Industrial Decarbonisation Frontiers Report

Public Perceptions and Just Transitions

Since its launch in 2021, the Industrial Decarbonisation Research and Innovation Centre (IDRIC) has funded 100 projects, investigating and addressing the key dimensions of the whole system of industrial decarbonisation. This work has generated a vast body of knowledge, offering critical insights into the challenges we face in decarbonising and into the solutions – technical, economic and social – that are emerging. The *Frontiers Reports* series brings together all these insights to share with our industry and policy stakeholders.

Each report synthesises key findings from multiple projects conducted on a closely related theme, providing a comprehensive perspective on a specific aspect of industrial decarbonisation. Far more than simply research summaries, these reports translate academic insights into practical, evidence-based recommendations for our stakeholders. These recommendations are shaped by the expertise and evidence gathered by our research teams and are designed to support decision-makers in advancing their net zero goals.

The *Frontiers Reports* are anticipated to serve as catalysts for meaningful discussions between academia, industry, and policymakers on the most viable paths forward. We welcome constructive debate and are eager to support the implementation of recommendations that best align with our stakeholders' priorities and goals towards net zero.

This report brings together all IDRIC's research on Public Perceptions and Just Transitions.

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Executive summary

Industrial decarbonisation is central to the UK's strategy for achieving net zero and ensuring long-term environmental and economic sustainability. However, technological progress alone is not sufficient. Securing public trust and delivering a just transition – one that is inclusive, equitable, and locally grounded – is essential.

This report brings together insights from ten IDRIC-funded research projects across the UK's industrial clusters, with a focus on public perceptions, social licence to operate (SLO), and the need for place-sensitive strategies that engage communities meaningfully. The report offers recommendations to industry and policymakers to ensure that the transition to a low-carbon economy is equitable and enjoys broad public support.

Key findings

Public awareness Is limited and uneven
Despite the scale of planned industrial change, understanding of decarbonisation technologies is generally low, even among those working in affected sectors. Misconceptions and lack of exposure to local Cluster Plans contribute to scepticism and undermine trust in both industry and government.

Support for climate goals does not guarantee local support
While the public broadly supports climate action, this does not always translate into support for specific decarbonisation initiatives. Factors include:

- Doubts about who benefits and who bears the burdens.
- Low confidence in industry and government competence.
- "Vision fatigue" following broken promises.
- A desire for change that does not disrupt local life.

Local context and history matter
Community responses are shaped by historical and contemporary experiences – ranging from distrust following past policies that resulted in de-industrialisation to concerns about fairness and environmental degradation. People want to see investment and regeneration, but only if it reflects their needs and identities.

Just transitions must be "place-sensitive"
A just transition must address social, environmental and economic concerns in a way that is responsive to place. Host communities often feel excluded from planning processes and are sceptical that benefits will be fairly distributed. Transparent and locally-specific communication of both benefits and potential negative impacts is required to build public trust and avoid perceived greenwashing.

Recommendations for industry

Build trust through transparency and collaboration
Industry should move beyond one-way communication and engage communities as long-term partners. Co-developing plans and being open about both benefits and risks helps to avoid accusations of "greenwashing."

Invest in public understanding
Address widespread knowledge gaps by partnering with educators and community organisations. Consider the use of accessible formats (including visuals and local narratives) to increase awareness and engagement with decarbonisation plans and technologies.

Support local wellbeing and place-based needs
Move beyond generic claims about economic benefits and tailor strategies to reflect local industrial legacies, social concerns and environmental aspirations. Prioritise long-term, tangible benefits for host communities – such as civic investment, social infrastructure and environmental enhancement.

Enable an inclusive workforce transition
Identify at-risk job roles, invest in local skills development and retraining and create opportunities for young people in their local communities.

Recommendations for policymakers

Build a mutual understanding with communities
Policymakers should engage early and meaningfully with host communities, recognising local values and concerns, and ensuring decisions are co-developed, rather than just consulted on. They should be transparent from the outset about which options are open for consideration, and which are not.

Enhance sustained public participation
Resources should be allocated for local engagement, embedding co-development in decision-making processes, and making host community engagement a condition of public funding.

Establish a place-sensitive approach
Strategies must reflect local histories, needs and identities. Community benefit mechanisms and coordinated governance across levels are essential to ensure fairness.

Establish a secure economic environment
A stable policy framework, clear incentives, and transparent governance are needed to attract investment and ensure equitable economic opportunities across regions.

Moving forward

To accelerate progress toward net zero, social acceptance must be treated as a core component – not a barrier – of the transition. Building mutual understanding across industry, government, and communities is critical. This means investing in adult education, acknowledging past harms and co-developing plans that resonate with local values and experiences.

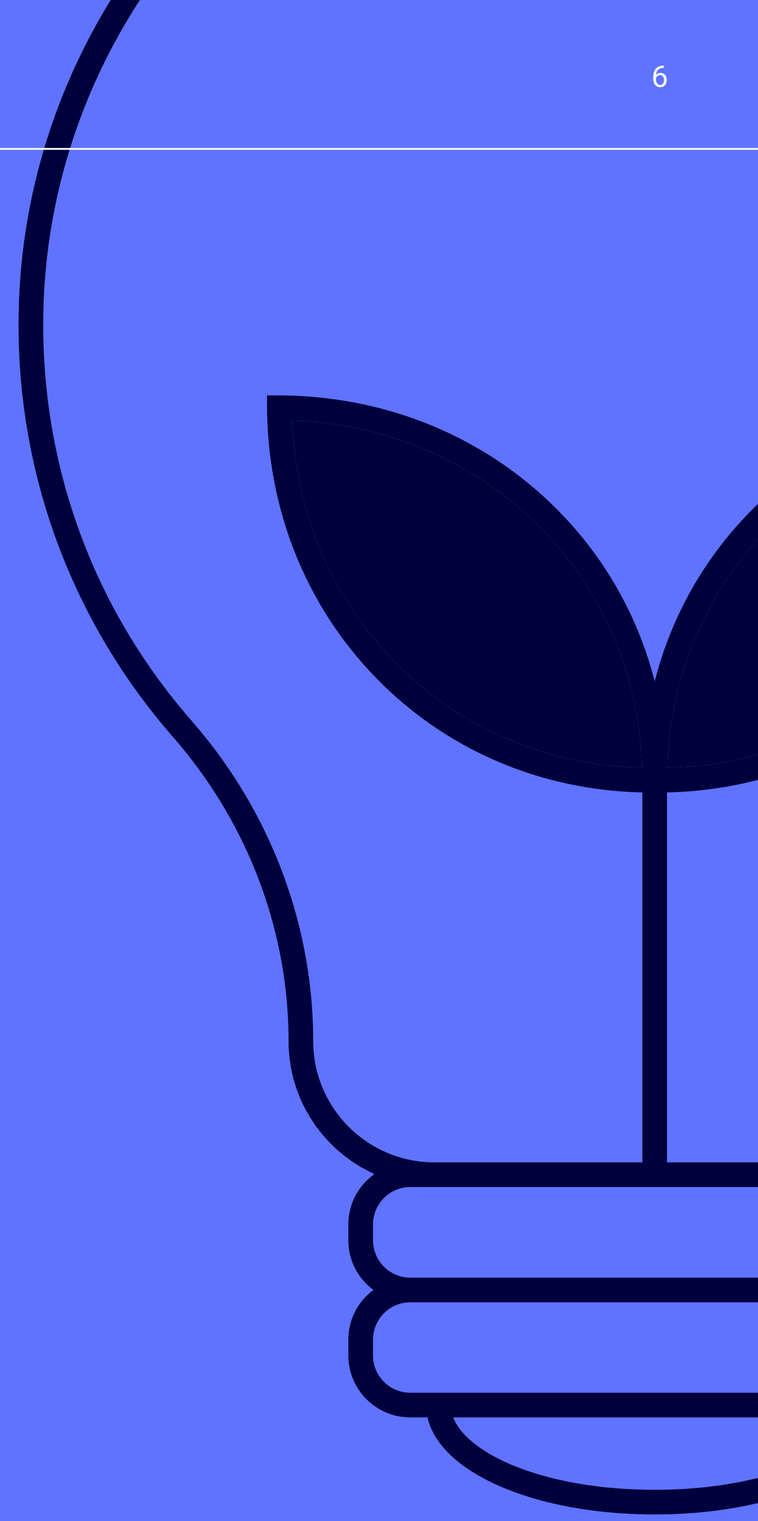
Future research should continue exploring how place-based identities and emotional responses shape public acceptance. Long-term engagement, grounded in trust, transparency, and shared purpose, will be essential to building the confidence needed for an inclusive industrial transition.

