IDRIC

Enabling a place-based, just transition to net zero
Guidance for stakeholders in Milford Haven

Jo Hamilton, Huei-Ling Lai, Patrick Devine-Wright, Stacia Ryder, Abigail Martin

University of Exeter, University of Sussex

March 2024

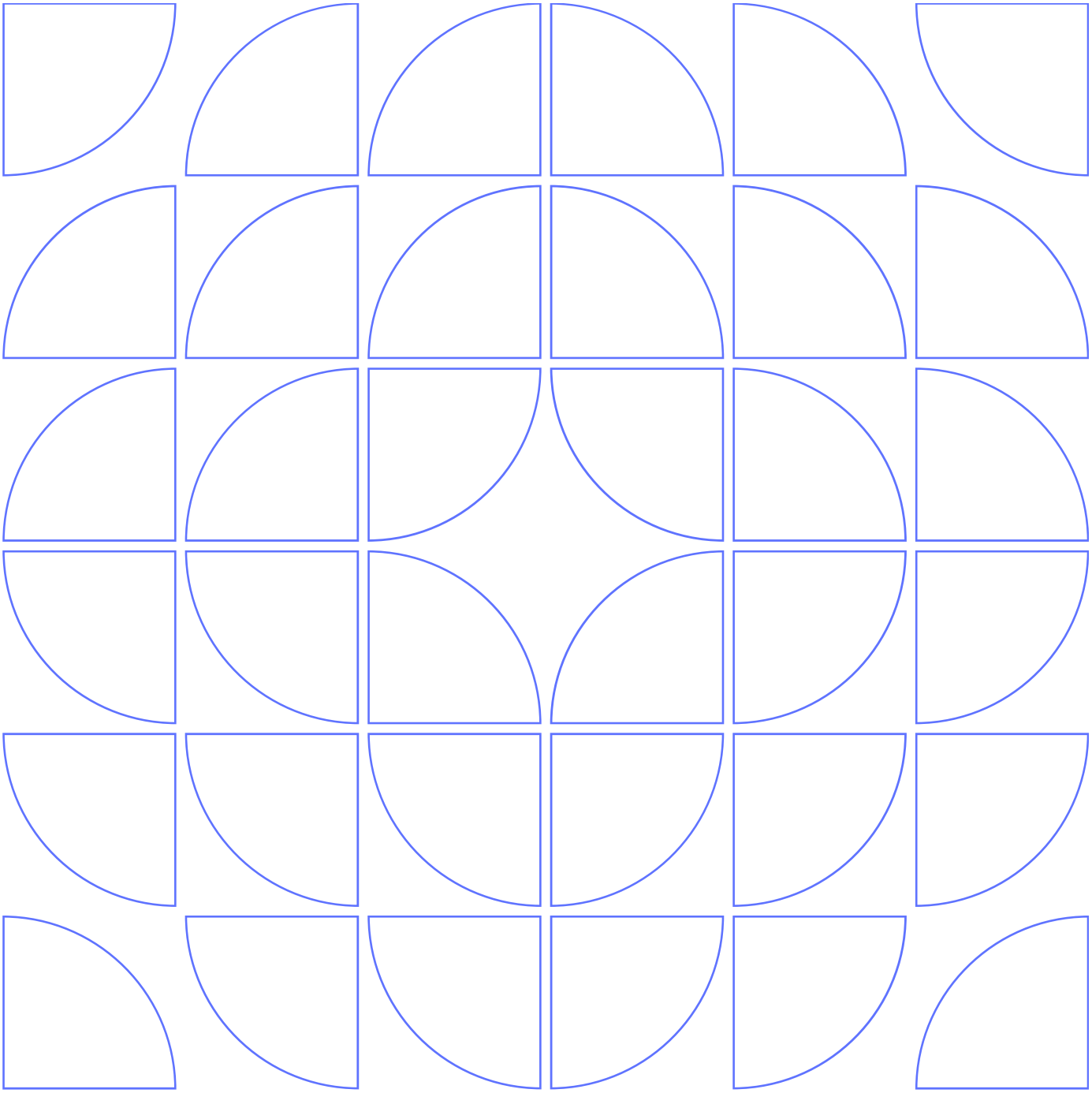
IDRIC

UK Research and Innovation

This work was supported by the UKRI ISCF Industrial Challenge, through the UK Industrial Decarbonisation Research and Innovation Centre (IDRIC) award number: EP/V027050/1, under the Industrial Decarbonisation Challenge (IDC)

This report is an output from IDRIC Impact Accelerator project IA3.1 Delivering a Place-based Just Transition in Industrial Clusters.

