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Green Industrial Futures Realised.

IDRIC – Clustering to drive the transition towards net zero

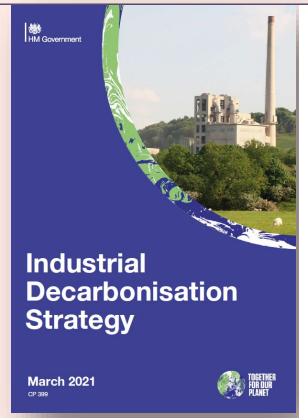
30-31st January: Zero Carbon Industry 2024

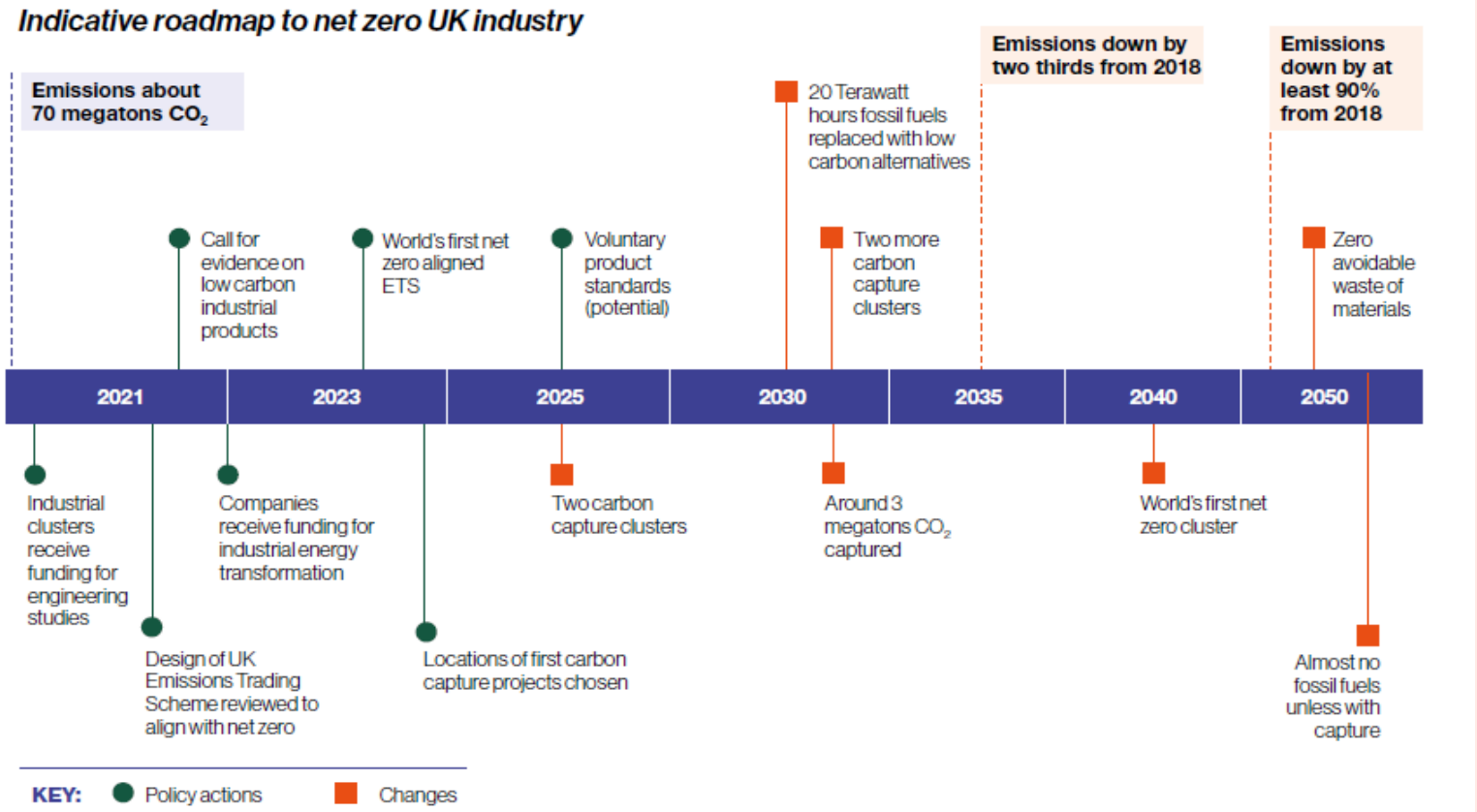
Dr Clare Howard
Centre Manager - IDRIC

Funded by

UK Research and Innovation

UK roadmap for industrial decarbonisation





> "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"**

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The Industrial Decarbonisation Challenge: Mission driven