Contents

Introduction 6
Research findings 8
Public perceptions, support and concerns 10
Just transitions 12
Recommendations to industry 15
Recommendations to policymakers 18
Moving forward 22
Contributing projects 25

Introduction

The decarbonisation of UK industries is essential if we are to achieve economic and environmental sustainability. Sectors that have, historically, depended on fossil fuels and made significant contributions to the build-up of greenhouse gases in Earth's atmosphere will have to develop and adapt to renewable energy sources, alternative feedstocks and new emission capture systems. These changes will require new infrastructures, including more wind turbines, expanded transmission networks and battery storage systems; remodelled factories; and new pipelines, pumping stations and gas storage facilities.



It is important to recognise that these are not simply engineering challenges – they also involve changes to both material landscapes and ways of working. Communities undergoing reindustrialisation through industrial decarbonisation have faced insecurities arising from the localised effects of a series of intersecting crises. These include energy, financial and food insecurity, climate impacts and biodiversity loss. Literature on public acceptance of environmental and technical risk already elucidates why there needs to be a carefully thought-through role for public participation. It is therefore critical that the social impacts of decarbonisation – both negative and positive – are fully understood and weighed up; that decisions are reached through participatory processes which include the full range of stakeholders; and that decarbonisation actions avoid detriments to people and damage to society that have accompanied previous industrial and energy transitions.

This report synthesises findings from IDRIC-funded projects that explored perceptions, expectations and responses to current and planned decarbonisation actions in different locations across the largest industrial clusters (i.e. concentrated areas of co-located energy intensive industries) within the UK (Figure 1). The projects worked with a range of stakeholders including local residents, workers, management, scientists and engineers in places and sectors that will be affected by decarbonisation. The primary focus of many of the projects was carbon capture, use and storage (CCUS), but the findings described below are likely to apply to other industrial decarbonisation actions.

Just transition

Just transition describes an intended process that 'secures the future and livelihoods of workers and their communities in the transition to a low-carbon economy' and that 'is based on social dialogue between workers and their unions, employers, government and communities'.[1]

Social licence to operate (SLO)

Social licence to operate or SLO reflects the level of public – and particularly local community – support for technologies or projects. SLO depends on a variety of actors, including industry, government bodies and local communities; the strength of an SLO can vary over time and scale as experience and events impact perceptions in local, regional and national contexts. The level of public support can have a significant impact on the SLO for industrial decarbonisation projects.

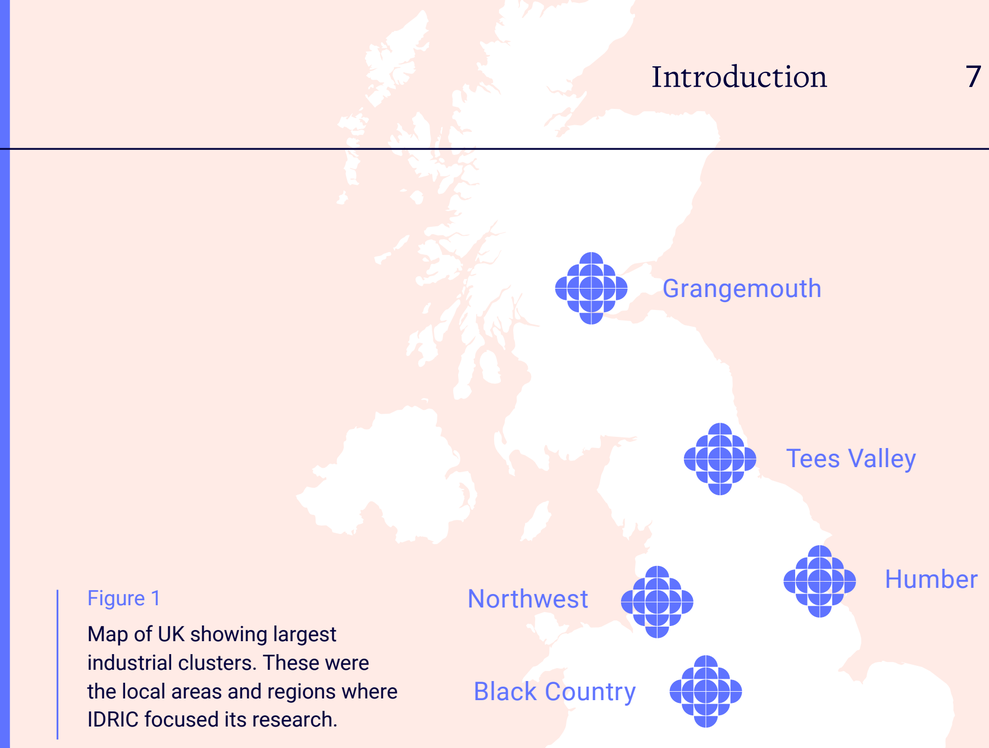


Figure 1
Map of UK showing largest industrial clusters. These were the local areas and regions where IDRIC focused its research.

In common with other related research, the report frequently uses these two terms.

Concepts of just transition and SLO help develop an understanding that largescale industrial decarbonisation is an ongoing process with positive and negative aspects that are meaningful and matter to people and the places where they live. People's views and experiences – whether based on expectation (perceived) or actual events (materialised) – can strongly influence how society talks about and reacts to industrial decarbonisation. These influences can, in turn, shape or reshape the choices and actions taken by governments, companies and communities.

1 Just Transitions Centre, International Trade Union Confederation.

Across the globe, we are seeing a resurgence in resistance to green policies, particularly in relation to concerns about cost, fairness, and the speed of proposed changes. In many cases, political and media narratives are playing a significant role in shaping public concerns – portraying net zero policies as expensive, disruptive, or disconnected from everyday life. This framing has contributed to the politicisation of environmental action and decarbonisation initiatives and has, at times, undermined public trust and support. In this context, the findings of this report – related to both obtaining social licence to operate and achieving just transitions – are more important than ever. Ensuring that communities are not only informed but actively involved in shaping industrial decarbonisation efforts is essential to rebuilding confidence and legitimacy in the continued transition ahead. It is also important to accept that communities have the right to make their own value judgements and that SLO may be unattainable for some projects and actions. This report prioritises the urgent need for effective engagement on both sides, rather than seeing just transition and SLO work as matters of more effective persuasion.

Research findings

This section of the report brings together findings from ten projects supported by IDRIC that explored different aspects of public perceptions, support and concerns in different regions of the UK.

Ten IDRIC projects contributed to this report. They are referred to by their project IDs throughout.
→ See further information.

Project ID	Project name
MIP 1.5	Understanding public responses to industrial decarbonisation in insecure times
MIP 1.7	An integrated framework for levelled up & low carbon industrial clusters
MIP 2.4	Just transitions for industrial decarbonisation in the UK
MIP 2.6	Integrated assessment of BECCS in context: environmental, policy, regulatory and social factors
MIP 3.4	Net zero sense of place
MIP 6.5	Protective space and social licence to operate industrial decarbonisation
FF 1.6	Visual intelligence and industrial decarbonisation [roll out] in South Wales
FF 4.1	Assessing the feasibility of implementing CO_2 capture and utilisation in Quorn mycoprotein process
FF 4.5	CCUS futures: mobilising workforce imaginaries
IA 3.1	Delivering a place-based just transition in industrial clusters

Despite widespread support for environmental sustainability, this often doesn't automatically translate into support for specific decarbonisation actions due for hopes for frictionless change, lack of trust in benefits, and fears of negative public responses.

In some projects, there was a specific focus on CCUS, and the projects sampled regions at different stages of scoping, planning and early implementation. However, each project also explored the associated social responses from a perspective of industrial decarbonisation and just transitions more broadly. Detailed findings can be found in the resources available on IDRIC's website. This report highlights key themes emerging across clusters and participant groups, highlighting the importance of place and context. Different methods and research foci utilised by the teams extended the explanatory scope and breadth of the inquiries. Across the different projects, findings were established that were consistent, robust and significant, signifying triangulation across data sources and high degrees of external validity.

Public perceptions, support and concerns

It is widely known that public awareness and understanding of decarbonisation technologies and actions is relatively low. The findings summarised here confirm this but go considerably further. They represent perceptions drawn from a wider range of stakeholders, including the voices of people working in affected sectors, those making management and investment decisions, and the R&D community. They offer a more detailed, nuanced picture of the hopes, concerns, misconceptions and uncertainties that feed into both the decisions about what actions to take, and anticipations of the likelihood of just transitions (and hence the probability of the public giving social licence to operate [SLO – see definition in introduction section]).