Find out more at idric.org



Guidance for Enabling a Place-based, Just Transition in Milford Haven

Summary and key recommendations

Milford Haven is an important part of the South Wales Industrial Cluster (SWIC) funded by the UK Government's Industrial Decarbonisation Challenge programme since 2020. This document offers science-informed and evidenced-based recommendations for governments, industry, host communities and associated organisations, to help enable a place-based, fair industrial transition in Milford Haven. Box 1 contains key recommendations, and Table 1 contains a summary of the full recommendations.

This guidance is informed by the Place-Based Just Transition (PBJT) framework (Figure 1, Section 3), designed to provide a collaborative approach for delivering a place-sensitive, socially fair transition to net zero in industrial clusters. The framework and document were developed from the findings of four IDRIC social science research projects (Appendix 1) and a local stakeholder workshop. The recommendations are offered with the expectation that a local organisation will develop ownership and oversight of them, and that stakeholders can decide who is best placed to take ownership/responsibility for their delivery. Doing so can help to connect this guidance with existing local initiatives and organisations, including the Celtic Freeport and Milford Haven Waterway: Future Energy Cluster initiatives, Pembrokeshire County Council and Milford Haven Port Authority. We hope the recommendations will contribute to the transition to net zero being mutually beneficial and socially fair for local communities and workers.

Whilst the focus of our research is Milford Haven, we recognise the diversity of communities with differing development histories in the areas surrounding Milford Haven who will also be affected by the Industrial Decarbonisation (ID) projects and associated developments. We offer these recommendations with the intention that due consideration is given to the distribution of benefits and costs of industrial decarbonisation in Milford Haven and the surrounding areas.

Box 1: Key action recommendations

- Develop a place-sensitive approach to ID that is grounded in the lived experiences of host communities such as Milford Haven, and treats local residents as stakeholders in ID.
- Undertake sustained and genuine engagement with stakeholders and host communities.
- Ground local benefits according to needs identified by residents including: long-term planning for employment and skills; availability of housing; cleaner air and water; addressing poverty and inequality.
- Improve local governance for ID by ensuring parish/town/county councillors act as points of visible contact and advocacy for residents about ID.
- Devise appropriate governance structures to coordinate joined up engagement and consultation activities, and embed these within existing initiatives such as the Milford Haven Waterway Future Energy Cluster and the Celtic Freeport.
- Recognise and work through trade-offs and tensions in stakeholders' priorities through engagement opportunities.

Overview of this document

- Summary and key action recommendations
- Section 1: Introduction
- Section 2: Background context of Milford Haven and Industrial Decarbonisation
- Section 3. Place-based just transition framework and research evidence
- Section 4: Action recommendations
- Section 5: Conclusion and next steps
- Appendix 1: Further source links
- Appendix 2: Overview of key industrial decarbonisation projects related to Milford Haven
- Appendix 3: Principles for genuine engagement

Table 1: Summary of the recommendations for action

Theme	Action recommendations	Key actors		
		Local Govt	Industry stake-holders	Other actors
Overall	• Identify which entity or organisation has ownership and oversight for implementing and reporting on these recommendations.	All		
Place sensitivity	• Treat local residents as key stakeholders in ID. • Adopt a place-sensitive approach to ID, grounded in the lived experiences, local knowledge and place attachments of host communities. • Develop an identity for Milford Haven and the surrounding area as a national green hub for Wales. • Develop and maintain a good track record of environmental health and safety, with less risk and more benefit from clean environmental goods.	Lead	Lead	
Engagement	• Undertake sustained and genuine engagement with stakeholders and host communities. This involves timely, clear communications designed to reach multiple audiences. • Create a dedicated website focused on Plain English content around industrial decarbonisation, showing the impacts as well as opportunities for host communities. • Rebuilding trust between host communities, industries, and local government requires the development and maintenance of long-lasting relationships. • Be accountable and build the capacity of host communities to contribute to consultations, by using multiple approaches to engagement e.g. face to face sessions or online surveys. • Partner with universities to inform the design, delivery, and evaluation of engagement activities. • Create a Milford Haven Engagement, Education and Communication Hub and/or visitor centre.	Co-lead	Co-lead	Milford Haven Port Authority, UK Government, involvement of civil society organisations and residents
Engagement	• Consider how sustained and genuine stakeholder and community engagement opportunities could be integrated across ID and Celtic Freeport initiatives.			Milford Haven Waterway Future Energy Cluster and Celtic Freeport
Localised benefits	• **Jobs: Ground local benefits within technology deployment plans**, through long term planning for employment and skills. Address skills gaps and clarify how the local workforce could access and benefit from promised highly-skilled ID jobs. View skills in a diverse way, e.g. skills around engagement and participation alongside science and technology. • Provide clarity about how ID and industries contribute to a circular economy at the local level.	Co-lead	Lead	Involve workers, training providers, colleges, universities, unions, and civil society organisations

