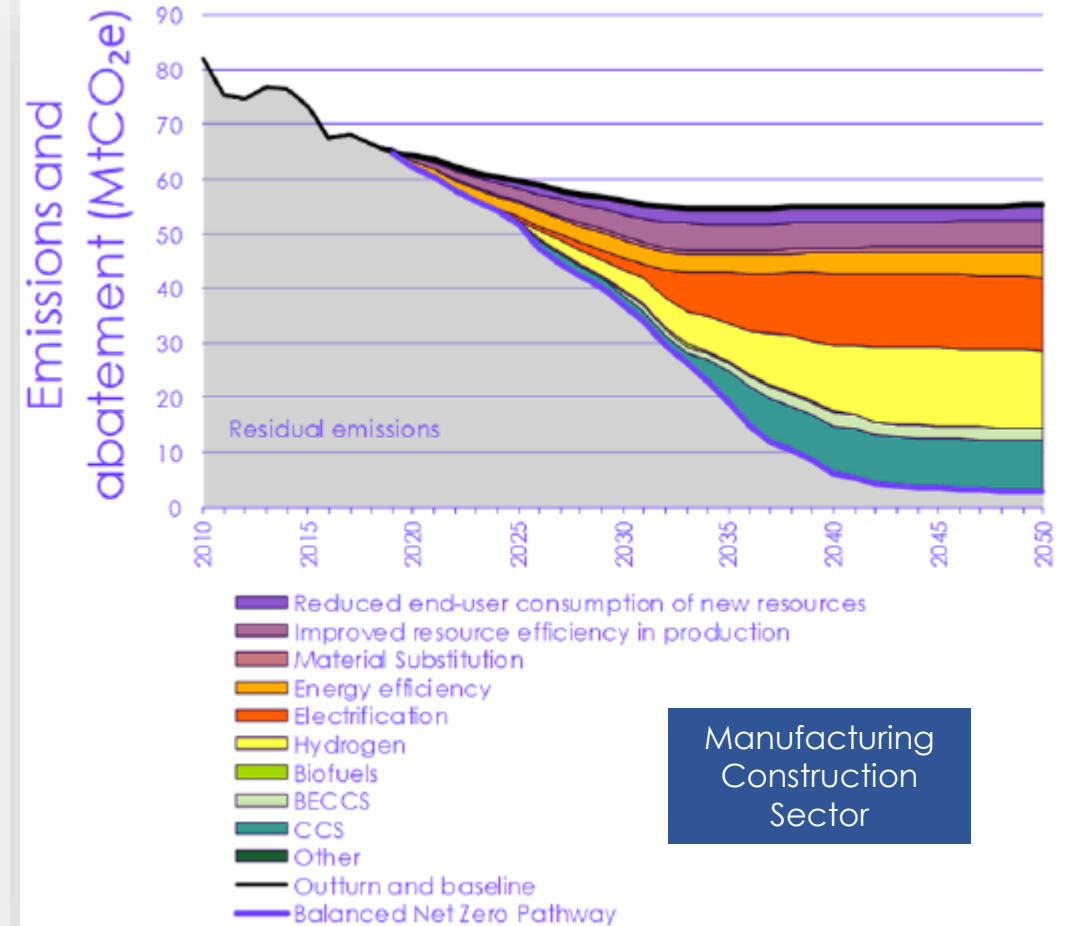
Source: BEIS (2019) *Final UK greenhouse gas emissions national statistics 1990-2017*; BEIS (2019) *2018 UK greenhouse gas emissions: provisional figures*; ONS (February 2019) *Gross Domestic Product: chained volume measures: Seasonally adjusted £m*; CCC analysis.

Figure 1.4. Progress reducing emissions in the UK has been imbalanced

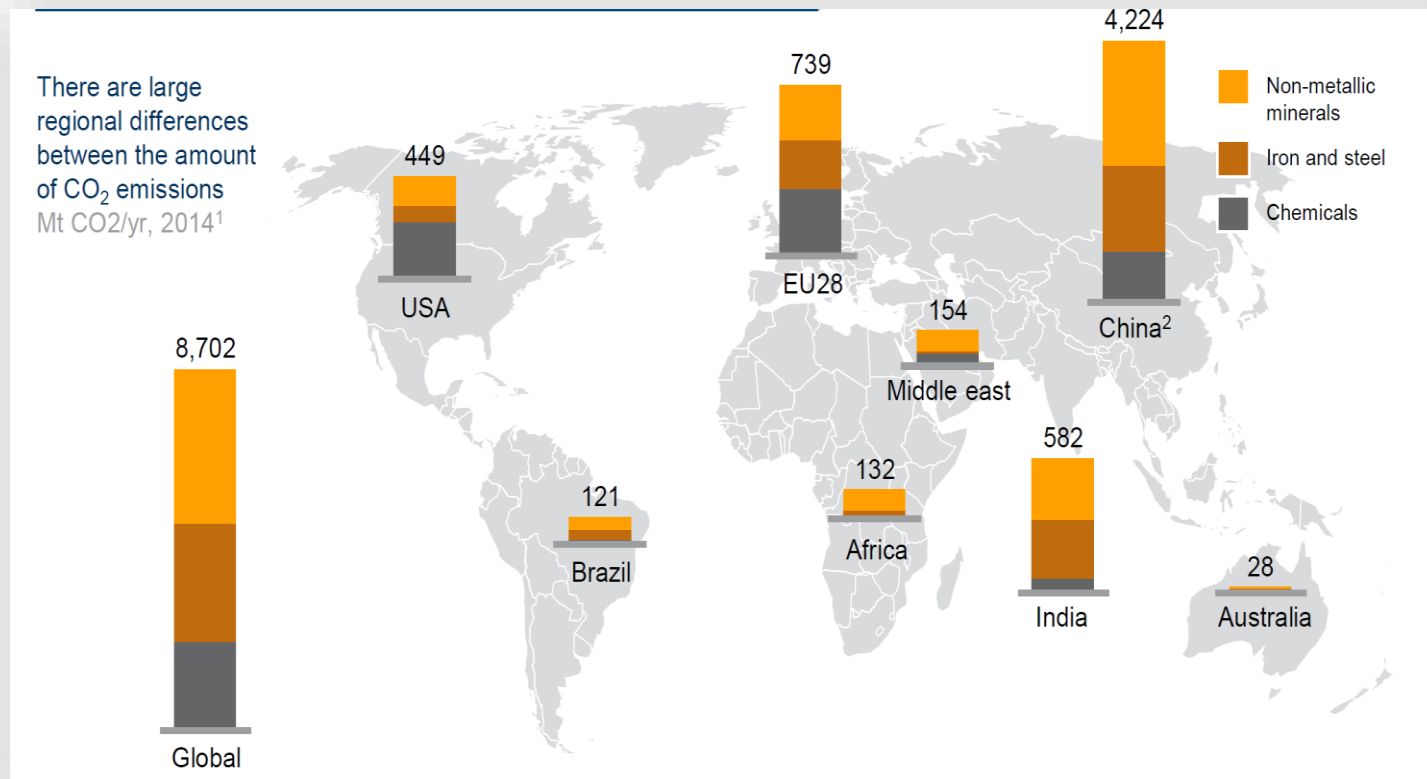


Source: BEIS (2019) *Final UK greenhouse gas emissions national statistics 1990-2017*; CCC analysis. LULUCF = land use, land use change and forestry.