- → Confirmation and elaboration of widespread lack of awareness and understanding needed to allow SLO to be meaningfully granted.
- → Widespread support for the ultimate goals of environmental and economic sustainability and good intentions within industry.
- → Rather weak translation of that support into support for specific decarbonisation actions, because of:
  - Persistent hopes for frictionless change, or change that is enacted mostly at a distance;
  - Lack of confidence or trust in the existence of any benefits, their fair distribution if they exist, and/or the competence of those tasked with delivery;
  - Fears of such negative public responses;
  - Lack of confidence in the commitment of government.
- → Positive, concrete suggestions for what is needed to overcome these barriers.

The research also showed that the degree to which decarbonisation is welcomed or resisted is influenced by both local histories and by broader contemporary social and cultural dynamics. The following subsections elaborate on each of these key findings.

Awareness and understandings

Research across the clusters, carried out by IDRIC projects MIP 1.5, MIP 2.4, MIP 2.6, MIP 3.4, MIP 6.5, FF 1.6, FF 4.5, IA 3.1 confirmed previous findings of generally low levels of both awareness and understanding of specific decarbonisation actions such as CCUS.

Research carried out by project FF 4.5 with people working or training in sectors likely to be affected by decarbonisation and CCUS actions in Scotland, highlighted a range of misconceptions that fed into misunderstandings, including a tendency to equate environmentally responsible behaviour with recycling/re-use, coupled with beliefs that CO_2 can be "used up" by re-use; beliefs that CO_2 (and greenhouse gases generally) is pollution, toxic and/or inflammable; and confusion between CO_2/carbon and "net zero"/zero. Similarly, research carried out by IDRIC projects MIP 6.5 and FF 4.1 with residents in the Humber, Northwest and Tees Valley clusters showed a continued lack of familiarity with "net zero" and extremely limited awareness of the UK-government funded Cluster Plans (designed to support local collaboration), which in turn prompted scepticism (see below).

Support for the ultimate goals of decarbonisation and good intentions

Research with various participants from different regions of the UK, carried out by IDRIC projects MIP 1.5, MIP 2.6, MIP 3.4, MIP 6.5, FF 1.6, FF 4.5, IA 3.1 confirmed widespread support for the goal of avoiding climate breakdown. In the Tees Valley, project FF 4.1 found that the deployment of industrial decarbonisation technologies other than carbon capture and storage (CCS) is underpinned by a clear recognition of the urgent need to act on climate change across engagements with stakeholders, publics and community groups. In Scotland, those working or training to work in relevant industries and sectors voiced support for pro-environmental activities such as recycling, although most had not heard of CCUS (project FF 4.5). Research involving key industry figures in Teesside showed that CCUS is acknowledged as a valuable transitional tool for achieving net zero, though they viewed carbon capture and utilisation (CCU) as preferable to geological CO_2 storage, which they saw as less sustainable (project FF 4.1). The project found that CCUS was recognised for its dual benefits: contributing to Environmental, Social and Governance (ESG) goals and enhancing the region's image as a green technology leader, which can attract a sustainability-focused workforce.

Weak translation of support into support for specific decarbonisation actions

IDRIC's research reveals not only reluctance or even resistance to the implementation of decarbonisation actions, but also provides some important indications of the reasons for these responses.

In Wales, projects MIP 1.5, MIP 2.4, highlighted that people in the Pembroke and Milford Haven areas had a complicated and potentially tense relationship with the global oil and gas industries who manage refineries and a power station in the area. This is not so surprising as global changes, like job outsourcing, can cause local conflicts and mistrust in industries. When businesses form tight global-to-local relationships, communities can feel insecure because their livelihoods depend on them.

In project MIP 1.5, researchers engaged with community figures and ran full-day workshops in Port Talbot and Pembroke Dock to explore regional perspectives through structured group tasks and facilitated discussions. Figure 2 shows some of the outputs of these workshops. There were concerns about past accidents and broken promises made by both industry and government, but also acknowledgment that the industries provide needed jobs. In Port Talbot, people expressed global concerns and collective responsibilities towards decarbonisation, as well as concerns about potential impacts of local change. When people were shown plans designed by industry and government, they expressed some degree of "vision fatigue" due to past experience of plans that had never materialised. Indeed, some people state a preference for past plans for tidal infrastructure that were no longer on the table.

Participants from a range of backgrounds in Scotland and elsewhere in the UK greeted CCUS with responses ranging from cynicism to rejection that were clearly influenced by both local histories and contemporary sociocultural contexts, including well-known stories of other infrastructure development projects or breakdowns. Project FF 4.5 found there was evidence of continued hopes that "green futures" can be realised without change or disruption to infrastructures, landscapes or lifestyles. A default resistance to change was coupled with beliefs that "emissions" are created elsewhere, by someone else, and that any decarbonisation actions should be implemented in those places and impact only on those responsible. This combined with a view of industry as inevitably spoiling, polluting and destructive to nature – even amongst those working or training to work in industry and industry-supporting sectors.

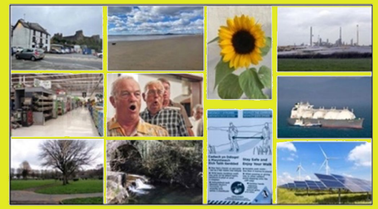
Research in Scotland (projects MIP 3.4, FF 4.5), Wales (projects MIP 1.5, MIP 3.4) and other industrial regions across the UK (projects FF 4.5, IA 3.1) also highlighted fears of repeating the localised negative social impacts of the end of coal mining and other industrial transitions (including poverty, unemployment and addiction, but also gentrification). People also have concerns about the feasibility and reliability of safe long-term storage, with some making comparisons with their fears about nuclear waste.

It is also important to recognise that there are very high levels of cynicism and assumptions of incompetence and greed within industry and government, clearly influenced by awareness of water pollution, sewage dumping, and other infrastructure projects such as HS2 (project FF 4.5).

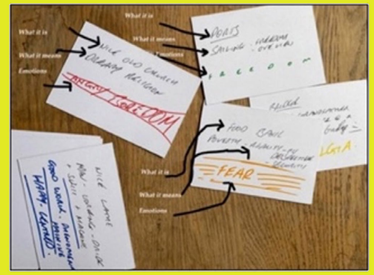
Despite recognising the potential benefits of decarbonisation actions such as CCUS, project FF 4.1 found that stakeholders in the Tees Valley identified key barriers including high implementation costs, political and market uncertainties, limited knowledge dissemination, and concerns about negative public perception. Challenges in the availability of a skilled workforce, a lack of clear UK policy strategy and urgency from Government, and a need to build public understanding were cited across several other projects.

Task 1
Individual mapping.

Task 2
Images from stakeholder presentation.

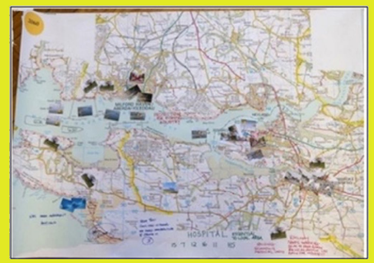


Task 3
Selection of some of the photographs.



Task 4
How the photographs were ascribed.

Task 5
Example of a constellation depicting a participant's meaningful image-objects.



Task 6
Example of a group map annotated with meaningful objects and visions of future in 2060 [MIP 1.5].

Figure 2

Photographs of workshop tasks.

Positive, concrete suggestions for what is needed to overcome barriers

Findings from across the projects suggest that transparent communication of benefits and impacts may avoid perceived greenwashing, cynicism and public rejection. In project MIP 6.5 residents in the Humber and Northwest expressed an appetite for more information. Local institutions were seen as being important for building effective partnerships, although with potentially limited power to influence outcomes.