	• **Address local needs:** Ground local benefits according to needs identified by residents, e.g. housing availability, cleaner air and water, address poverty and inequality, address regional 'brain drain' of young people leaving rural areas.			
Localised benefits	• **Address local needs:** Explore mechanisms to channel funding to address locally determined needs, e.g. retaining business rates, infrastructure levy.[1] • Instigate a new County Council post: Local Champion for new energy industries.	Lead		
Localised benefits	• Consider providing additional funding initiatives for community projects, similar to the Milford Haven Port Authority's Community Fund and Green Energy Fund.[2] Ensure that funds are visible, accessible, inclusive, and impactful to host communities. Evaluate community benefit fund delivery and outcomes to ensure they are fit for purpose.		Lead	
Connecting levels of government	• Improve local governance for ID by ensuring parish/town/county councillors act as points of visible contact and advocacy for residents about ID.	Lead		Parish, town, and county councils
Connecting levels of government	• Devise appropriate governance structures to coordinate activities such as joined up engagement and consultation activities to contribute to social benefits across the Milford Haven Waterway Future Energy Cluster (hereafter Haven Energy Cluster) and the Celtic Freeport. • Devise appropriate governance structures to coordinate joined up engagement and consultation activities, and embed these within existing initiatives such as the Milford Haven Waterway Future Energy Cluster and the Celtic Freeport.			Milford Haven Waterway Future Energy Cluster and Celtic Freeport
Connecting levels of government, engagement, localised benefit	• Increase community visibility and trust of The Crown Estate in Milford Haven. • Consider devolving The Crown Estate to Wales, with similar arrangements to Crown Estate Scotland regarding grounding local benefits.[3]			The Crown Estate
Trade-offs and tensions	• Acknowledge existing trade-offs and tensions at a local level and provide opportunities to address these tensions, e.g. through carefully facilitated forums for learning, knowledge exchange and deliberation.	Co-lead	Co-lead	Relevant organisations

[1] Under consultation at time of writing. See the UK Government webpage 'Technical consultation on the Infrastructure Levy', available at https://www.gov.uk/government/consultations/technical-consultation-on-the-infrastructure-levy.
[2] For information about Port of Milford Haven's Community Fund, see https://www.mhpa.co.uk/resource-library/community-fund-application-form/. For information about Green Energy Fund, see https://www.mhpa.co.uk/latest-news-and-blog/port-of-milford-haven-launches-green-energy-fund/.
[3] See https://www.crownestatescotland.com/.

1. Introduction

Industrial activities account for 16% of UK greenhouse gas emissions (72 $MtCO_2e$ annually),[4] and accounted for 29% of Welsh CO_2 emissions in 2016.[5] South Wales is currently the second largest industrial emitter of CO_2e in the UK, with 16 $MtCO_2e$ per year released across industry and energy generation.[6] In 2019, a net zero target for Wales by 2050 was announced by the Welsh Government and further legalised in 2021. With UK Government and industry funding, the South Wales Industrial Cluster (SWIC) - and associated decarbonisation projects across the industrial heartlands in the region - aims to achieve net zero industries in South Wales by 2040. The deployment of these decarbonisation technologies and infrastructure will reshape the industrial landscape and affect the lives of people who live and work in these areas. How to carry out industrial decarbonisation in a timely, socially fair, and place-sensitive manner is an urgent challenge that will influence future industrial development in the country alongside the wellbeing of surrounding communities and workers.