6th C budget, CCC, Dec 2020



Challenges for energy intensive industries



Emissions from
process
feedstock

Highly
integrated
processes

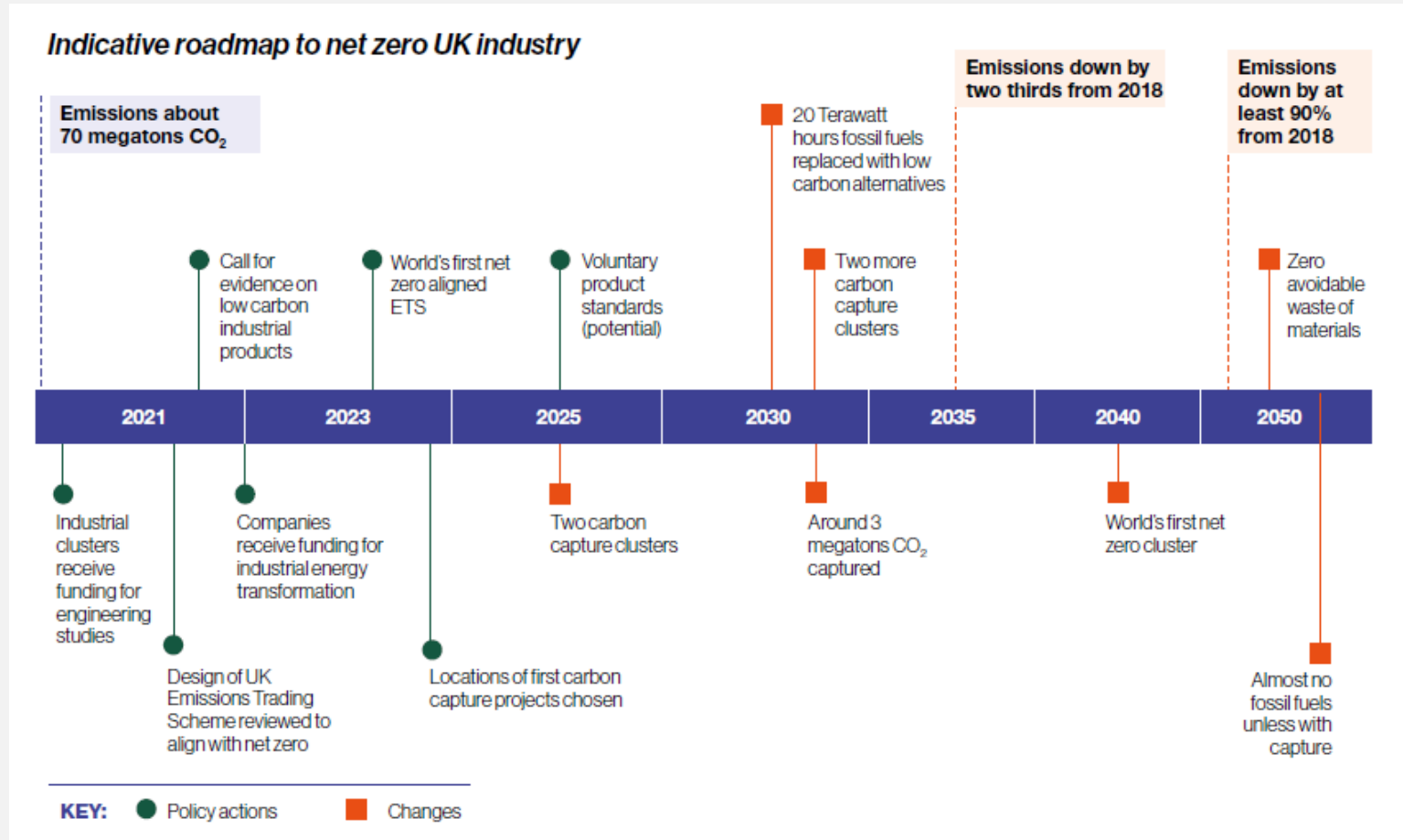
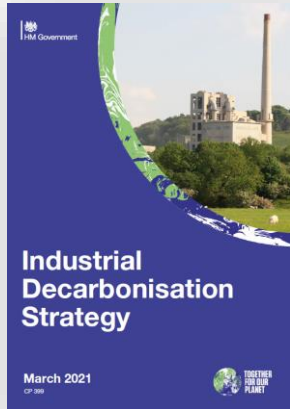
High
temperature
demand