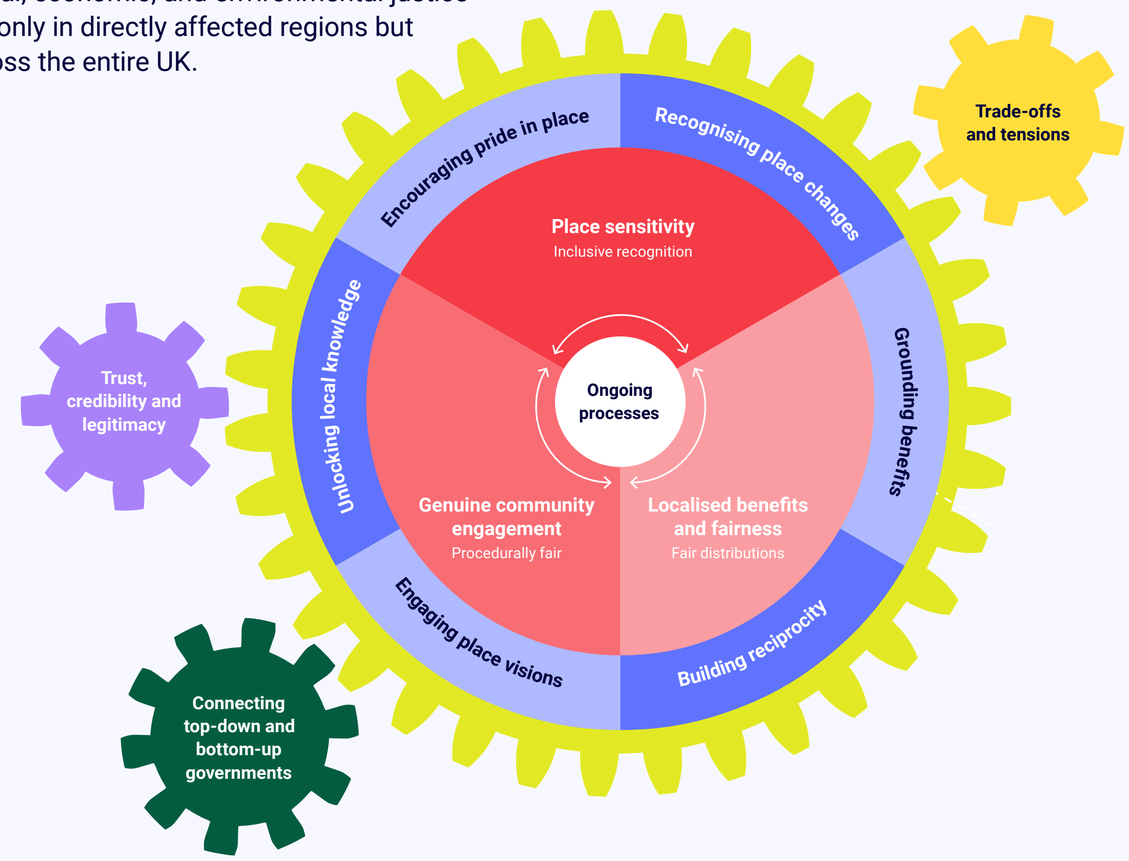
In the same project, stakeholders in the Humber, Northwest and Teesside highlighted how its proximity to major industrial emitters, supportive local political landscape, and the existing social acceptance of net zero initiatives, position the area uniquely for successful CCUS adoption. They also identified good existing physical infrastructure, a strong industrial heritage and common shared vision across partnerships as regional strengths for building an SLO for industrial decarbonisation more generally.

Findings in Wales, from project MIP 1.5, underlined how idealised views of certain technologies can shape resistance to or acceptance of local decarbonisation plans. The researchers, exploring 'forms of public acceptance', also found that it was easier to communicate using a mix of images and words, rather than text alone. Initially, a group who participated in research in Port Talbot, resisted local industrial decarbonisation proposals and expressed a strong preference for onshore wind, but this was later understood to reflect an 'idealised solution' that didn't realistically address many of their concerns. After discussion, people expressed cautious support for both offshore wind and CCUS infrastructure at the port – on the condition that any plans also included investment into civic areas in need of regeneration. This evolving response suggested a resilient community who wanted to co-produce change and who were open to integrating new technological, environmental and social information into their decision-making. In Pembroke Dock, the researchers observed a different pattern. Rather than acknowledging any negative impacts of past industrial change, many participants seemed to focus on idealised visions of technological progress and place, rather than formation of a more resilient integrated position. The research shows that while resilience is highly valued, it takes time to build and communities often struggle to voice their fears and integrate them with more positive ideas for change. It highlights the need to understand emotional responses to loss and to use collaboration and clear communication to build trust in decarbonisation efforts.

Just transitions

Achieving a just transition in the decarbonised energy and industrial sectors presents both significant opportunities and challenges. IDRIC's projects explored these challenges and opportunities in detail and highlight the need for a more place-sensitive and collaborative approach to industrial decarbonisation, exemplified by the framework developed in IA 3.1 displayed in Figure 3. This is essential to ensuring social, economic, and environmental justice – not only in directly affected regions but across the entire UK.

Figure 3
Framework for a place-based just transition [IA 3.1].



Social aspects

The research highlighted the importance of social aspects of just transition. IDRIC project MIP 2.4 revealed a contrasting understanding of industrial places existing between policy/industry stakeholders and host communities. Policies and cluster discourses tended to take a techno-economic perspective to place and industrial decarbonisation (e.g. focusing on market competitiveness, technological innovation and economic growth). Place was mostly invoked as a cluster branding technique, and local communities were seen as passive recipients of information and place changes.

Contrastingly, host communities tended to adopt a socio-cultural interpretation of place (e.g. strong ties to place and community through work, social and family connections). Whilst pride in connections to local industry and its strategic UK importance did exist, many residents expressed ambivalent and often negative views of current industrial activities and impacts. There was a feeling of increasingly exploitative community-industry relationships across localities, and a growing sense of unfairness regarding the uneven share of industrial costs/benefits and public investment between industry and host communities. Similar tensions were identified in other projects, including projects MIP 2.6, MIP 3.4, MIP 5.4 and FF 4.5.

The visualisation in Figure 4 from project MIP 2.4 illustrates the relationships and overlaps between three key perspectives in the just transitions literature – energy and environmental justice, equity and transitions and energy democracy – highlighting their disciplinary roots and thematic interconnections.

Across several IDRIC projects, including MIP 2.4, MIP 2.6, MIP 5.4, FF 4.5, MIP 1.5, it was found that the past and existing experiences of industry, the negligence of local needs and concerns as well as insufficient community engagement have affected local perceptions to the proclaimed benefits and legitimacy of decarbonisation projects, often negatively.

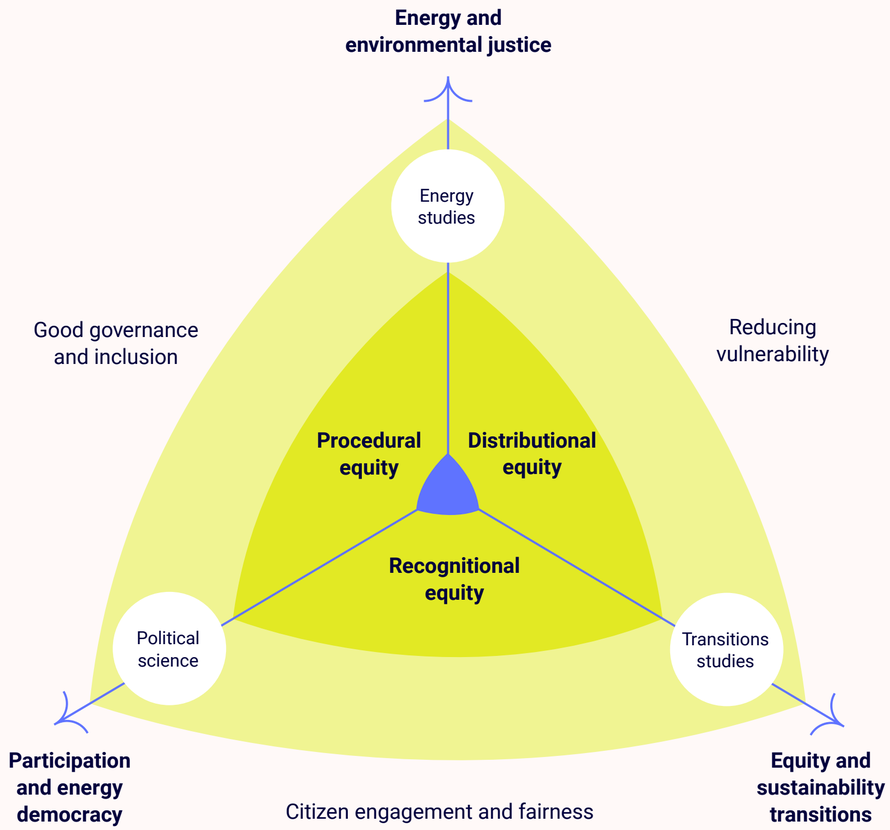


Figure 4

Visualising the contributions and connections between energy and environmental justice, equity and transitions, and energy democracy [MIP 2.4].