This document aims to provide guidance to support a place-based, fair industrial transition in Milford Haven and the surrounding areas. It offers science-informed, evidence-based recommendations for local governments, industry, host communities, workers, and associated organisations to work together towards making Milford Haven a net zero place. These recommendations are developed from the suggestions made by eight participants (from local government, Port Authority, and local community) at the local stakeholder workshop held in the Torch Theatre on the 30th of October 2023. We supplement these suggestions with the research insights from four partner projects that focus on place, fairness, social license, and community engagement in industrial decarbonisation.[7] These include interviews, two community focus groups, and a multi-stakeholder workshop conducted in 2023 regarding people's sense of place[8] and views on just transitions[9] in Milford Haven, and feedback from initial drafts of this document. These insights also informed a Policy Brief: 'Delivering Place-sensitive, Fair Industrial Decarbonisation' for policymakers and cluster developers, produced alongside this guidance.[10]

Whilst our research focused on Milford Haven, we recognise the diversity of communities in the area – e.g. Pembroke Dock and surrounding rural communities – who share similar experiences but have differing development histories, and will also be affected by the industrial decarbonisation projects and associated developments. Given the interconnections between neighbouring communities, and the shared infrastructure and services, we offer these recommendations in the hope that due consideration is given to the distribution of benefits and costs of industrial decarbonisation in Milford Haven and the surrounding areas.

[4] See 2021 'Industrial Decarbonisation Strategy' policy paper, available at https://www.gov.uk/government/publications/industrial-decarbonisation-strategy.
[5] See Welsh Government (2019) 'Industry sector emission pathway', available at https://www.gov.wales/industry-sector-emission-pathway-factsheet.
[6] See https://www.gov.uk/government/news/net-zero-ambitions-move-a-step-closer-in-wales.
[7] These projects are MIP3.4 'Net Zero Sense of Place', MIP2.4 'Just Transitions for Industrial Decarbonisation in the UK', MIP6.5 'Protective Space and Social License to Operate Industrial Decarbonisation', and MIP9.1 'Learning from International Experiencing in Decarbonising Industrial Clusters' at the Industrial Decarbonisation Research and Innovation Centre (IDRIC).
[8] The term 'Sense of Place' refers to the perceptions, emotions, identities, lived experiences, attachments, and future visions that people have about a place.
[9] The term 'just transition' was originally used by labour movements and environmental justice groups in the USA and has gained momentum in relation to decarbonisation. The concept of just transition highlights the importance of considering transitions to net zero that are fair and equitable in process and decision making (procedural justice), in the distribution of burdens and benefits (distributive justice), between different publics, e.g. local residents, current and future workforce, and their differing needs (recognition justice), and between past, present and future generations (intergenerational justice).
[10] Delivering Place-sensitive, Fair Industrial Decarbonisation Policy Brief. Available at: https://idric.org/resources/policy-brief-delivering-place-sensitive-fair-industrial-decarbonisation/

2. Background context of Milford Haven and Industrial Decarbonisation (ID)

Milford Haven (Aberdaugleddau in Welsh, meaning 'mouth of the two Rivers Cleddau') is a port town whose history is deeply shaped by the sea. It has experienced several rounds of industrial boom and bust, from whaling to fishing and boat building industries, and a booming oil industry in the 1960s. After the decline of the oil industry in the 1980- 90s, several refineries and oil assets were taken over by an emerging gas industry around the turn of the century. These included South Hook LNG and Dragon LNG, whose gas terminals are capable of handling 30% of the UK's liquid natural gas. Today, Milford Haven is known as the UK's largest energy port, surrounded by the two gas terminals as well as Valero's oil refinery, RWE's Pembroke Power Station, and Puma Energy's oil complex. These industrial activities are dependent on the surrounding waterways and are interspersed with more traditional land uses, as the area is surrounded by agricultural fields and dairy farms. Decarbonisation of this energy industry is thus vital to the future development of Milford Haven in the era of climate change.