Existing
plant
lifetimes

Low-cost
commodity
products

Global
competitive
markets

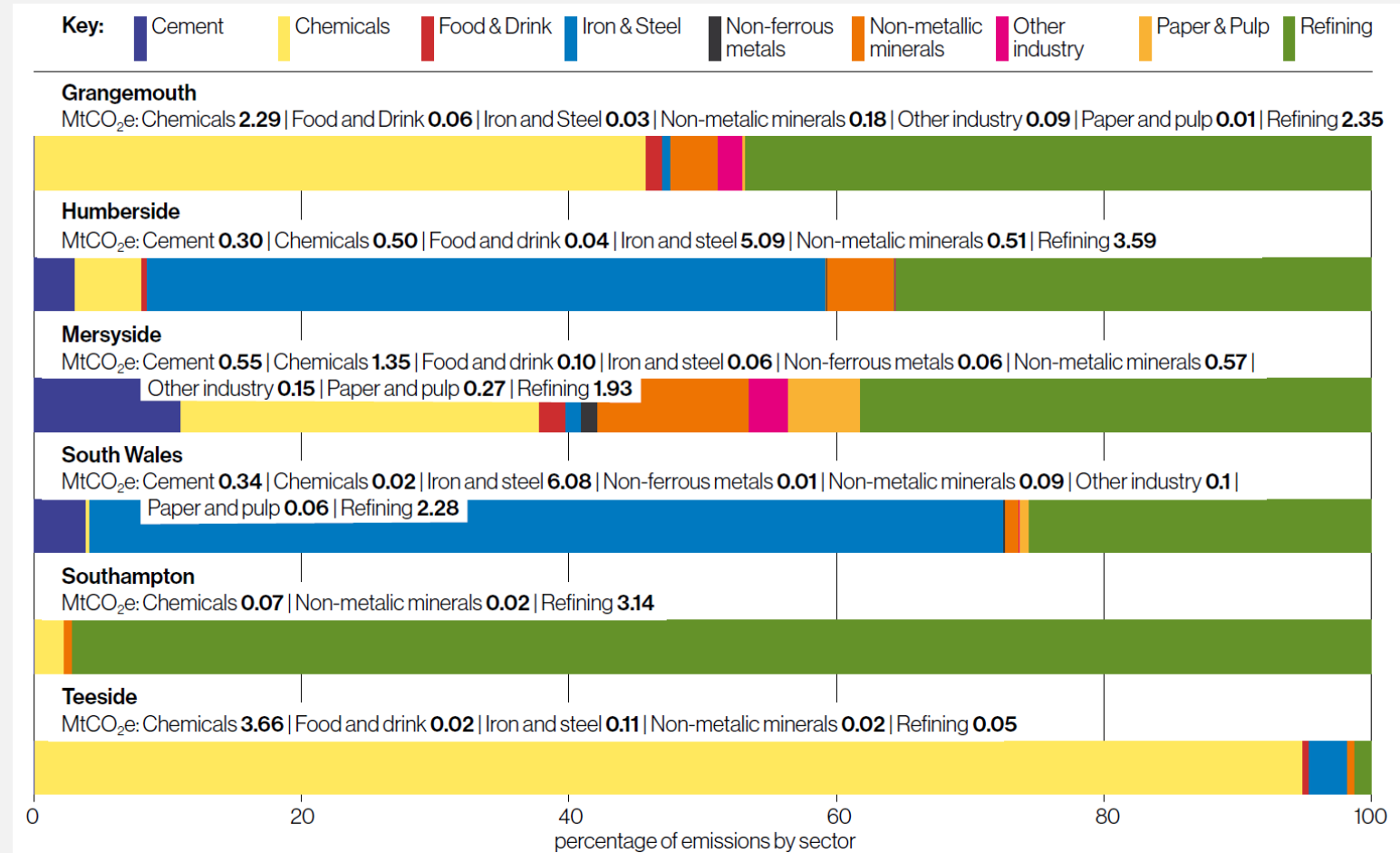
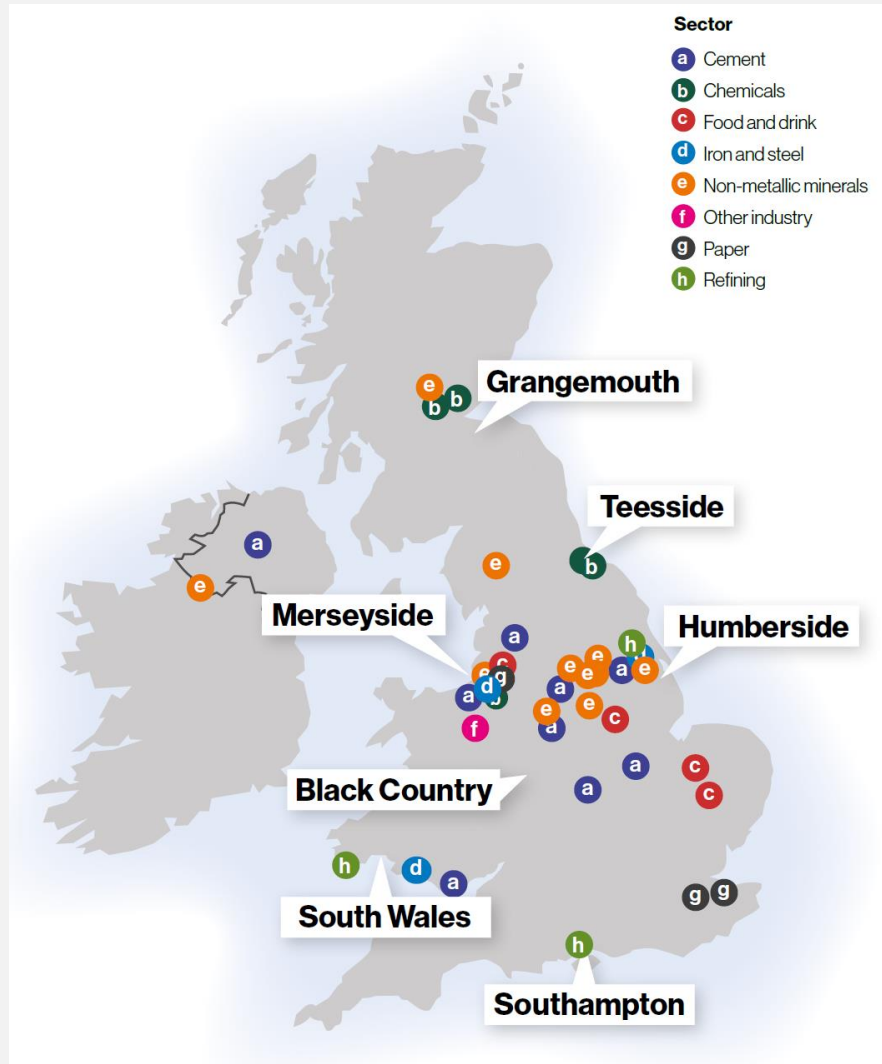
UK Industrial Decarbonisation Strategy



BEIS, March 2021

“ We will also draw on our world-class universities and research institutions, including through our £20 million funding that is being used to establish the Industrial Decarbonisation Research and Innovation Centre ”

UK Industrial Clusters



Industrial Decarbonisation Challenge

Industry plays a key role in society



9% of UK's GDP



2.6 million direct jobs



16% the UK's emissions



2 million green jobs by 2030

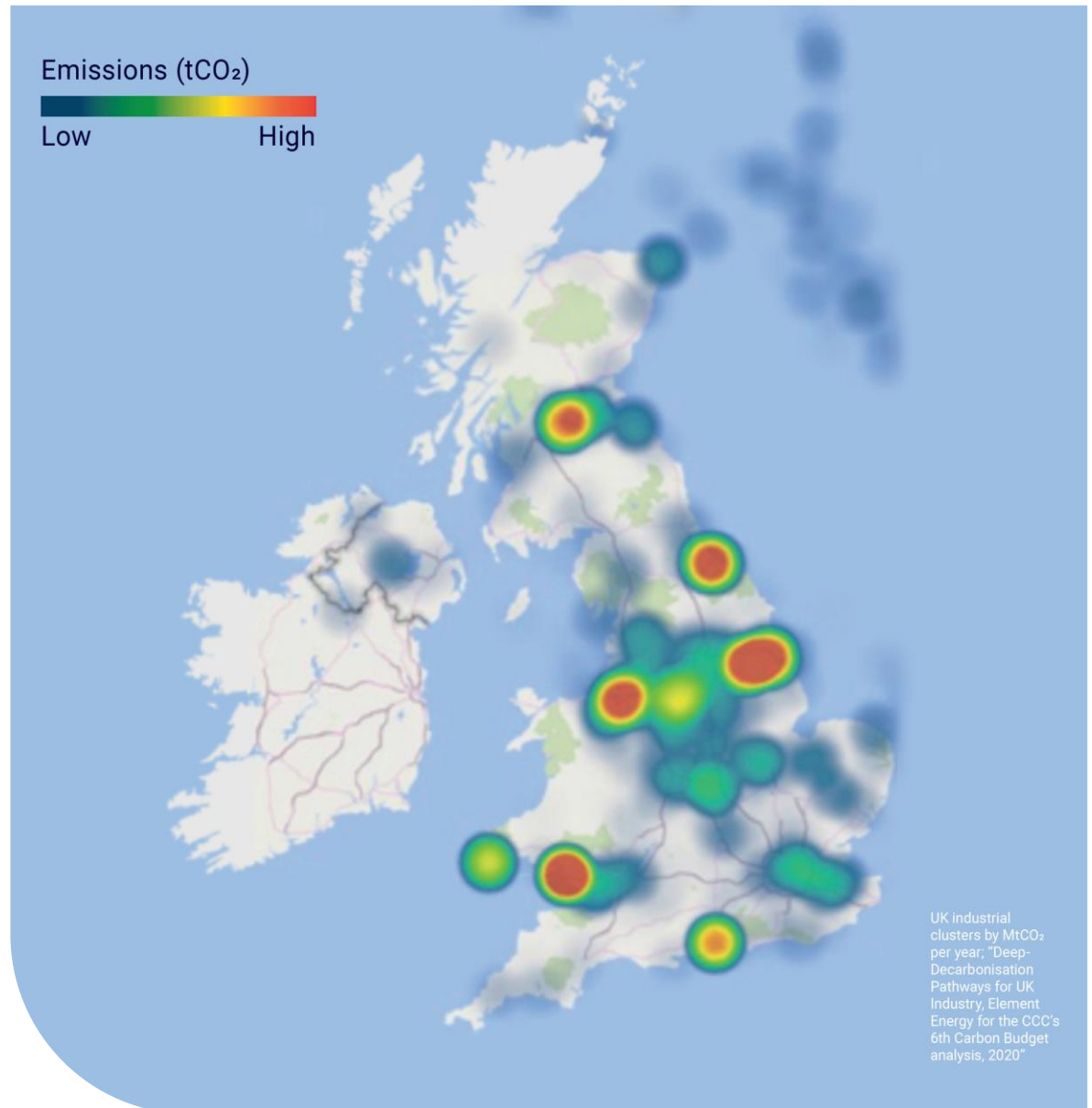
What are industrial clusters and why are they important to the UK?