Economic aspects

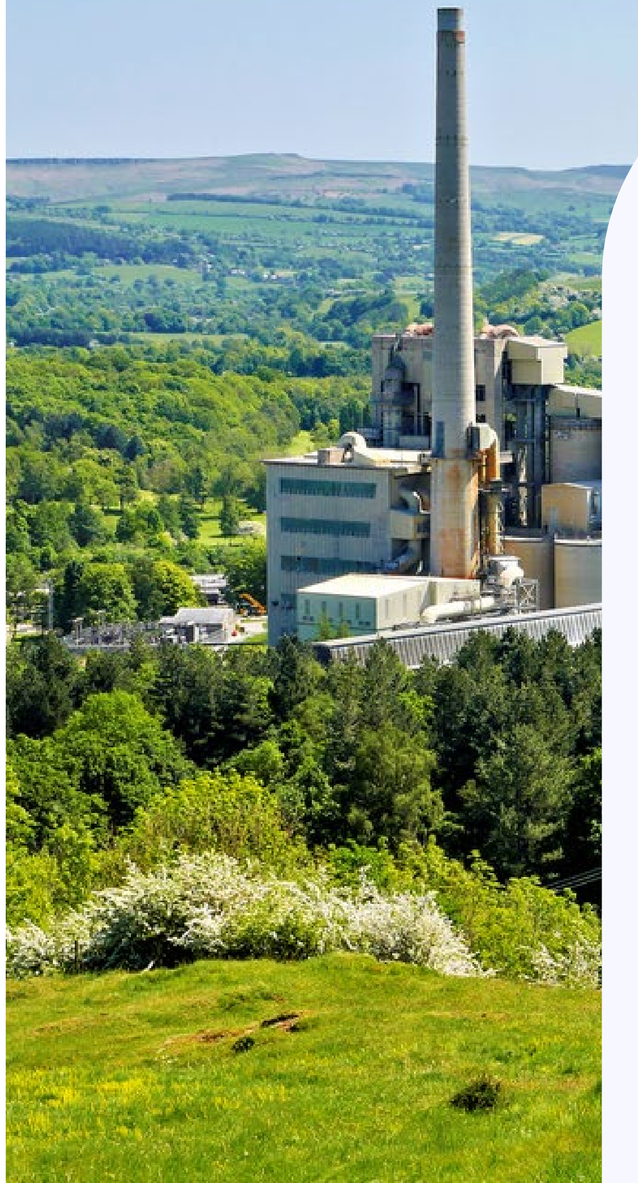
The analysis of regional economic impacts carried out by project MIP 1.7 revealed that investments in decarbonisation can generate substantial job creation and Gross Value Added (GVA) across various sectors. The distribution, however, depends on the region – where some regions (such as the Humber) offered higher returns due to their existing industrial infrastructure and resources. Figure 5 displays the regional socio-economic impacts of blue hydrogen investments in each of the UK's industrial clusters. A key finding is that there is an urgent need for region-specific policies that address skills development, retraining and ensure that disadvantaged communities are included in the transition towards low-carbon solutions. A key practical implication for a just transition is the importance of aligning decarbonisation strategies with social equity, ensuring that the workforce is equipped with the necessary skills for emerging low-carbon sectors.

Environmental aspects

In projects MIP 1.5, MIP 2.4, MIP 3.4, FF 4.5 and IA 3.1, concerns were raised across industrial regions that green spaces and natural environments need to be protected and/or enhanced during decarbonisation actions.
It is worth emphasising that green spaces and natural environments are not synonymous, with significant importance being placed on created and maintained green spaces such as parks, playgrounds and other outdoor sport/leisure facilities. While the depth of this concern varied (to some extent, depending on the present state of the local environment), there were consistent threads including:

- Sensitivity to the environmental characteristics of place leading to fears of damage to or loss of those characteristics through removal or imposition of infrastructure, such as wind turbines and pylons.
- Desires to preserve or create green spaces for community social and health benefits.
- A sense of injustice associated with the potential construction of infrastructures in places that are currently seen (whether rightly or wrongly) as not contributing to GHG emissions and therefore not responsible for the need to act.

These further demonstrate the interdependency of social, economic and environmental justices and thus the need to approach them holistically.



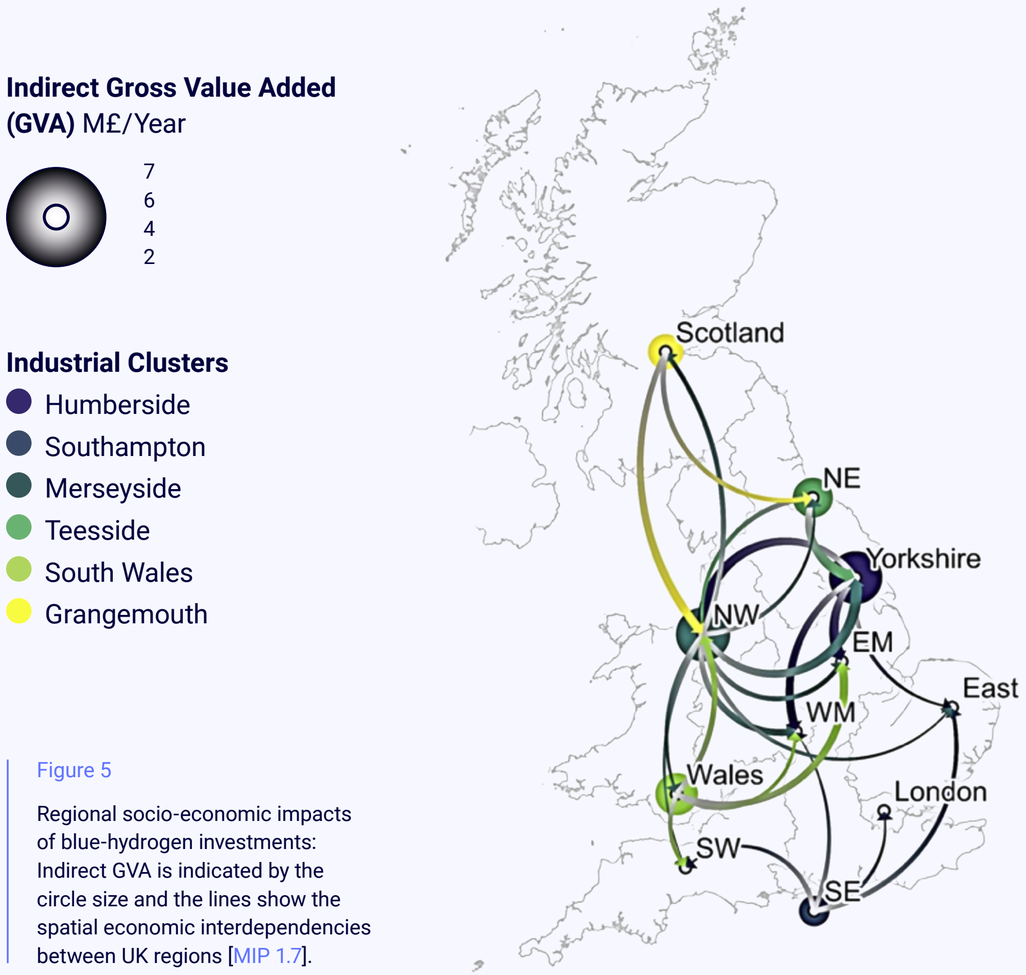


Figure 5

Regional socio-economic impacts of blue-hydrogen investments: Indirect GVA is indicated by the circle size and the lines show the spatial economic interdependencies between UK regions [MIP 1.7].

Recommendations to industry

The collective findings described in the previous section highlight that a **mutual understanding between industry and local communities/people is essential**. Progress towards a just transition requires this mutual understanding to be developed in relation to perceptions of, support for, and concerns about social, economic and environmental impacts of specific decarbonisation actions in specific places. It is important to recognise that mutual understanding will always be dependent on context and so is highly sensitive to place – including local histories and cultures – and concurrent challenges in other spheres.

Key recommendations

1 **Build trust through transparency and collaboration**
Industry should move beyond one-way communication and engage communities as long-term partners.
Co-developing plans and being open about both benefits and risks helps to avoid accusations of “greenwashing.”