9% of UK's GDP

2.6 million direct jobs

16% the UK's emissions

2 million green jobs by 2030

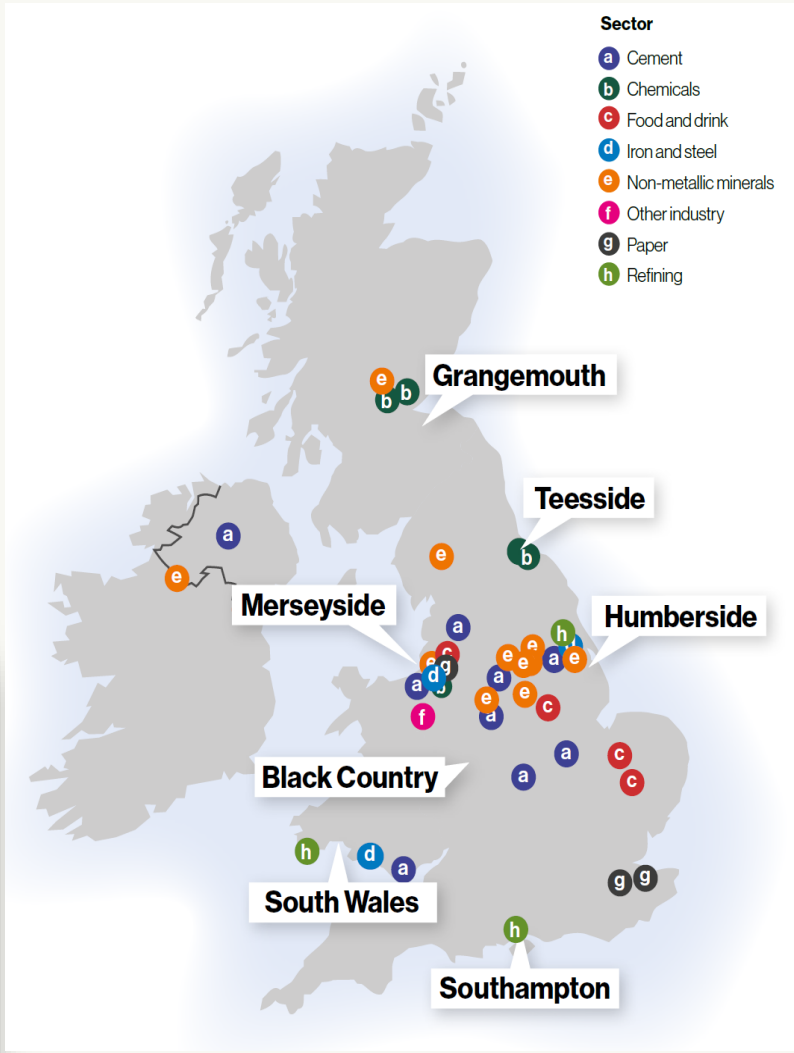
What are industrial clusters and why are they important to the UK?

Industrial clusters are areas with a number of industrial sites

For instance those producing:



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



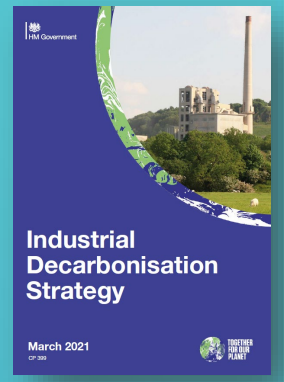
£210M government investment, matched by £261M to support the decarbonisation of UK's industrial clusters:

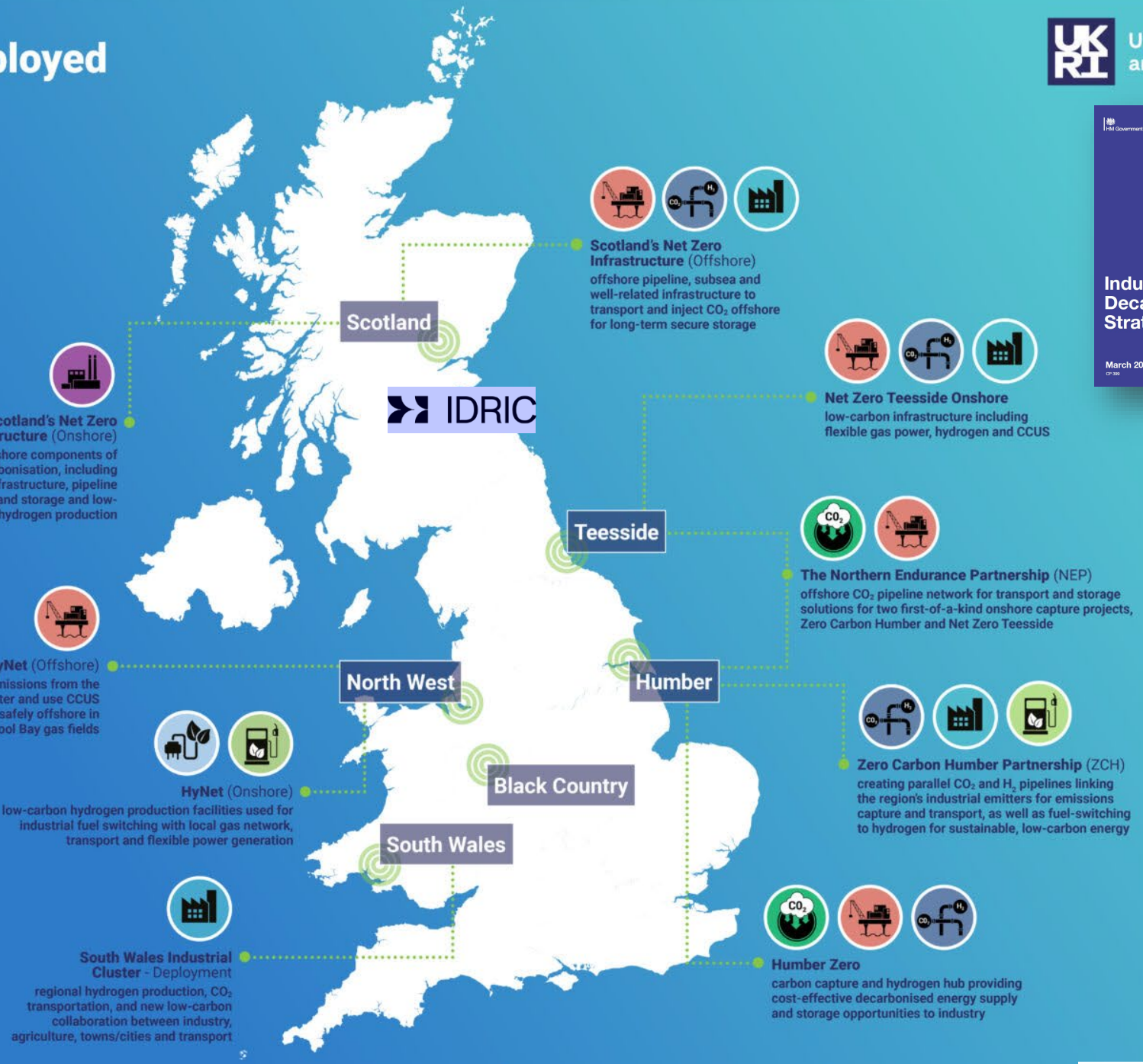
- Development of four low-carbon industrial clusters by 2030
- Development of the world's first net-zero industrial cluster by 2040

Technologies developed and deployed

UK Research and Innovation

- Industrial carbon capture technology
- Offshore subsea storage facilities
- CO_2 and Hydrogen transportation pipelines
- Modern, low-carbon power stations
- Industrial infrastructure
- Flexible, greener energy systems
- Fuel replacement technology





Industrial Decarbonisation Challenge

- Cluster Plan Projects; £8M, InnovateUK
- Deployment Projects; £172M, InnovateUK
- **IDRIC Industrial Decarbonisation Research and Innovation Centre, £20M, EPSRC**

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Green Industrial Futures, Realised.