Industrial clusters are areas with a number of industrial sites

For instance those producing:



<https://assets.publishing.service.gov.uk/government>

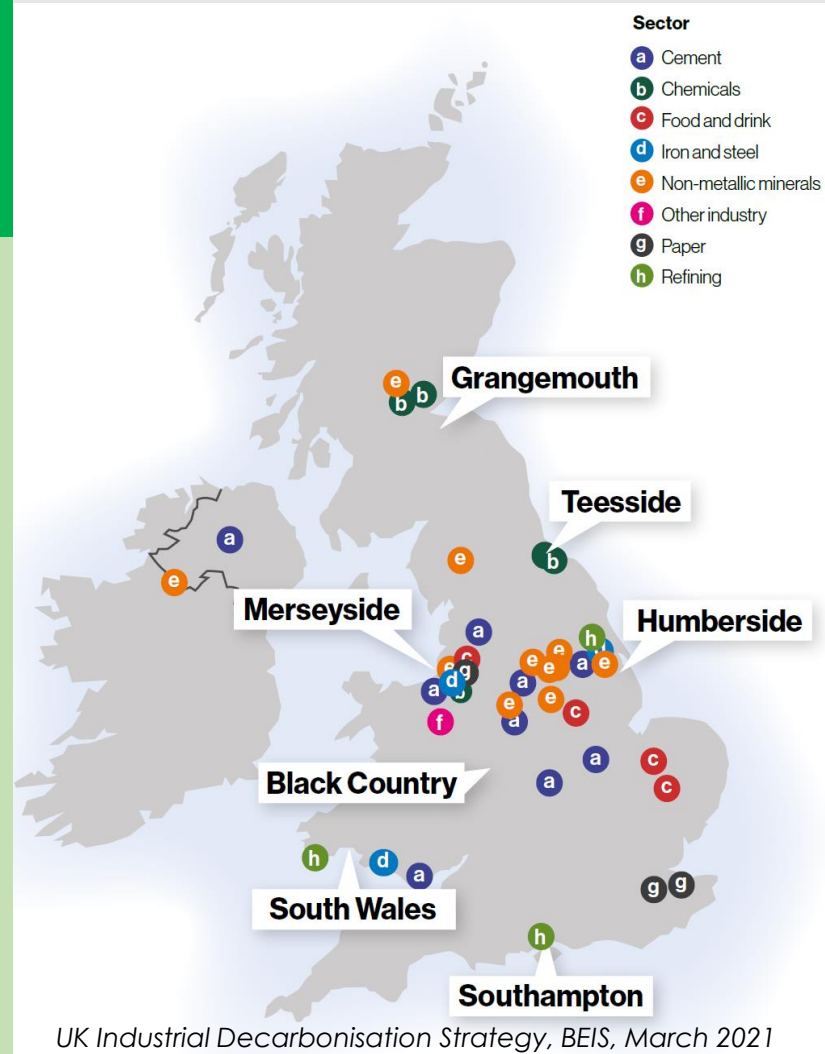


Industrial Decarbonisation Challenge

The Industrial Decarbonisation Challenge is funded by £210M from the Industrial Strategy Challenge Fund (ISCF) to be matched up to £261M.

Delivered through three complementary strands:

1. Industrial Demonstrators and Shared Infrastructure (£172M, UKRI-InnovateUK).
2. Cluster Decarbonisation Roadmaps and Feasibility Studies (£8M, UKRI-InnovateUK).
3. **IDRIC- The UK Industrial Decarbonisation Research and Innovation Centre (£20M, UKRI-EPSRC).**

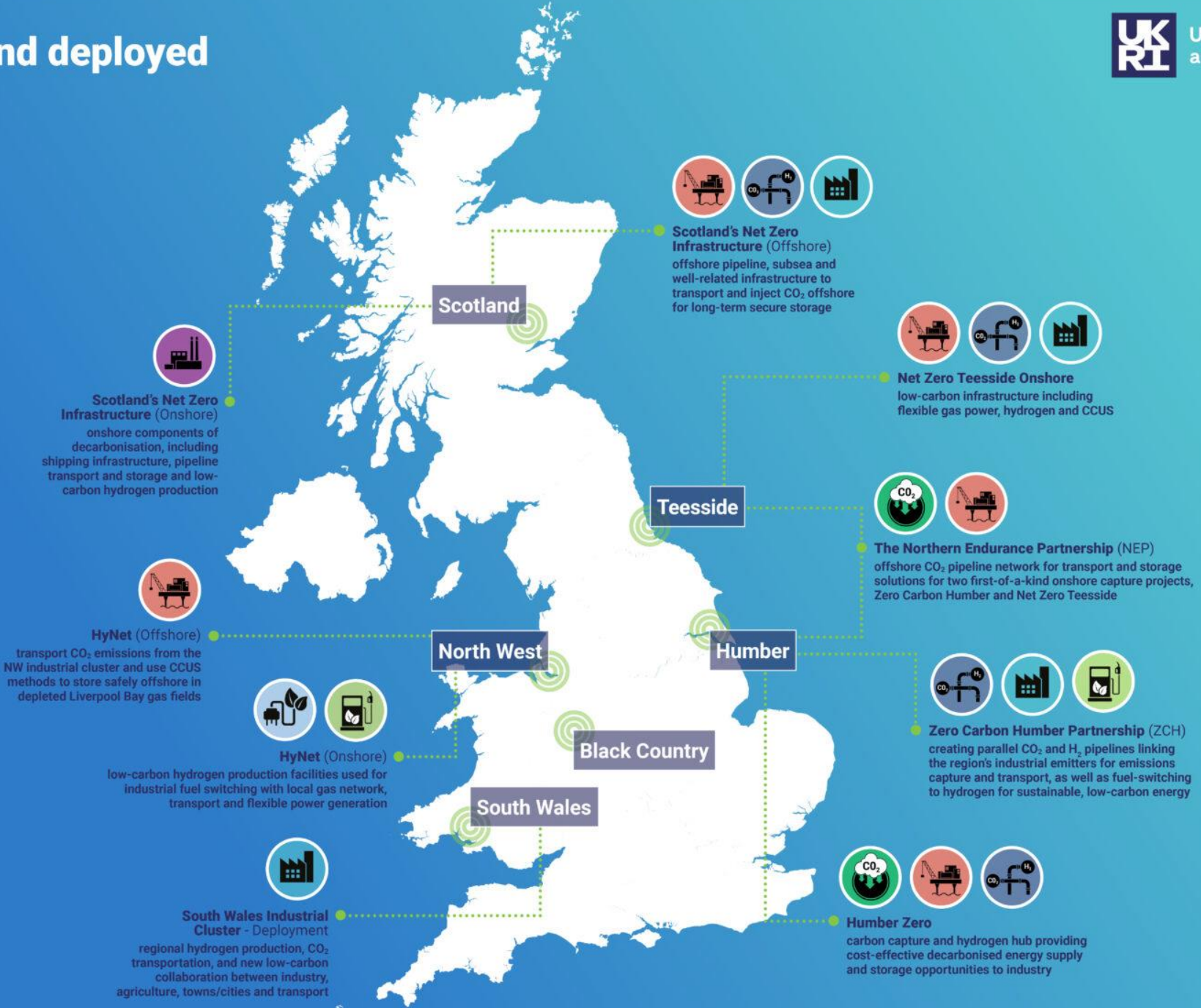


The programme will enable the development of:

- ❖ Four low-carbon industrial clusters by 2030; and
- ❖ The world's first net-zero industrial cluster by 2040

Technologies developed and deployed

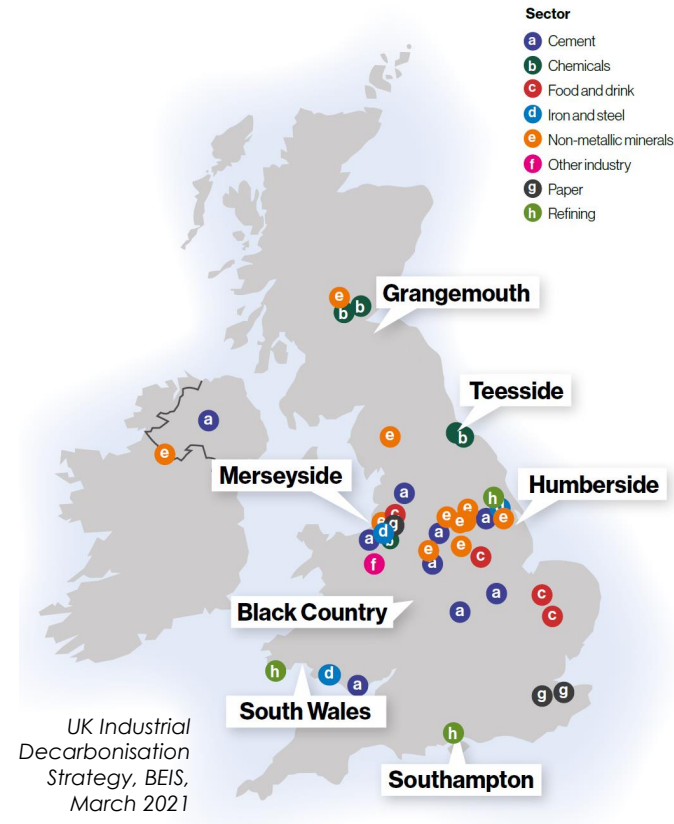
-  Industrial carbon capture technology
-  Offshore subsea storage facilities
-  CO₂ and Hydrogen transportation pipelines
-  Modern, low-carbon power stations
-  Industrial infrastructure
-  Flexible, greener energy systems
-  Fuel replacement technology



Partnerships at scale and pace

IDRIC is the **focal point of the green transformation** in the UK's industrial heartlands. Powered by **research and innovation** and funded by UKRI, IDRIC develops **innovative decarbonisation solutions at speed and scale** in the places where it matters most.

Collaborating with research organisations, industry, government, policymakers, NGOs, trade organisations and the public, we are **co-creating whole-system multidisciplinary solutions** that are accelerating the green futures of our industries.