Milford Haven has grown into the second largest town in Pembrokeshire, with a population of around 15,000 people. Despite this growth and the local industrial activities and shipping businesses, several areas of the town (in the West, East, and Hubberston wards) are categorised amongst the 20% most deprived group (overall) in the 2019 Welsh Index of Multiple Deprivation (WIMD).[11] Additionally, the town has moved from 20-30% most deprived group (in the employment domain) in the 2016 WIMD into the 10% most deprived in the 2019 WIMD,[12] raising questions about the allocation of the benefits and job opportunities generated from industry. This question is compounded by residents' concerns over the shortage of public investment in services such as healthcare, schools, and the supply of housing. County council funding cuts have led to the recent sale of the Milford Haven Town Hall, described by one participant as "*the jewel in the crown*". The shortage of healthcare facilities is particularly concerning for the ageing population, alongside the town's proximity to five top tier industrial sites according to the 2015 the Control of Major Accident Hazards (COMAH) Regulations.[13]

Several local development projects have been proposed over the past few years, with mixed results. In 2020, Pembrokeshire County Council launched a two-year 'Milford Haven: Energy Kingdom' project with the Port Authority and other energy companies. This project aimed to explore the potential of decarbonising the transport and domestic sectors in Milford Haven, Pembroke, and Pembroke Dock with renewable electricity and fuel switching to hydrogen. Despite progress in demonstrating hydrogen cars and engaging with local schools, the hydrogen charging station in the Milford Marina was removed in 2023. The lessons and partnerships built through the project have supported the work of other energy and ID projects that followed. Meanwhile, an initiative to redevelop the train station led by South West Wales Connected (a Community Rail Partnership established by Transport for Wales) in 2021 has thus far generated little visible impact.

The Milford Haven Port Authority (MHPA) has been the key developer of Milford Haven with its own assets, including the completion of a new modern hotel in the Milford Marina in 2022. In 2019 a "Sense of Place" branding programme was launched with the aim of boosting the local tourist industry. This initiative was undertaken in cooperation with a local volunteer-led group, the Milford Haven Museum, and local businesses around the Marina. The Port Authority also worked with Pembrokeshire County Council and partners in Port Talbot (such as Associated British Ports, Neath Port Talbot Council) on the Celtic Freeport project, which was shortlisted by the UK Government in

[11] See the 2019 WIMD full report, available at https://datamap.gov.wales/maps/new?layer=inspire-wg:WelshIndexOfMultipleDeprivationWIMD2019#/.
[12] See Welsh Government website https://www.gov.wales/welsh-index-multiple-deprivation-full-index-update-ranks-2019.
[13] See https://www.pembrokeshire.gov.uk/emergency-planning/industrial-accidents.

March 2023. This project is expected to be operational from 2024, supporting the development of hydrogen production and marine energy development for low-carbon industrial and energy transitions in these areas.

Overview of industrial decarbonisation projects in Milford Haven

Milford Haven is an important part of the South Wales Industrial Cluster (SWIC), which has been funded by the UK Government's Industrial Decarbonisation Challenge programme since 2020. As one of the most advanced 'SuperPlaces/mini clusters' in SWIC, the Milford Haven Waterway: Future Energy Cluster was formed by a coalition of the MHPA, Pembrokeshire County Council, several energy companies (e.g. RWE, Dragon LNG, Valero), and renewable developers. It aims to expand South Wales's grid capacity by 10 GW by 2030, contribute to 20% of UK's low-carbon hydrogen target, and contribute to at least 10% of UK's floating offshore wind target by 2030. The Celtic Sea Floating Offshore Wind (FLOW) project could support the expansion of Pembroke Port, and currently comprises three project development areas in the Celtic Sea identified by the Crown Estate, and a new clean energy Centre at Pembroke Port. This is accompanied by the Pembroke Dock marine programme (£60m) initiated in 2022 by MHPA and three marine energy companies/organisations to develop offshore wind, tidal, and wave energy in the Celtic Sea and Milford Haven Waterway. MHPA also conducted a skills gap study in the area for SWIC with recommendations on how to meet the gap between decarbonisation job opportunities and the current talent pool.

In addition, several decarbonisation projects have been announced by local energy companies. RWE launched the Pembroke Net Zero Centre in 2021 for the development of green and blue hydrogen production with carbon capture and shipping technologies in its Pembroke Power Station. Dragon LNG introduced several decarbonisation projects at its site. These included: a 9.9 MW solar farm completed in 2022 to provide up to 9% of its electricity demand; 3 wind turbines; and energy efficiency projects, for example warm water exchange with RWE. In 2023, H2 Energy initiated a 20 MW green hydrogen generation scheme at the Puma Energy site, due to be commissioned within 2 years. Furthermore, Wales and West Utilities has conducted the feasibility assessment in 2022 for the HyLine project, a major hydrogen pipeline project connecting Milford Haven and Port Talbot by repurposing an oil pipeline. HyLine is conducted in collaboration with port authorities and local industries in both places, Pembrokeshire County Council, and National Grid Gas Transmission. This project could potentially connect to, or be in addition to, National Grid's Project Union – a UK-wide hydrogen pipeline network – in the future. **Appendix 2** provides a more detailed overview of key industrial decarbonisation projects related to Milford Haven.