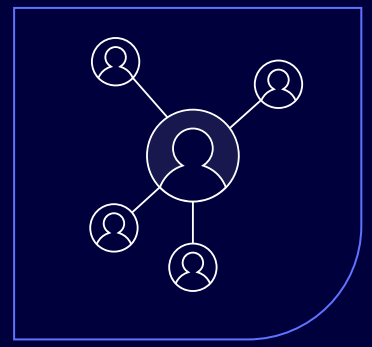
Policy & Engagement

Development of effective policy and regulatory frameworks



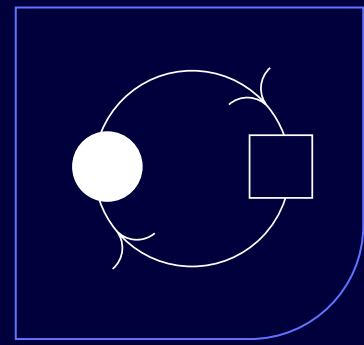
Research & Innovation

Whole systems solutions integrating technology, policy and business models



Skills & Leadership

Collaborations at scale & pace across the innovation ecosystem



Knowledge Exchange

Cross-learning, evidence gathering and independent advice

IDRIC

UK Research and Innovation

Collaborating at scale and pace



Prof Mercedes Maroto-Valer
Champion and Director
Heriot-Watt University

Funding
£20M
Until 2024

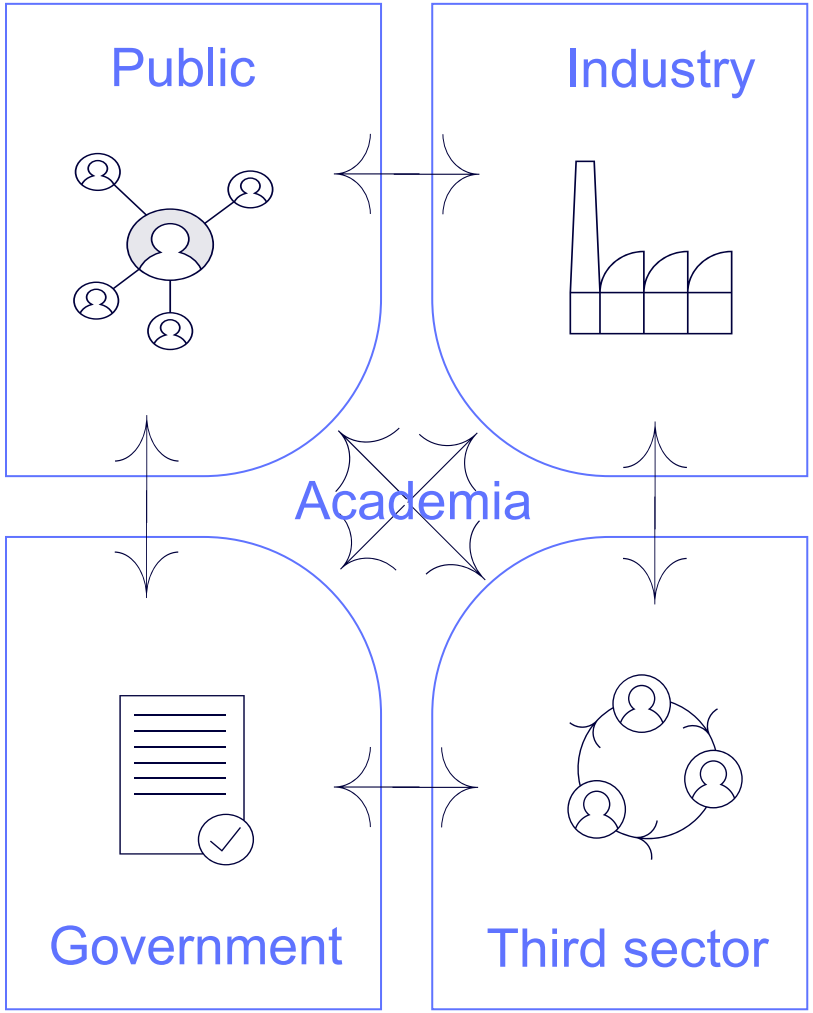
142 Partners
200+ Stakeholders
With global reach