142 partners
£20m funding

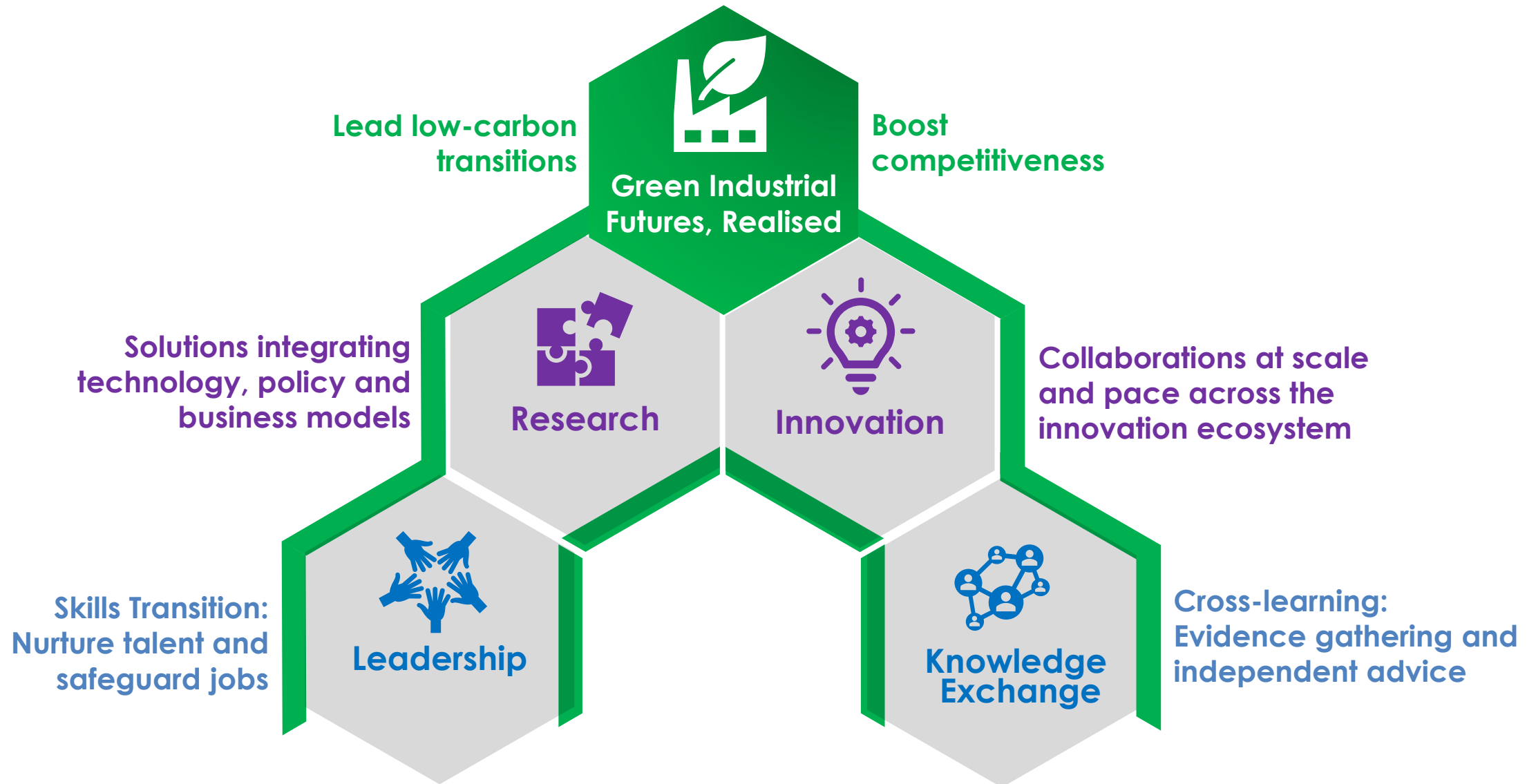
23 Research
Organisations

74 Industry
Partners

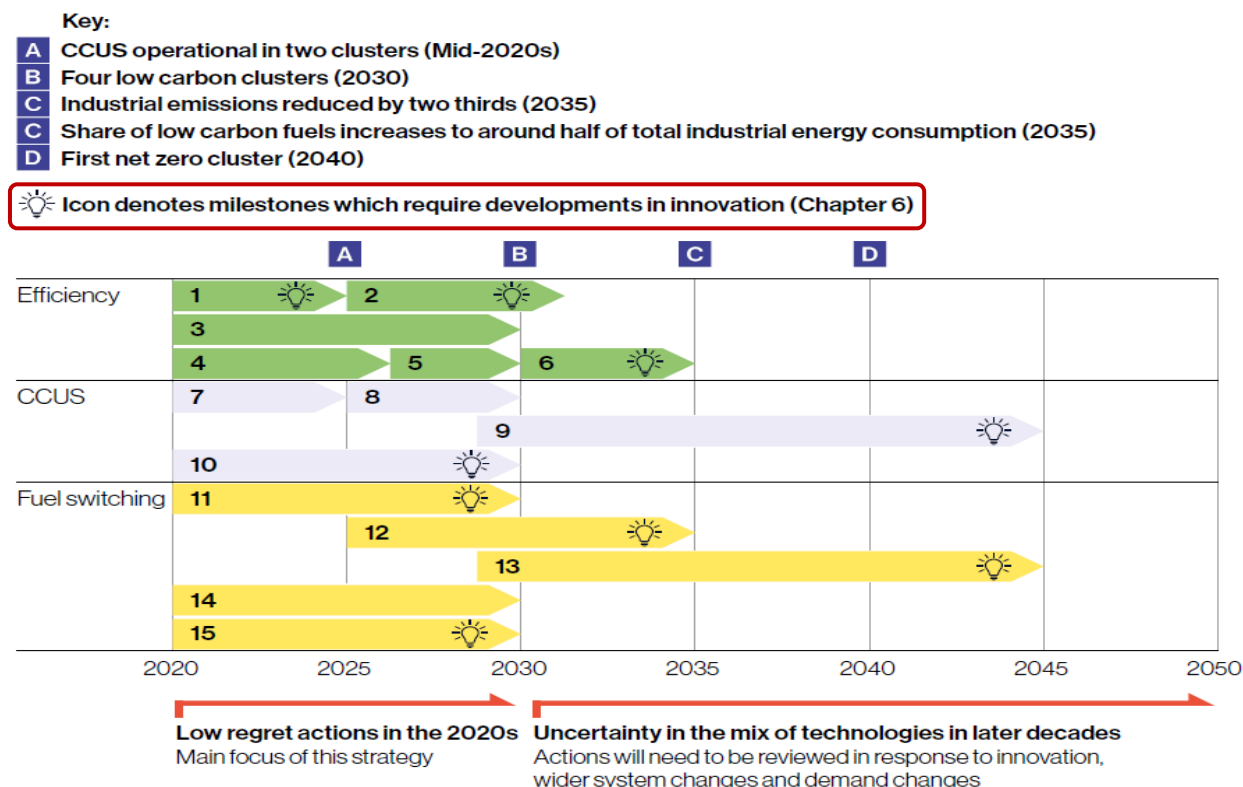
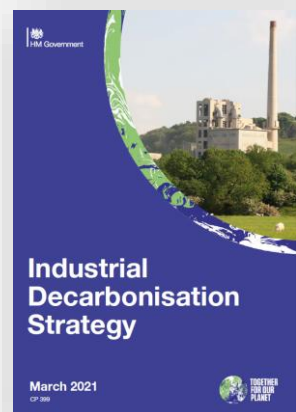
35 Associations, NGOs
Trade Organisations

10 Policy Makers
Government bodies

Accelerating the UK industrial clusters transition to net zero



Overview of technology strategy for the next three decades



Efficiency

- 1 Development of industrial digital technologies
- 2 Increased reuse, recycling and substitution of materials within industry
- 3 All sites adopt EE technologies with low payback times already available in the market
- 4 Widespread implementation of improved energy management system
- 5 Smart metering widely adopted in industry
- 6 Heat recovery maximised in sites operating with high temperatures

CCUS

- 7 Build CCUS network infrastructure in the first two clusters
- 8 CCUS infrastructure expanded to additional clusters
- 9 CCUS networks expanded to remaining clusters and beyond dispensing on technical development
- 10 Demonstration of CO₂ capture across a range of industries

Fuel switching






- 11 Testing hydrogen as a fuel for heating in industrial process
- 12 Widespread fuel switching (chosen technology depends on various factors) across clusters
- 13 Fuel switching extends to dispersed sites (hydrogen vs electrification depends on system changes such as repurposing the gas grid)
- 14 Installation of commercially ready electrification options in low temperature applications
- 15 Development of high temperature electrification technologies

“ Develop, demonstrate and reduce the costs of industrial decarbonisation technologies through government funded competitions. We will:

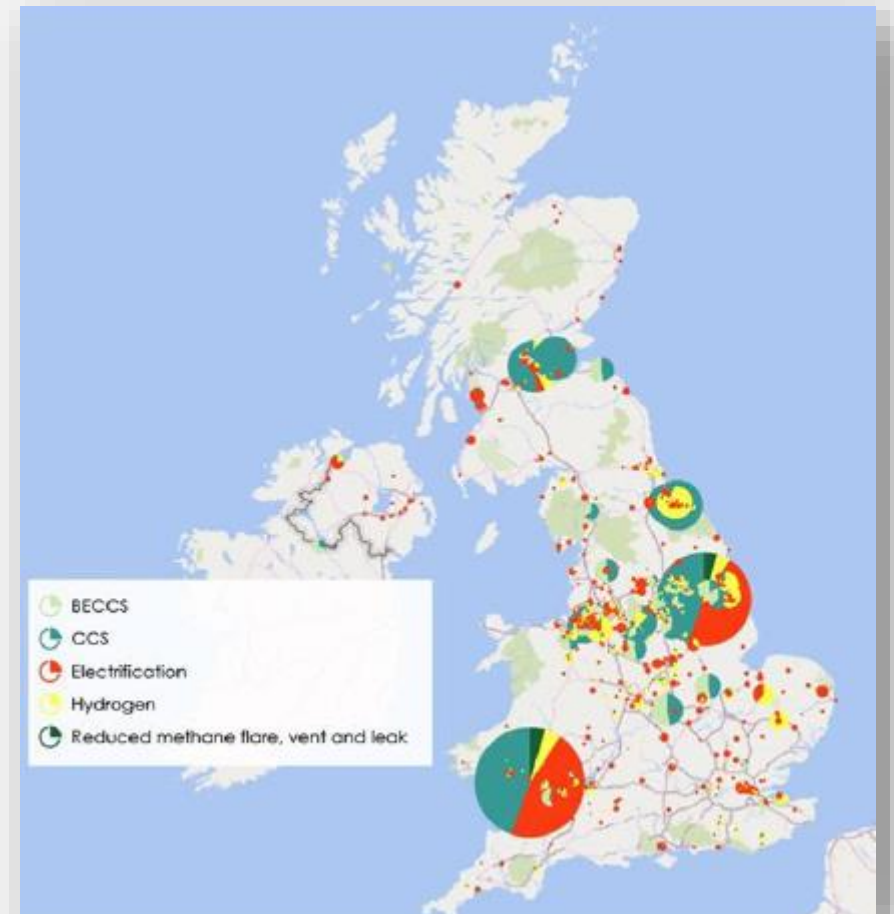
- ... support research and innovation through the Industrial Decarbonisation Research and Innovation Centre ”