2 **Invest in public understanding**
Address widespread knowledge gaps by partnering with educators and community organisations. Consider the use of accessible formats (including visuals and local narratives) to increase awareness and engagement with decarbonisation plans and technologies.

3 **Support local wellbeing and place-based needs**
Move beyond generic claims about economic benefits and tailor strategies to reflect local industrial legacies, social concerns and environmental aspirations. Prioritise long-term, tangible benefits for host communities – such as civic investment, social infrastructure and environmental enhancement.

4 **Enable an inclusive workforce transition**
Identify at-risk job roles, invest in local skills development and retraining and create opportunities for young people in their local communities.

Building trust and confidence through shared goals

Key messages emerging from the research emphasise trust and confidence, particularly in establishing shared values and goals. The collective findings highlight that **trust depends on transparent communication and evidence** for competent and ethical behaviour.

We recommend that industry should:

→ Take seriously the need to **establish and demonstrate shared social, economic and environmental values and goals**.

→ **Take steps towards increasing mutual understanding of planned decarbonisation actions** and their likely impact, leading to:

- Co-development of shared ambitions for relationships between industrial organisations and their local communities;
- Co-development and publication of concrete plans for investment and economic governance, including for future maintenance and/or decommissioning;
- Co-development and publication of concrete plans for avoidance and mitigation of any potential impacts on local environments. This can include integrating nature-positive measures within Cluster Plans.

Improving public engagement

Industry attempts at public engagement and consultation will continue to encounter resistance and suspicion unless the misconceptions and contextual influences are directly addressed. IDRIC's research shows that local communities are interested in learning more about local industrial decarbonisation initiatives, with an appetite for **'honest' communication which presents potential negative impacts as well as benefits**; attempts to 'greenwash' will be treated with scepticism.

Industrial planners must rebuild mutual trust with host communities by conducting community engagement in ways that are proactive, systematic, transparent, accessible, timely, ongoing, balanced, and address concerns, especially when deploying unfamiliar and controversial industrial decarbonisation technologies.

To improve engagement, we recommend industry should:

→ **Ensure honest communications on industrial decarbonisation plans**, which present a balanced perspective, including challenges and uncertainties (pros and cons). This will help to avoid perceived 'greenwashing'.

→ **Address widespread gaps in awareness regarding industrial decarbonisation technologies**. It is important to recognise that simplified infographics and promises of green futures will not generate the levels of mutual understanding needed to allow for informed and values-based judgements.

→ **Communicate the economic benefits of industrial decarbonisation more effectively** – both within the cluster and more widely. For example, in the context of carbon capture and utilisation (CCU), communicate how industries outside the clusters can benefit, such as using captured CO_2 in products like polymers and methanol.

→ **Provide evidence and data from existing projects and alternative approaches** to build credibility. This can include making use of narrative forms of evidence capable of mobilising language along with visual effects.

→ **Collaborate with community stakeholders, as well as adult and community education experts** to create resources that communicate both the actions needed to decarbonise and their potential consequences, including acknowledging the complexities and uncertainties involved in predicting potential outcomes.

→ **Establish diverse forms of public participation that go beyond one-way messaging** and takes host communities as partners in industrial decarbonisation, providing updated, integrated and responsive information to host communities with a single and accessible point of contact (e.g. a physical hub in high streets or a user-friendly website).

→ **Ensure continued communication and mutual knowledge-building activities** are conducted locally, but with clear connections to wider regional, national and international contexts. This will help to ensuring that communities do not perceive themselves to be shouldering unfair burdens or engaging in hopeless efforts that are being undermined by actions elsewhere.

Establishing a place-sensitive approach

To create a climate of mutual trust and confidence, based on shared values and goals, IDRIC research findings suggest the following barriers need to be overcome:

- A widespread loss of belief that industrial activity can lead to progress and advances in quality of life. Although in some places, there is pride in industrial heritage, there is a need to re-establish a sense that industrial progress can and should be responsible for advancing standards of living and environmental sustainability.
- Influences of other technologically related fears and scandals, including water/sewerage and another pipeline/ transport infrastructures (leaks and under-investment in maintenance); feared and realised disasters in the nuclear sector (leaks, explosions and long-term storage).
- Influences of other socially related fears, such as memories of prior energy transitions, lack of clarity about the kinds of jobs available in new/transformed industries, and fears of incomers/gentrification.

To overcome these challenges, industry should address issues in locally relatable ways:

- **Adopt a long-term approach to community involvement**, with ongoing and genuine engagement initiatives within clusters to foster and maintain trust. Confidence in organisations is inherently linked to past experiences, so ongoing community relations need to rebuild connections with local communities and demonstrate that promises are kept.
- **Recognise the existing sense of place, place-based needs and place visions held by host communities** when conceiving cluster discourses and visions. Hopeful cluster visions and narratives that overlook local sense of place and mixed feelings of industry tend to have limited purchasing power among host communities.
- **Channel benefits to host communities** in ways that address past harms, tackle broader social needs (e.g. child poverty, declining social infrastructure, poor public transportation) and improve community wellbeing. This entails going beyond general economic benefit claims (e.g. job creations) and providing contextualised schemes to help host communities – including those not employed directly by the industries – to address local development challenges and improve community wellbeing. This is especially important in so-called 'left-behind' places, such as declining industrial towns, if 'levelling up' is to be achieved.

Ensuring economic stability and supporting workforce transition

Decarbonisation initiatives must be economically viable in the long term and must support a just transition of the workforce. To enhance economic sustainability, we recommend industry should:

- **Collaborate across clusters on shared infrastructure and resources** (e.g. for technologies such as CCUS), which will reduce costs, streamline implementation, and increase collective impact.
- **Explore public-private partnerships** as a means of both reducing economic risks and creating the conditions for higher levels of trust and confidence. However, this must be balanced against a need to ensure that industry is not seen as in a position to exert undue influence (see recommendations for policymakers in following section).
- **Clarify if and how decarbonisation strategies might enhance a company's environmental and social governance reputation** and thus potentially attract sustainability-conscious talent.
- **Conduct a thorough assessment of which job roles will be affected** by decarbonisation, especially in high-carbon sectors, and identify those that will require retraining to ensure that the workforce is not left behind. It is critical that such assessments are transparent and that efforts are made to share their implications with local stakeholders in communities likely to be directly affected.
- **Establish training and employment opportunities for young locals** to improve the skills base and enable the local workforce. This will help to clarify how investment is targeted at actions that bring value to industry and local communities simultaneously.

More information on the economic impacts of decarbonisation on the workforce and on skills and workforce planning is available through other reports in the IDRIC Frontiers Reports series: Workforce for Net Zero: Skills, Planning and Equality, Diversity & Inclusion and Green Finance and Economic Consideration.

Recommendations to policymakers

The recommendations to policymakers have much in common with the recommendations for industry. The key messages are again about trust and confidence, and in establishing shared values and goals but also in long-term commitment, planning, competence and ethical behaviour.

Key recommendations

1 **Build a mutual understanding with communities**
Policymakers should engage early and meaningfully with host communities, recognising local values and concerns, and ensuring decisions are co-developed, rather than just consulted on. They should be transparent from the outset about which options are open for consideration, and which are not.

2 **Enhance sustained public participation**
Resources should be allocated for local engagement, embedding co-development in decision-making processes, and making host community engagement a condition of public funding.

3 **Establish a place-sensitive approach**
Strategies must reflect local histories, needs and identities. Community benefit mechanisms and coordinated governance across levels are essential to ensure fairness.

4 **Establish a secure economic environment**
A stable policy framework, clear incentives, and transparent governance are needed to attract investment and ensure equitable economic opportunities across regions.

IDRIC's collective findings again highlight that this is likely to depend on transparent communication and evidence for competent and ethical behaviour in relation to social, economic and environmental values and goals.

As for industry, policymakers will need to ensure:

- Co-development of shared ambitions for relationships between regulating bodies and the publics they are responsible to.
- Co-development of (rather than simply consultation on) strategies for state investment and economic governance, including for future maintenance and/or decommissioning.
- Co-development of plans for avoidance and mitigation of any potential impacts on local environments.

Much of this will depend on explicit efforts to build mutual understandings and established shared values and goals.