30+
Research organisations

74
Industry partners

35
NGOs & Trade organisations

10
Policymakers & gov bodies



Covering the whole value chain of decarbonisation

100 Research Projects

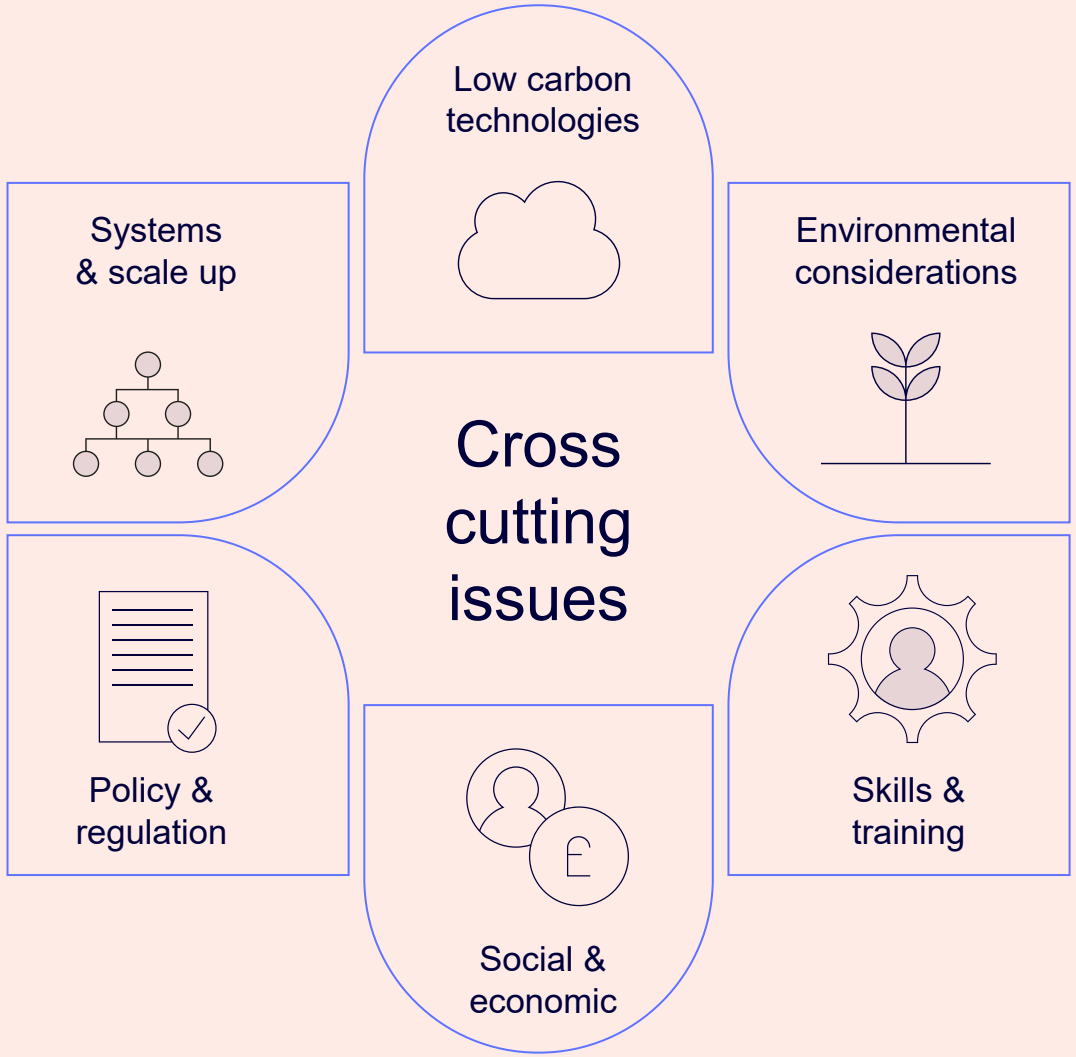
34+ Academic Partners

138+ Researchers Investigators

Whole system approach

Integrating engineering, environmental and technical solutions with economic, behavioural and policy interactions.

- Identify and coordinate research
- Facilitate industry alignment
- Enable implementing impact



Academic Partners

Imperial College London

The University Of Sheffield.

University of Birmingham

University of South Wales Prifysgol De Cymru

Durham University

University of Strathclyde Glasgow

Loughborough University

Heriot-Watt University

The University of Manchester

University of Southampton

Aston University Birmingham UK

University of Bath

University of Hull

University of Sussex

BGS

Lancaster University

UCL

Teesside University

Cardiff University Prifysgol Caerdydd

Queen's University Belfast

University of St Andrews

Swansea University Prifysgol Abertawe

University of Leeds

1872 Prifysgol Aberystwyth University

University of Chester

Newcastle University

University of Exeter

Warwick The University of Warwick

Edinburgh Napier University

Erasmus University Rotterdam

IDRIC's research portfolio and knowledge hub

CCUS

Carbon dioxide - ports to pipelines
University of Southampton

Good plant design for measurement of CO_2, in carbon capture and storage applications
Aston University

BECCS-to-sustainable aviation fuels (SAF)
University of Sheffield

Hydrogen

Electrolysis for green hydrogen and co-produced chemicals at scale
Imperial College London

Hydrogen storage and transport networks for net-zero industrial clusters
Heriot-Watt University

Reducing CO_2 emissions with improved hydrogen recovery processes
University of South Wales