3. Place-based just transition framework and research evidence

This action plan is guided by the place-based just transition (PBJT) framework (Figure 1) that is designed to provide a collaborative approach for delivering a place-sensitive, socially fair transition in industrial clusters.

The framework integrates seven key themes developed from the insights of four IDRIC research projects. It starts with the recognition of industrial decarbonisation as an ongoing process, integral to the process of place-making and the pursuit of social, environmental, and economic justice for current and future generations. The framework core is formed of three justice-related themes. These integrate three interdependent dimensions of justice and six place elements (drawn from one of the partner projects[14]) and outline important steps to achieve a place-based just transition. The

[14] The "Net Zero Sense of Place Framework (Summary)", available at https://idric.org/resources/guidance-toolkit-net-zero-sense-of-place-framework/.

framework context is provided by three context themes, which link to broader social and political challenges. When properly addressed, these challenges become strengths to facilitate the delivery of a place-based just transition.

This section offers a contextualised reading of the framework and grounds the action recommendations with existing knowledge drawn from participants of local stakeholder workshops, supplemented with findings from our research carried out in Milford Haven.

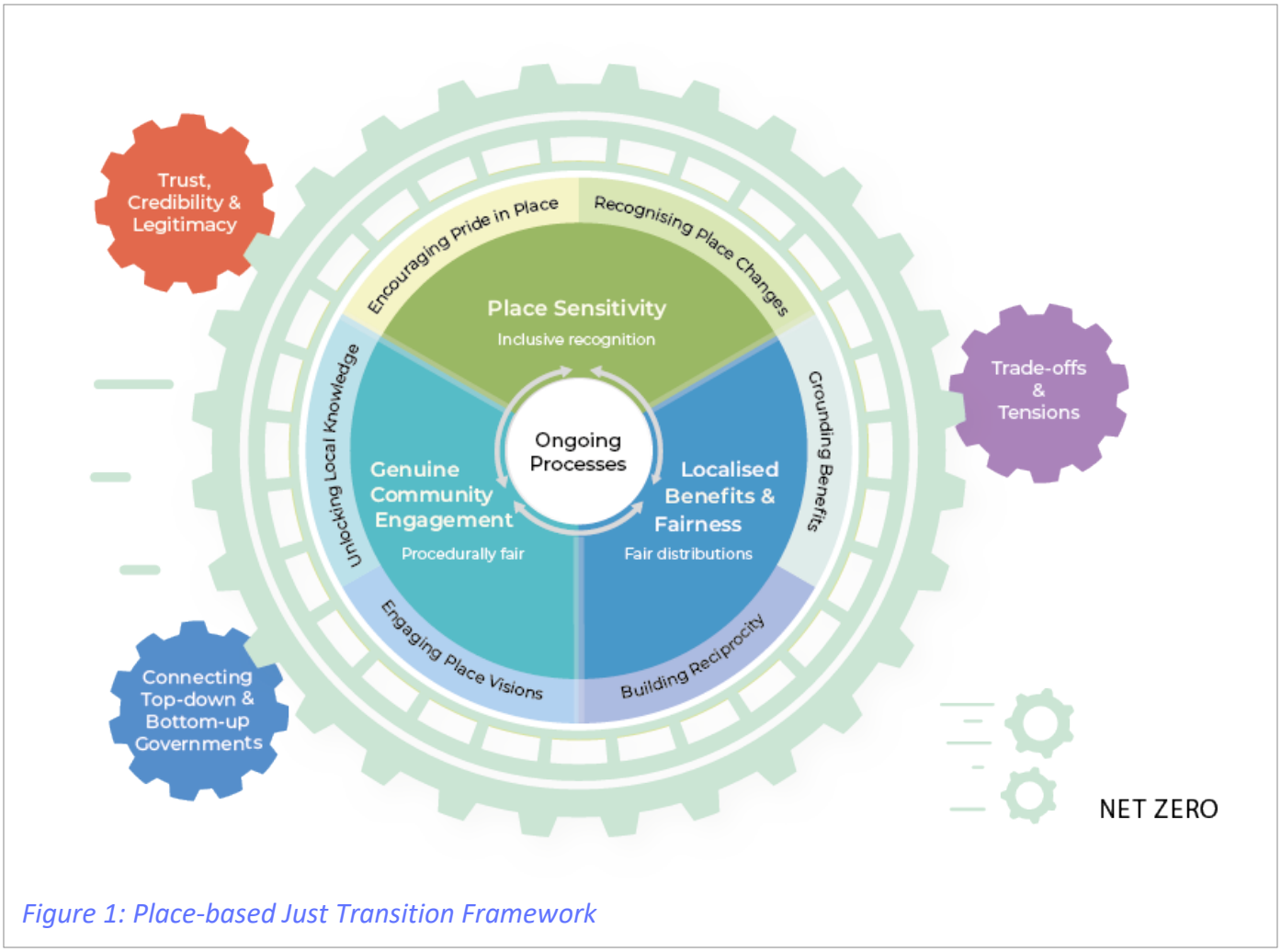


Figure 1: Place-based Just Transition Framework

Core theme: ongoing processes

(1) Ongoing processes: Technology deployment for industrial decarbonisation is an act of place-making that brings the needs and concerns of host communities and affected groups into view. Depending on the combination of social, economic, and political processes, low-carbon technology deployment and investments will uniquely impact the host communities through shifting, extending or defining features of –and connections to – a particular place.

Evidence from our research

Building and maintaining local trust in industrial decarbonisation stakeholders is an ongoing process incorporating the past, present, and future. In Milford Haven, decarbonising the existing fossil fuel-based industry and developing marine and onshore renewable energies and hydrogen production was seen by several community members and industrial stakeholders as a new stage of local industrial development. Some participants expressed hope and excitement about how this may

bring about a promising future. Other participants were more cautious about the decarbonisation claims and the implications for local development based on prior experiences and impacts of the LNG developments, and unfulfilled visions of Milford Haven in the past.

> *"There have been plans since when was Milford first established, they continue to be plans and promises and visions."* [Milford Haven resident]