Building a mutual understanding between policymakers and the communities they serve

To build mutual understanding, we recommend policymakers should:

- **Gain a strong understanding of the local contextual factors** that need to be considered when decisions about planning and implantation are made.
- **Take community resilience into account** – this plays a vital role in helping individuals and communities cope with change and maintain well-being during periods of disruption. This requires more than simply mentioning resilience in policy or planning – it involves genuinely understanding what resilience looks like in different places and supporting it in ways that are meaningful and beneficial to the community.
- **Ensure the less positive sides of systems-wide transformation are not obscured**, i.e. those which pose challenges to societies and human life by sustainable, net zero transition locally and across the globe.
- **Demonstrate that industrial decarbonisation projects are planned and deployed in line with principles of procedural and distributive justice**, requiring a consistent approach which shows transparency and integrity across all aspects of industrial and net zero strategies. Poor handling of related issues will affect trust across the board.
- **Show leadership in providing clear, consistent communication on climate change, net zero and industrial decarbonisation's role**. This is needed to enhance understanding of ongoing initiatives and regional impacts, strengthening community support and involvement. A positive view of industry and government working together on delivery and funding lends legitimacy to projects.
- **Make efforts to build trust and confidence in shared environmental values and goals**. Publicly demonstrate how industrial decarbonisation will improve existing and potential pollution burdens, so that environmental inequalities and social injustices experienced by host communities and workers are improved.

Enhancing sustained public participation

To achieve these positive outcomes, it will be necessary to deliver a programme of sustained net zero public participation to make industrial policy open and responsive to society at all levels. This will require government to:

- **Allocate more resources to increase the capacity for community engagement** by government, especially at the local level, and to enable delivery, reflection, learning and evaluation.
- **Make host community engagement a condition of awarding public funds** to clusters and industrial decarbonisation projects.
- **Recognise that while some concerns may be grounded in misconceptions, they are still legitimate** and reasonable concerns which should not be dismissed. Steps can be taken to improve public understanding of the risks and benefits of specific technologies, such as CCUS, but steps must also be taken to improve policymaker understanding of the reasons behind public concerns.

Establishing a place sensitive approach

Known challenges to industrial decarbonisation include issues of timing (e.g. accelerating delivery without sufficient scientific knowledge) and location (e.g. tightly defining the boundaries of a cluster when a case could be made for a more dispersed cluster).

To establish place-sensitive mutual trust and confidence, based on shared values and goals, we recommend policymakers should:

- **Build a strong understanding that industrial decarbonisation is an ongoing place-making process** that requires partnership with host communities.
- **Improve coordination between governments across localities, sectors and scales** for effective resource allocation, knowledge exchange and community engagement.
- **Consider integrating community benefit funds**, deriving from industrial decarbonisation actions across projects, and ensure these are accessible to a wide range of local community organisations.
- **Attend to the needs of host communities**, who may or may not work directly for the industries that operate locally. Policymakers will need to recognise and prepare for tensions and trade-offs between different stakeholder priorities, including acknowledging that the causes of tensions are often valid and based on different values and evaluations of different types of benefit.
- **Take steps to depoliticise** what needs to be a long-term commitment and a transition that brings value to all, not just to powerful elites. There is clear evidence from IDRIC's body of research for a negative impact on trust and confidence arising from party politics in the years prior to the 2024 General Election.

Establishing a secure economic environment

To establish the conditions for trust, confidence and a more secure economic environment for industrial decarbonisation, we recommend policymakers should:

- **Establish a stable, long-term policy framework** that minimises political shifts, ensures funding consistency, and incentivises both private and public investment. This is needed to accelerate the adoption of industrial decarbonisation pathways that require major new infrastructure development such as CCUS.
- **Develop a coordinated national strategy** which addresses the intersection between different technologies and pathways. It should prioritise regions where industrial clusters and supportive local governments create conditions likely to be conducive to deployment and demonstrable success.
- **Make concerted efforts to communicate the rationale behind such frameworks and national strategies** across the UK, with an explicit effort to explain how different regional strategies and policies support overall progress towards net zero goals. National policy instability has negative consequences for public support and perceptions of industrial decarbonisation.
- **Take into account that co-designing policy is viewed more suspiciously if industry and government are seen as too close**, for example when the perceived motivation for pursuing CCS and blue hydrogen technologies is the maintenance of fossil fuel industries. Trust and confidence can be improved by demonstrating that agendas are not driven by the private sector but are aligned with broader public and environmental goals. There also needs to be transparency in how contracts are awarded.
- **Ensure that, at a national level, economic inclusion of marginalised regions is prioritised** by directing investments to clusters with the highest potential for job creation and GVA growth, especially considering inter-regional dependencies and spillover effects.
- **Ensure regional policies integrate social equity considerations**, focusing on retraining and skills development for workers transitioning from high-carbon to low-carbon industries.
- **Ensure local governments work to create a supportive regulatory environment for green investments** and ensure that decarbonisation strategies are tailored to local conditions, considering the unique socio-economic needs of each region.
- **Take deliberate, public and positive steps to build public trust in financial/ managerial competence** and oversight. Significant sums of public money have been committed to CCS and IDRIC's research showed that the distrust encountered was expressed against a backdrop of perceived failure in other large-scale infrastructure development reliant upon public funding. Communication about decarbonisation interventions needs to explain how these technologies and industries will be different.
- **Foster a close working relationship between local governments – especially those within established industrial clusters – and national bodies** to streamline permitting processes and support regional partnerships.

More information on the economic impacts of decarbonisation on the workforce and on skills and workforce planning is available through other reports in IDRIC Frontiers Reports series: Workforce for Net Zero: Skills, Planning and Equality, Diversity and Inclusion and Green Finance and Economic Consideration.

Moving forward

Accelerating the transition to net zero

To accelerate the transition to net zero, further research efforts should focus on understanding the specific socio-economic challenges faced by different regions, particularly those most reliant on high-carbon industries. Additionally, research on the scalability of low-carbon technologies in different sectors is crucial. There are challenges related to technological adoption, such as the need for infrastructure and investment in new technologies, but also social acceptance, especially in regions where decarbonisation may disrupt existing industries. Addressing these challenges requires concerted efforts from both industry and government to engage with communities and build trust. Policymakers should ensure that green policies promote inclusivity, with a focus on reskilling and social protections for vulnerable workers. Data accessibility remains a critical challenge, as detailed regional economic and workforce data are necessary to ensure the successful implementation of decarbonisation strategies.

To further accelerate net zero within industrial clusters, it is critical to ensure social acceptance of CCUS. However, to date public acceptance of CCUS technology is hindered by doubts around its purpose and safety, with some viewing it as a temporary fix or a form of "carbon washing." Addressing these perceptions requires clear, accessible communication about the social, environmental and economic benefits of CCUS, and the technology's role in reducing emissions from hard-to-abate sectors. Engaging with communities directly, especially through localised campaigns that highlight CCUS's contributions to regional growth and sustainability, can build trust and public support.

Addressing potential challenges in building mutual understanding and engagement

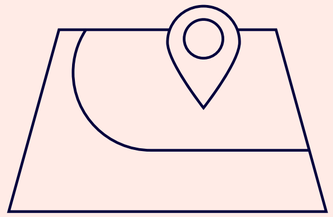
There is a need for activities that build mutual understanding and engagement, on basic (climate) science as well as the science and technology of interventions such as CCUS, aimed at enabling adults in community, industry and policy roles to better understand the short-term and local impacts and consequences of different courses of action as well as long-term and global impacts. While environmental education and education for sustainability have increasingly grown in schools, we cannot wait for those currently in mandatory education to grow up before taking decarbonisation actions. Most adults – i.e. most voters and taxpayers – are not in formal education, and thus alternative ways of engaging them in meaningful value judgements and decisions must be developed. This means developing materials, resources and activities that:

a Recognise and value local knowledge, but that also recognise and address misconceptions and negative contextual influences;
b Explicitly addresses benefits and risks and their complex intersections;
c Can be deployed and accessed in a variety of ways;
d Can be the basis for future consultations about what is acceptable, and what is reasonable restitution or recompense for any local disruption.

Achieving a programme of pedagogically-informed engagement that meets these requirements will thus need more research into how place-based resources can be co-developed with adult and community educators, scientific experts, industry and local residents in ways that allow for effective transfer across contexts. The necessary learning works two ways, however, and it should also be recognised that, ultimately, the public may not grant acceptance to CCS, either locally or more generally.

Place sensitive approaches

Further data generation regarding local "sense of place" and perceptions of industrial decarbonisation should be conducted by governments and cluster developers, using a more extensive methodological approach and a longer timeframe. This includes examining the challenges facing government and industry actors in conducting early, genuine community engagement, along with the solutions to any potential lack of political will, resources, coordination and action.