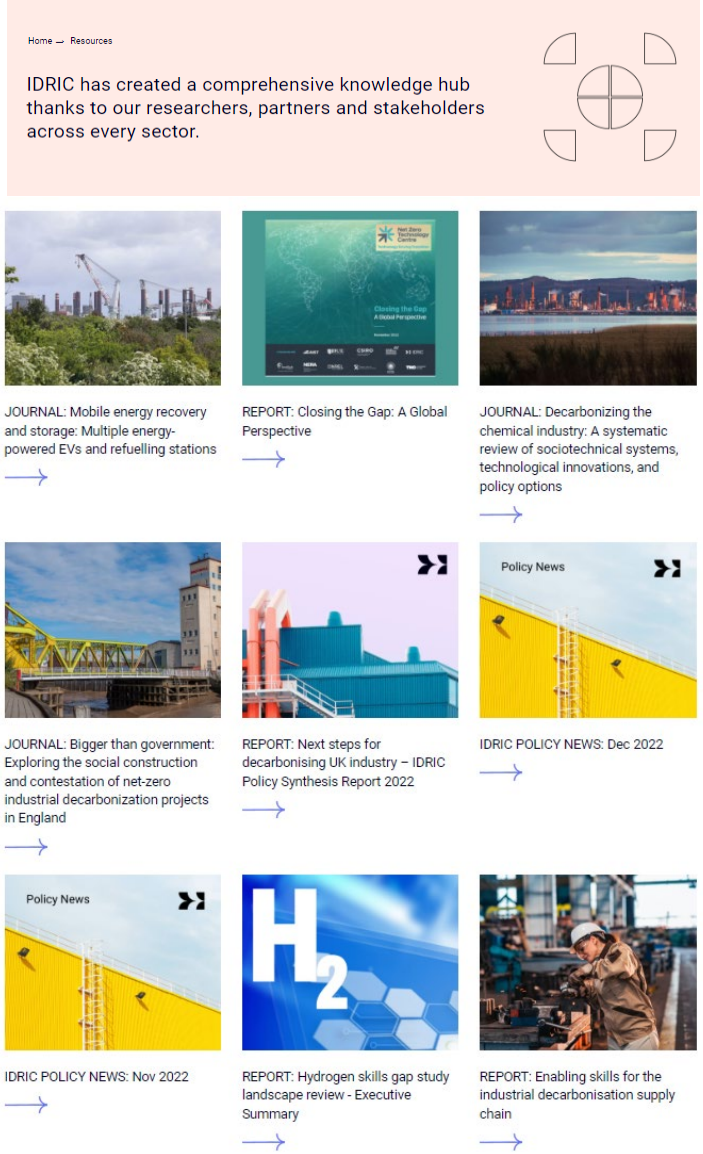
Socio-economic

Understanding public responses to industrial decarbonisation in insecure times
Cardiff University

Protective space and social licence to operate industrial decarbonisation
University of Manchester

Learning from international experience in decarbonising industrial clusters
University of Leeds

More info at www.idric.org/research-programme



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UK Research and Innovation

Knowledge Exchange and Collaboration

Knowledge Hub https://idric.org/resources/

IDRIC has created a comprehensive knowledge hub thanks to our researchers, partners and stakeholders across every sector



JOURNAL: Mobile energy recovery and storage: Multiple energy-powered EVs and refuelling stations



REPORT: Closing the Gap: A Global Perspective



JOURNAL: Decarbonizing the chemical industry: A systematic review of sociotechnical systems, technological innovations, and policy options



JOURNAL: Industrial clusters for deep decarbonization: Net-zero megaprojects in the UK offer promise and lessons



IDRIC POLICY NEWS: Oct 2022



REPORT: Cluster Mapping Report: Humber Industrial Cluster



JOURNAL: Bigger than government: Exploring the social construction and contestation of net-zero industrial decarbonization projects in England



REPORT: Next steps for decarbonising UK industry – IDRIC Policy Synthesis Report 2022



IDRIC POLICY NEWS: Dec 2022



REPORT: Cluster Mapping Report: North West Industrial Cluster



BRIEFING PAPER: Decarbonising industry through industrial clusters: lessons from international experience



BRIEFING PAPER: "Sunset and sunrise": Offensive, exploratory, and defensive industry strategies in socio-technical energy transitions



IDRIC POLICY NEWS: Nov 2022



REPORT: Hydrogen skills gap study landscape review - Executive Summary



REPORT: Enabling skills for the industrial decarbonisation supply chain



JOURNAL: A data-science approach to predict the heat capacity of nanoporous materials



JOURNAL: Decarbonisation of industrial clusters: A place-based research agenda



IDRIC POLICY NEWS: Sept 2022

Westminster Policy Reception

June 2022

Cluster Event Series

October 2022 & Webinar Series 2023

Risk in Decarbonisation Finance Series

Ongoing

UK Stakeholder & International Fora

June 2022, May & June 2023

Policy and Skills Fora & Roundtables

Ongoing

Hydrogen for Impact Conference

April 2022 and February 2023

Bringing together our researchers, industrial stakeholders and policymakers to share findings and foster collaboration

Examples of impactful outputs to date

- **Improved CO_2 storage capacity data** for 200 oil & gas fields not previously included in the UK's national CO2 storage database, CO2Stored, to support UK clusters' CCS strategies.
- **Online platform** identifying optimal carbon capture solutions for businesses, upgraded to include technoeconomic assessments and environmental impact evaluation via life cycle assessment.
- **Patent** filed for a 'mobile energy stored as heat' system which can transport waste heat from industrial sites to domestic heat users.
- **Report quantifying the workforce** needed to meet the demands of industry, now being **used by the clusters,** ECITB, Cogent, EU Skills and CCSA to inform future workforce strategies
- Comprehensive **framework that supports industry and policy makers** in designing and deploying industrial decarbonisation in a way that fully engages local communities.

Examples of key transdisciplinary learnings across projects

- **Equity, justice & just transitions are key**. Public attitudes and people's views on decarbonisation affect its emplacement, and public concerns involve legitimacy, accountability and social acceptance as well as forms of engagement.
- Industrial decarbonisation has the potential to yield **immense co-benefits** beyond emissions reduction, e.g. jobs, community resilience, health, trade competitiveness, innovation, and geopolitical gains (local, national or even global.
- Industrial decarbonisation involves a **diversity of technical options**, although certain **cross-cutting solutions** exist that span clusters and sectors, such as hydrogen, CCUS, process substitution, resource efficiency, and fuel switching.
- Net zero implementation strategies need **strong leadership, policy certainty and robust governance,** given that significant barriers remain, and these threats are crosscutting as well.

Policy research and engagement

IDRIC Policy Team

- **Provides evidence for UK policy-making, both UK wide and devolved**
- **Facilitates dialogue and collaboration amongst stakeholders**

Priority areas:

- Business model support to scale up low-carbon technologies
- Fuel switching and electrification
- Supporting infrastructure for transport and storage of energy & CO_2
- Timely planning and consenting
- Comprehensive carbon accounting and standards
- Resilient low-carbon supply chains
- Net Zero skills and workforce



Recent and upcoming activities

Policy Roundtables & Insight Reports

- Industrial Electrification
- Planning, consenting and permitting
- Carbon Accounting for circular economy

Industry Surveys

- Grid Connections

Collaboration

- Supporting Government Policy Development
- Co-authoring high profile reports (e.g. Mission Zero Coalition)

Monthly Policy News Update

More info:
policy@idrig.org
https://idric.org/impact-areas/policy-hub/

Skills, Talent, Leadership

Skill Sector Engagement

- Convene partners and stakeholders working in the skill sector to help shape the agenda for training provision and investment.