Solutions for decarbonisation of industrial clusters

Portfolio of technologies

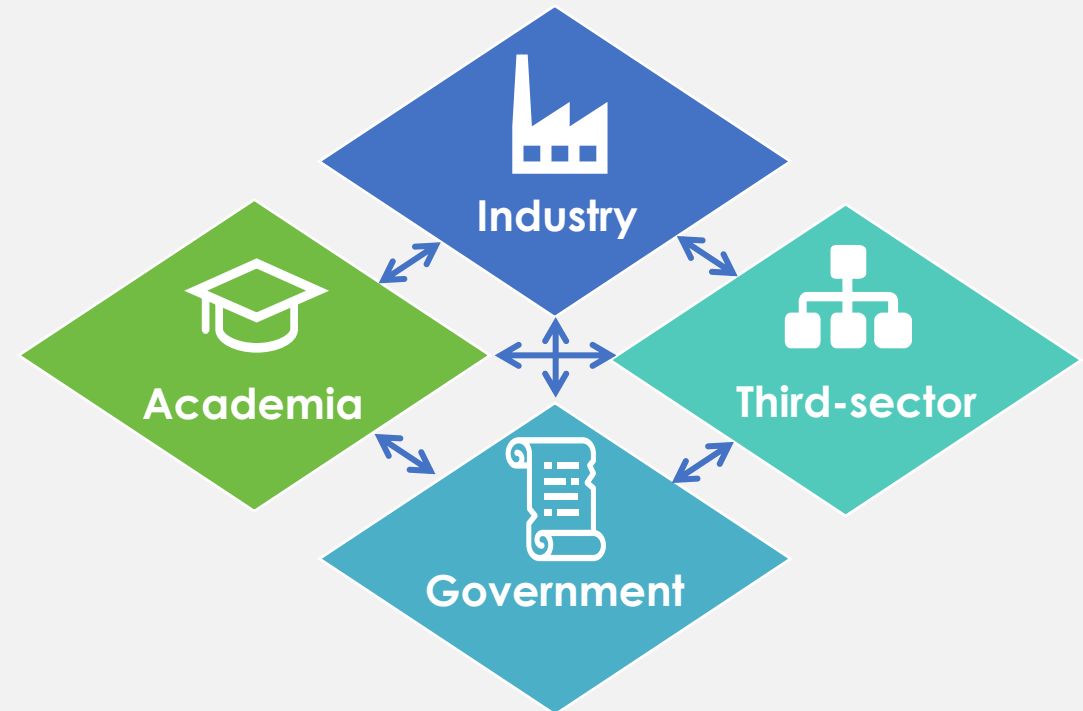
						
		Electrification of heat	Hydrogen as fuel or feedstock	Biomass as fuel or feedstock ²	CCS	Other innovations ³
Feedstock and fuel	Cement	✓	✓	✓	✓	Alternative feedstocks ⁴ ✓ ✓ ✓
	Iron and steel		✓	✓	✓	Electrical reduction of iron ✓
	Ammonia		✓	✓	✓	Methane pyrolysis for hydrogen production ✓
	Ethylene	✓	✓	✓	✓	Electrochemical processes for monomer production ✓
Fuel	Other industry ¹ (heat)	✓	✓	✓	✓	Medium temperature heat pumps ✓

Decarbonization of industrial sectors: the next frontier
McKinsey & Company, June 2018



Decarbonisation measures for manufacturing and construction sector (balanced pathway)
6th C budget, CCC, Dec 2020

Whole systems approach



Whole-systems approach integrating engineering, environmental and technical solutions with economic, behavioural and policy interactions.

Wave 1 Projects

Multidisciplinary Integrated Programmes, MIPs

Identify, direct
and coordinate
research



Facilitate
industry
alignment



Enable
implementation
and impact



MIP1: System planning for net-zero industrial clusters

MIP2: Infrastructure for net-zero industrial clusters

MIP3: Operating net-zero industrial clusters

MIP4: Scale up opportunities at cluster and value chain level

MIP5: Energy vectors for industrial decarbonisation

MIP6: Accelerating deployment of CCUS for industrial decarbonisation

MIP7: Large scale deployment of hydrogen systems for industrial decarbonisation

MIP8: Reducing costs and risks of NETs and their integration in industrial clusters

MIP9: Integration: Policy, knowledge exchange and skills

Full list of Wave 1 projects: <https://idric.org/research-innovation/>

Wave 1 Portfolio

From October 2021 we have launched Wave 1 projects



43

Projects Launched



23

Research Partners



52

Research Staff



41

Co-Investigators



7

Awards • Recognition



20

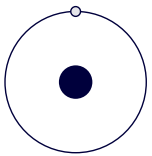
Publications/Reports

Wave 1 Portfolio

Stakeholder engagement

Hydrogen for everyone

Two-day
conference for
industry and
academia on
the role of
hydrogen.



April 2022

IDRIC-1

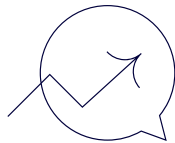
Annual all
stakeholder
event with over
230 delegates
from across the
UK



June 2022

Multi-cluster meeting

In association
with clusters
and CCSA



June 2022

Westminster policy reception

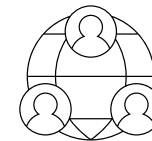
Bringing
industry,
academic and
MPs at the
Palace of
Westminster



June 2022

IDRIC Stakeholder Group

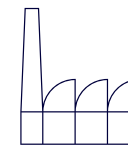
Deployment
and Cluster
Plan leads to
guide IDRIC's
activities



July 2022

Cluster events

Regional events
bringing
together local
industry and
academic
expertise



Oct 2022

Policy and skill fora

Multi-
stakeholder
discussions of
key challenges
and way
forward



Ongoing

43 research projects engaging with stakeholder across all seven clusters,
industry, policy makers, skills bodies, trade associations

Research and Evidence

Provide evidence for policy-making:

- Build knowledge base of policy-relevant research findings
- Provide policy analysis across industrial decarbonisation focus areas

Engagement and Dialogue

Develop shared understanding and initiatives:

- Bilateral conversations with policy-makers
- Parliamentary engagements
- Policy workshops with industry, academia and government

Monthly policy news updates

Sign up: policy@idric.org



IDRIC policy report
November 2022



Policy Forum
20 October 2022



Engagement with Net Zero Review
October 2022



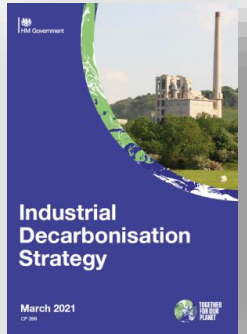
Dr Anna Pultar



Dr John Ferrier

Policy Team
policy@idric.org

IDRIC – UK Strategy for Net Zero



March 2021

“We will also draw on our world-class universities and research institutions, including through our £20 million funding that is being used to establish the Industrial Decarbonisation Research and Innovation Centre”



August 2021

“To accelerate fuel switching to low carbon hydrogen, we will seek to support research and innovation through the existing NetZero Innov. Portfolio and initiatives led by the Industrial Decarbonisation Research & Innovation Centre (IDRIC)”



October 2021

“... initiatives led by the Industrial Decarbonisation Research & Innovation Centre (IDRIC)”

Skills, Talent and Leadership

Skills mapping • Research to monitor, analyse and report on skills mapping activities and competence frameworks across different industry sectors, the supply chain and job disciplines.

Enabling skills for the industrial decarbonisation
supply chain University of Chester

Development of competence, skills and training
for the transition to hydrogen Energy Institute

Skills policy & investment • Provide relevant and reliable analysis on skills policy and collate investment opportunities for reskilling, upskilling, training and education. Shape the agenda for training provision and investment.

Workforce Planning for Industrial Decarbonisation Roundtable, 22 November 2022: Launching IDRIC report and bringing together community together to talk about key challenges, what policy, investment, training mechanisms are needed.

EDI and outreach • Incorporate EDI initiatives into the development of future skills, incl. supporting clusters and industry with EDI practice.