There is also a need for research that explores the interplay between both emotionally and socially influenced public perceptions of how infrastructure affects people and places. This kind of work can offer new and valuable insights into how industrial decarbonisation impacts mental health, community identity, and environmental well-being. By linking this research to just transition and public acceptance strategies, researchers can support the development of community knowledge which concurrently supports industry and policy stakeholders and ensures the development of more collaborative, creative, and inclusive approaches. They can also develop and use participatory "trial and test" approaches to help address sensitive issues surrounding both the benefits and potential harms of new technologies. This includes recognising the negative emotional impact of past industrial experiences ("wounding") and how the concept of community resilience can often be "idealised".

The research also highlights that community engagement often relies heavily on visuals and infographics – used frequently in commercial environments - to communicate future visions. While useful, there has been little discussion about how the public interprets and responds to these images. More research is needed into how to use a mix of communication tools – including visual and interactive methods – to build genuine, two-way understanding between industry, policymakers and communities.

Another recommendation is to develop new and evolving ways of talking about fairness and justice, which reflect multi-national and cultural attitudes and acknowledge how people experience change. This includes encouraging open discussion of past harm or loss, rather than treating it as something shameful and to be avoided.

Going forward with trust and confidence in the possibility of just transitions

There is a role for a variety of actors in addressing the lack of awareness of Cluster Plans within a broad and clear narrative of the purpose and benefits, including the role of industrial decarbonisation to achieve climate goals and maintain UK industry. This goes beyond the clusters, to make decarbonisation part of the national debate, improving information and engagement across multiple voices and channels. Genuine engagement across projects needs to be ongoing over the long term, with a potential role for local authorities to bridge the gap between industry, national government, and community. Rebuilding trust in government is a critical part of establishing that industrial decarbonisation technologies, including CCS and hydrogen, are credible and legitimate solutions that can be delivered with strong social licence to operate.

A just transition demands that the economic benefits of CCUS are shared fairly, particularly for communities that have historically relied on high-carbon industries. Training programs focused on reskilling local workforces will be essential, ensuring that workers can transition smoothly into emerging green roles and reducing the risk of economic displacement. Additionally, collaboration with local leaders, educational institutions, and industry can help establish a strong talent pipeline, enabling a skilled workforce for CCUS and related technologies.

Achieving social support requires policies that prioritise transparency, community input, and local benefits, aligning CCUS deployment with regional economic goals and creating a pathway for sustainable, community-centred growth. Widespread engagement may increase costs, extend project timescales in the short term (but reduce in the long term) and necessitate the involvement and coordination of many organisations.

Different expectations of the timing and the extent of community engagement often exist between stakeholders. While community stakeholders favoured a variety of pro-active and ongoing engagement, industry stakeholders often expressed concerns over the value of early timing and a wide range of community engagement, due to project uncertainties.

The lack of mutual trust between government, industry and host communities also impedes the instigation and participation in community engagement, which in turn increases mutual distrust. Furthermore, there is ambiguity and difficulty in defining the temporal and geographical scope of community engagement, and in identifying which stakeholder(s) should take ownership of leading on implementing actions and recommendations and subsequently monitoring their progress.

Contributing projects

IDRIC projects included in this report

IDRIC ran three complementary strands of projects:

1 In-depth research projects embedded within nine Multidisciplinary Integrated Programmes (MIPs), each programme tackling a key challenge or pathway for industrial decarbonisation;

2 Shorter-term Flexible Fund (FF) projects designed to rapidly address emerging or urgent opportunities identified directly by industrial clusters;

3 Impact Accelerator (IA) projects aimed at maximising the impact of existing IDRIC projects.

Projects discussed within the report are referred to by their project number.

◗ – Principal investigator

Project ID	Project name	Researchers	
MIP 1.5	Understanding public responses to industrial decarbonisation in insecure times	Nick Pidgeon ◗, Karen Henwood, Harriet Smith	Cardiff University
MIP 1.7	An integrated framework for levelled up and low carbon industrial clusters	Niall Mac Dowell ◗, Nadine Moustafa, Mai Bui	Imperial College London
MIP 2.4	Just transitions for industrial decarbonisation in the UK	Benjamin Sovacool ◗, Abigail Martin, Paul Upham, Siobhan Stack-Maddox	University of Sussex
		Patrick Devine-Wright, Stacia Ryder	University of Exeter
		Sarah Mander	University of Manchester
MIP 2.6	Integrated assessment of BECCS in context: environmental, policy, regulatory and social factors	Clair Gough ◗, Sarah Mander, Diarmaid Clery, Muir Freer, Abhilasha Fullonton, Lisa Bell	University of Manchester
MIP 3.4	Net zero sense of place	Patrick Devine-Wright ◗, Huei-Ling Lai, Jo Hamilton	University of Exeter
MIP 6.5	Protective space and social licence to operate industrial decarbonisation	Clair Gough ◗, Diarmaid Clery	University of Manchester
FF 1.6	Visual intelligence and industrial decarbonisation [roll out] in South Wales	Nick Pidgeon ◗, Karen Henwood, Harriet Smith	Cardiff University
FF 4.1	Assessing the feasibility of implementing CO_2 capture and utilisation in Quorn mycoprotein process	Dawid Hanak ◗, Nashwan Dawood, Gari Harris, Kumar Patchigolla, Diana Feliciano, Ellis Marshall	Teesside University
FF 4.5	CCUS futures: mobilising workforce imaginaries	Anna Wilson ◗, George Robertson	University of Glasgow
		Jennifer Dickie	University of Stirling
		Jen Roberts, Zoe Shipton	University of Strathclyde
IA 3.1	Delivering a place-based just transition in industrial clusters	Huei-Ling Lai ◗, Patrick Devine-Wright, Jo Hamilton	University of Exeter
		Abigail Martin	University of Sussex
		Sarah Mander, Diarmaid Clery	University of Manchester
		Peter Taylor, Imogen Rattle	University of Leeds
		Stacia Ryder	Utah State University

Project ID	Project name	Outputs	
MIP 1.5	Understanding public responses to industrial decarbonisation in insecure times	It's not a very certain future...	Journal
		The infrastructural ecologies of industrial decarbonisation	
		Will industrial decarbonisation produce resilient communities?	Report
		Accepting idealised solar farm portrayals?	Book Chapter
		Understanding public responses to industrial decarbonisation in insecure times	Webinar
		Will industrial decarbonisation produce resilient communities? — Understanding risk	Video
MIP 2.4	Just transitions for industrial decarbonisation in the UK	Just transitions for industrial decarbonisation	Journal
MIP 2.6	Integrated assessment of BECCS in context: environmental, policy, regulatory and social factors	Co-deployment of bioenergy with carbon capture and storage in the UK: Growth or gridlock?	Journal
		Integrated assessment of BECCS in context: environmental, policy, regulatory and social factors	Webinar
MIP 3.4	Net zero sense of place	Decarbonisation of industrial clusters: A place-based research agenda	Journal
		Imagining and emplacing net zero industrial clusters	
		How do stakeholders emplace Net Zero industrial clusters? — Phase 1 summary report	Report
		How does the sense of place of host communities shape people's views on Net Zero industrial clusters? — Phase 2 summary report	
		Net Zero sense of place multi-stakeholder dialogues — Phase 3 summary report	
		Net Zero Sense of Place Framework	Toolkit
		Net zero sense of place (Northwest Industrial Cluster)	Webinar
		Net zero sense of place (Scotland Industrial Cluster)	
MIP 6.5	Protective space and social licence to operate industrial decarbonisation	Cluster Mapping Report: The Humber Industrial Cluster	Report
		Cluster Mapping Report: The North West Industrial Cluster	
		Carbon capture and storage and greenhouse gas removal	Blog
FF 4.5	CCUS futures: mobilising workforce imaginaries	CC(U)S Futures 1: Visions from the Scottish Cluster	Report
		CC(U)S Futures 2: Visions from within the sector	
IA 3.1	Delivering a place-based just transition in industrial clusters	Delivering place-sensitive, fair industrial decarbonisation	Policy Brief
		Enabling a place-based, just transition to net zero — Guidance for stakeholders in Milford Haven	Guidance
		Enabling a place-based, just transition to net zero — Guidance for stakeholders in Ellesmere Port	
		Enabling a place-based, just transition to net zero — Guidance for stakeholders in Grangemouth	
		A Place-based, Just Transition framework can guide industrial decarbonisation with a social licence	Journal
		Towards Fair Net Zero UK Industrial Clusters: Place-based just transition strategies for communities, governments, and industries	Toolkit
		Introducing the place-based just transition framework	Video

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