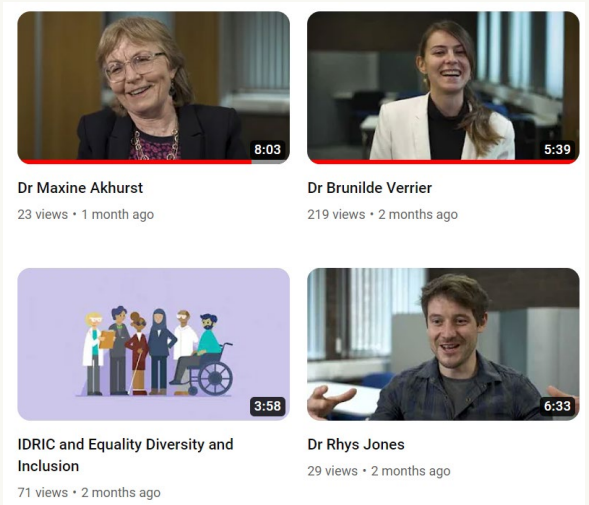
- Landscape map current initiatives across national, devolved and local governments and work with stakeholders to develop initiatives.



IDRIC Skills Roundtable, Nov 2022

EDI Strategy

- EDI Monitoring – biannual survey
- EDI Media Project
- Disability Workshops



https://www.youtube.com/@idric1529/videos

Early Career Researchers Academy (ECRA)