Media project: Showcasing career pathways for young people and school leavers through video project and online resources



Dr Charlotte McLean
Skills Research Officer
info@idric.com



Flexible
secondments



Stakeholder
engagement



Workshops &
forums



Position
papers



Career
pathways

Knowledge Exchange Platform



Digital repository for knowledge gained through IDRIC programme



Completed 'discovery phase' with ESC to map out needs



Enthusiasm to share knowledge through the platform



Host a broad range of 'knowledge' datasets



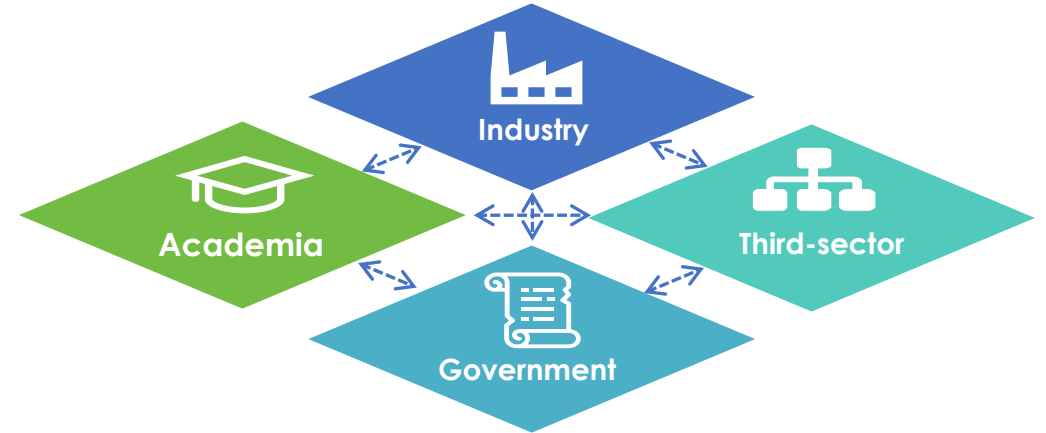
Path to finding new contacts and establish new collaborations



Knowledge must be discoverable and platform easy to use



Considerations given to protection and related IP issues



INSIGHT

Accurate or deep understanding of a concept, process, object, and/or relationship, and the conclusions drawn from this.

KNOWLEDGE

Information that has been synthesised into a narrative or story that can be understood by a wide range of stakeholders.

INFORMATION

Data that has been put into a human understandable form, in order to observe its characteristics, and derive knowledge from.

DATA

Collected from activities during projects. This can be quantitative or qualitative, and human or machine generated.



Led by Dr Isobel Marr
Knowledge Exchange Manager
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International Engagement and Impact

International Study, NZTC



Expo, Dubai

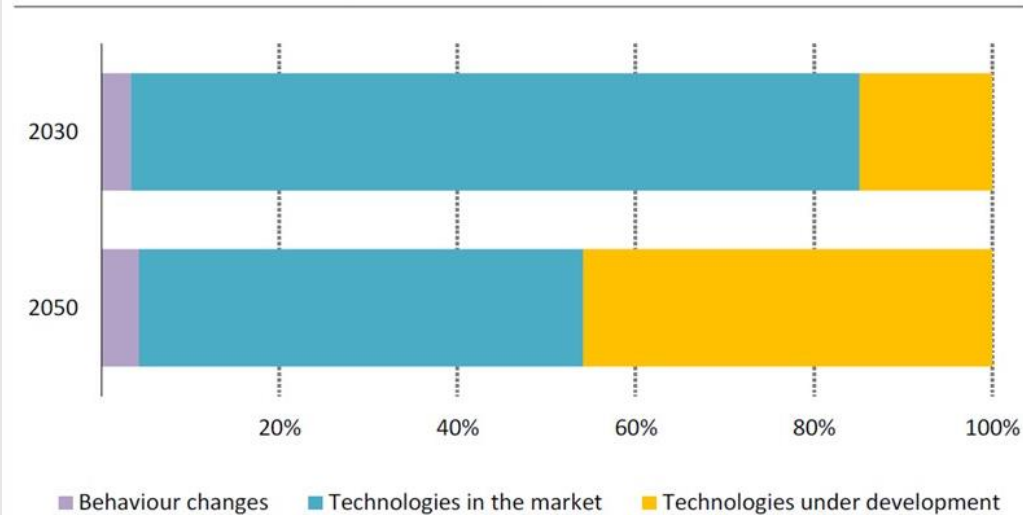


 **International Events
& Global Expert Missions:**
US, China, Brazil and
Australia

From ambition to deployment

Role of Innovation

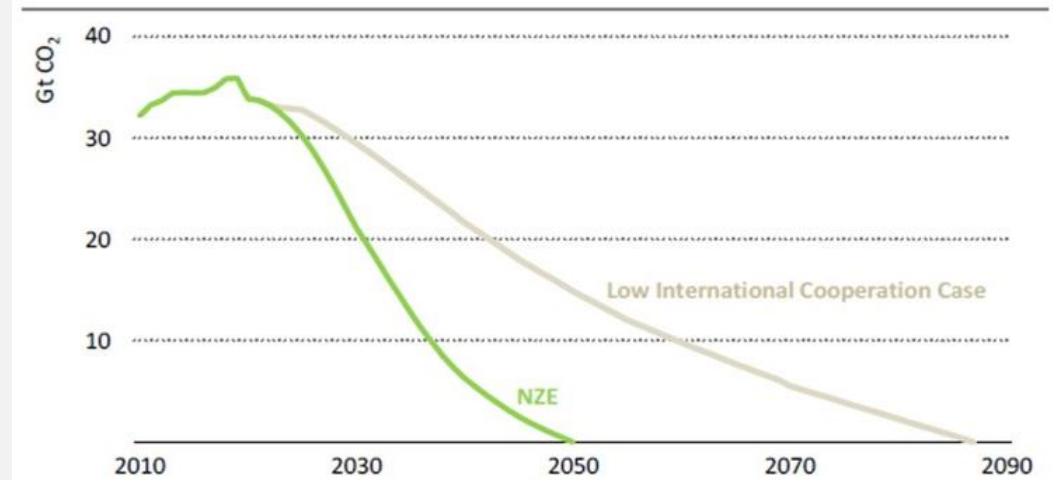
Annual CO₂ emissions savings in the net zero pathway, relative to 2020



IEA, Net Zero by 2050, A Roadmap for the Global Energy Sector
[iea.li/nzeromap](https://www.iea.org/net-zero), Octobre 2021

International Collaboration

Global energy-related CO₂ emissions in the net zero pathway and Low International Co-operation Case



IEA, Net Zero by 2050, A Roadmap for the Global Energy Sector
[iea.li/nzeromap](https://www.iea.org/net-zero), Octobre 2021

Together we can make the 2020's
the decade of massive expansion of clean energy

IDRIC Team



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Director



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Centre Manager



Prof Heather McGregor
EDI Champion



Gill Watson
Executive Assistant
to Director



Stella Gouzon
Centre Administrator



Jennifer Graham
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Support



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Officer



Dr John Ferrier
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Officer



Dr Charlotte McLean
Skills Research
Officer



Danny Cowe
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Executive



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Exchange Manager



Helen Kibby
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Manager

Research Co-Directors



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University of Sussex

MIPs 1, 2 and 9



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Imperial College London

MIPs 4, 6 and 7



Prof Marcelle McManus

University of Bath

MIPs 3, 5 and 8

Academic Cluster Leads



Lindsay-Marie Armstrong
Solent



Jonathan Radcliffe
Black Country



Maxine Akhurst
Scotland



Jon Maddy
South Wales (SWIC)



Joe Howe
HyNet and Northwest



Tony Roskilly
Teesside

IDRIC



Thank you