Over 80 research associates are employed across IDRIC's projects

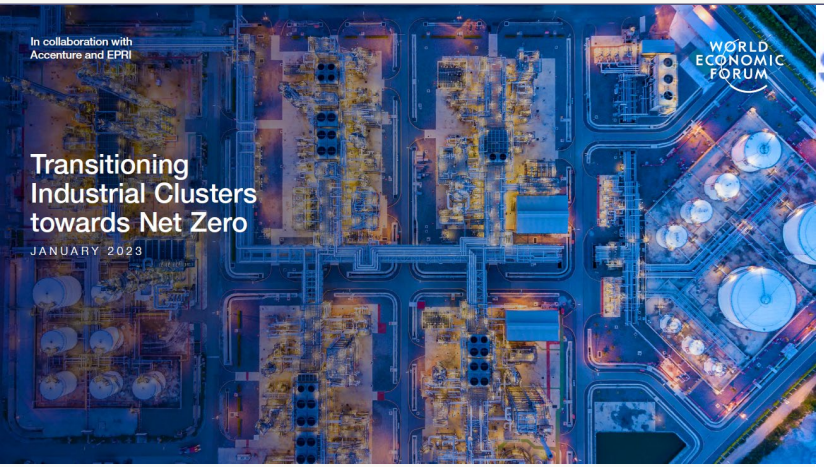
Targeted training

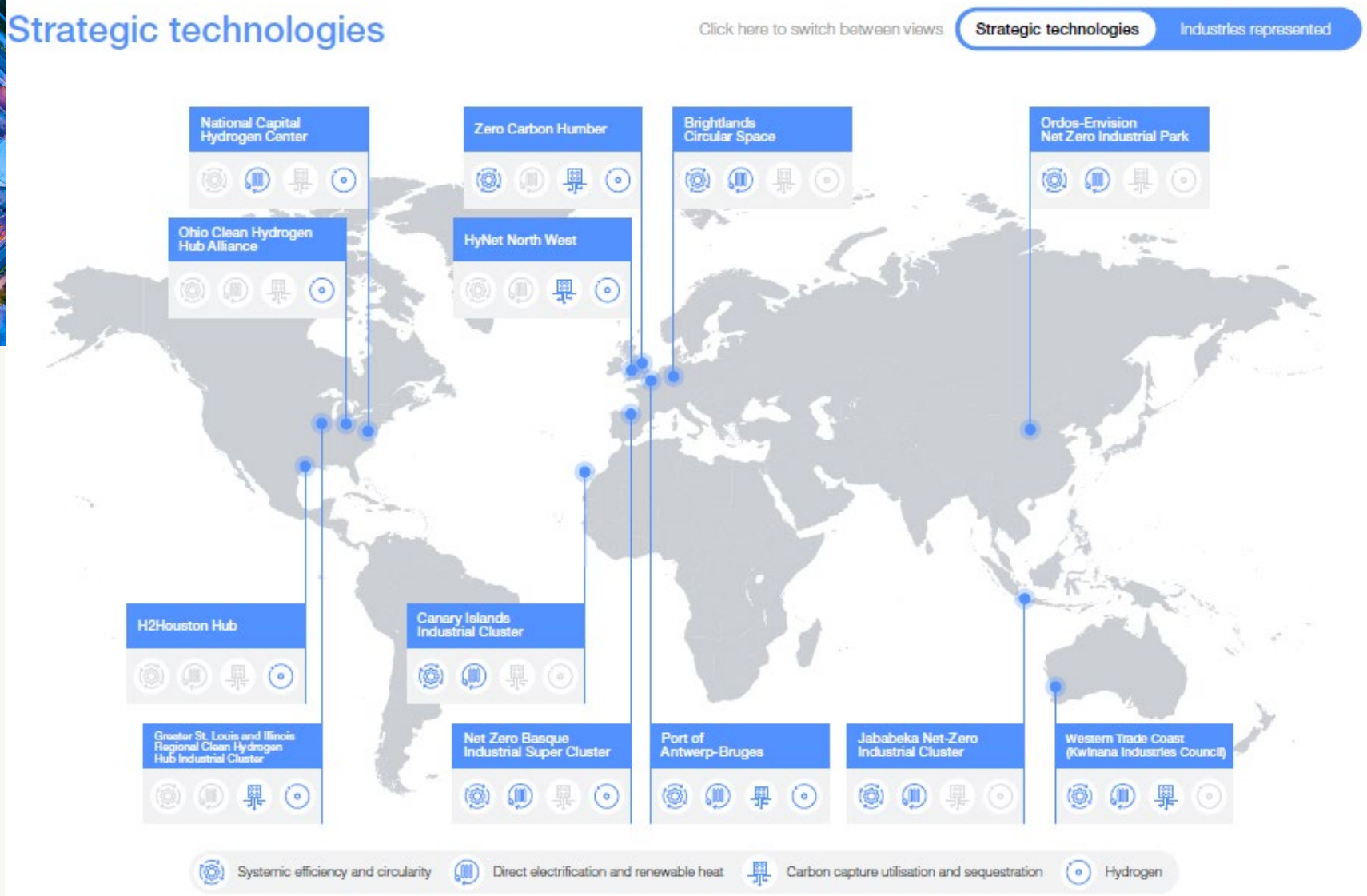
Networking events

Career development

Secondment opportunities

Industrial hubs: Opportunities for scaling up





International delivery

IDRIC

Industrial Cluster Decarbonisation: Sharing International Experience

iea

Department for Energy Security & Net Zero

HILTCRC

NET-ZERO INDUSTRIES MISSION

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION





COP28 UAE

International Workshops

- June 2023, London
- COP28, December 2023, Dubai

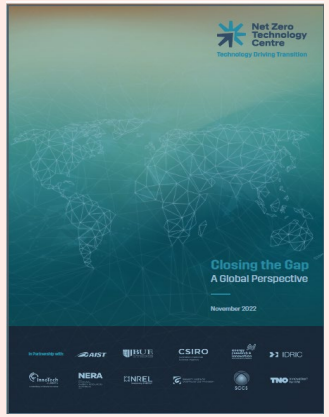


Research projects

Decarbonising industry through industrial clusters: lessons from international experience, University of Leeds

UN Council of Engineers for Energy Transition

Independent advisory council to the UN Security Council



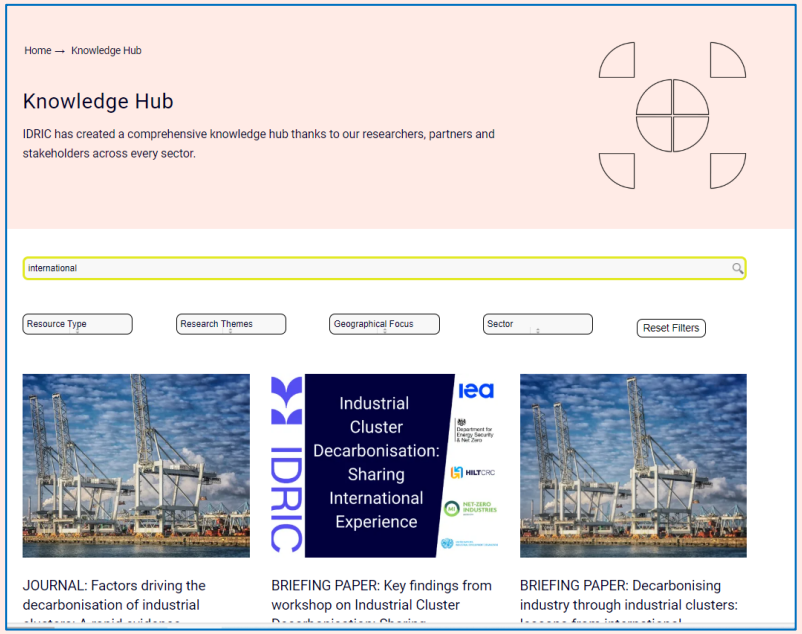
Collaborative reports

Closing the Gap: A Global Perspective

- 10 technology centres; 8 countries
- Identified joint challenges and actions for international collaboration
- Presented at COP27

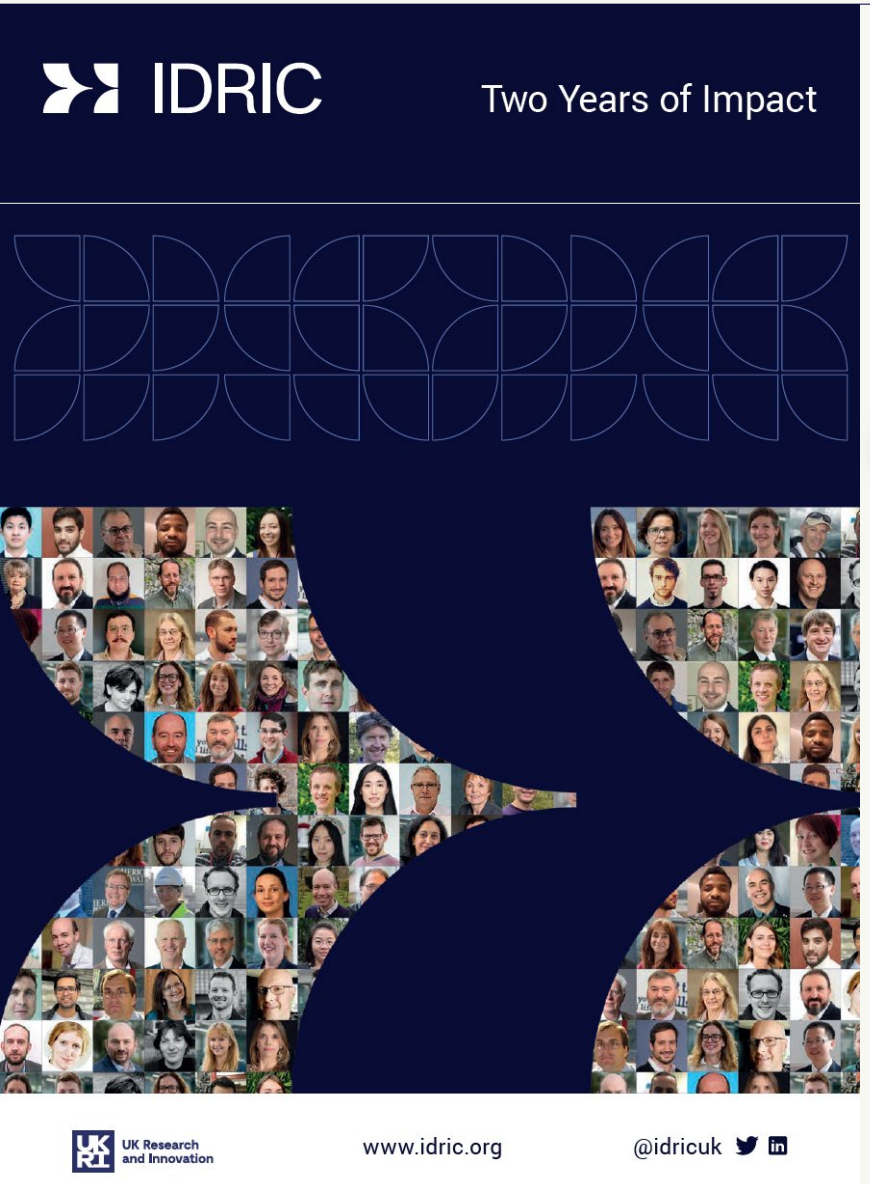
International Research and Workshops

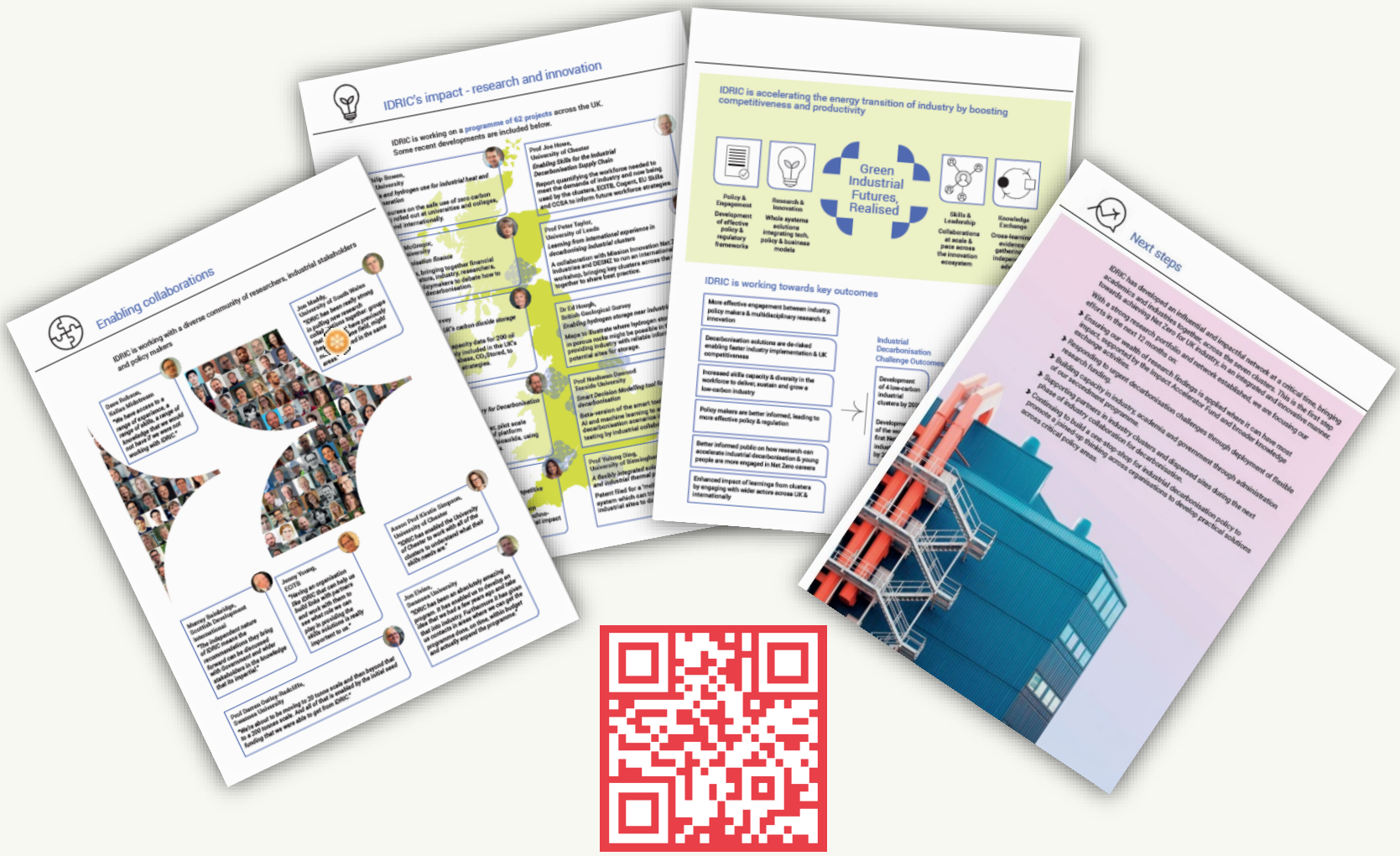
- All information about this can be found on the IDRIC Knowledge Hub
- https://idric.org/knowledge-hub/



- WORKSHOP: How can place-based approaches enable competitive decarbonisation while unlocking local benefits (local community, environment, wider economy)?
- JOURNAL: Factors driving the decarbonisation of industrial clusters: A rapid evidence assessment of international experience
- WORKSHOP: Sharing International Experience in Industrial Decarbonisation
- BREIFING PAPER: Decarbonising industry through industrial clusters: lessons from international experience Briefing paper

Two Years of Impact: Report and Video



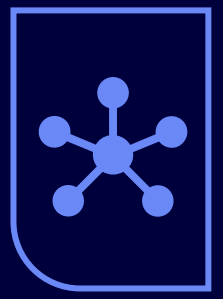


www.idric.org/review

Mission driven and place-based innovation



1. Our journey to net zero must gain momentum in all regions, from our industrial zones, through our cities, and also reaching into rural areas



2. Whole systems approach integrating engineering, environmental and technical solutions with economic, social and political interactions



3. Global opportunities for new technologies, products, services and jobs require integrated and coordinated plans

Upcoming & future activities

- Synthesis of project outputs
- Grid Connection Survey
- Cluster Webinar Series
- Targeted Impact reports
- Knowledge Hub updates

IDRIC's Annual Conference –
7-8 March 2024
Manchester

Academia, industry, policy