>
> *"[Milford Haven] had the potential to be like Liverpool and it's still a little town."* [Milford Haven resident]

As such, workshop participants identified that learning from the past is important to obtain local confidence in the potential of the industrial decarbonisation projects to remake Milford Haven. Some participants reflected that ongoing engagement after the development of the LNG/LPG terminals would have been helpful, to receive updates on company activities. Concerns about negative impacts from industry (e.g. flaring, smells, explosion risks, impact on homes and transport during construction of the LNG terminals, and lack of local benefits arising from the projects) have also been transferred to future industrial decarbonisation development (e.g. concerns about hydrogen explosions and increasing competition for houses). Thus, lessons need to be drawn from local residents' experiences with previous industrial development to prevent industrial decarbonisation generating similar negative impacts. This can also help to mitigate negative perceptions that local residents may have towards industry and local government.

Core: 3 justice-related themes

(2) Place sensitivity: Deployment of industrial decarbonisation technologies involves fitting into – and reshaping – the social, built, and natural environment of a place, which in turn affects people's pride in place. It is important to recognise both historical and potential changes to a place, as new and existing industrial impacts on the landscape and on people's emotional bonds and experiences with the place will influence their perceptions of industrial decarbonisation. A place- sensitive approach is one that treats local residents as stakeholders in industrial decarbonisation and accounts for their concerns, connections to place, threats to local ways of life and livelihood, and visions of the future.

Evidence from our research

Visions of the future for Milford Haven and surrounding areas**:** *Participants would like a cleaner, safer, more vibrant town and surrounding area, with a thriving community spirit and connection to the natural environment (land and water) to support local community wellbeing. They would like to see the town and surrounding area become a green hub and have a circular economy, increasing wealth and positively contributing to the identity of - and pride in - the area. Participants envisaged some physical changes, such as seeing hydrogen vehicles, wind turbines in the distance, an absence of towers, oil refineries and gas storage tanks, alongside an increase in biodiversity, clean air and water, and green spaces.*

The sense of place expressed by local participants combines pride associated with Milford Haven's unique access to the natural environment, the historical industries, and importance of the location for the rest of Wales/UK, alongside a sense of disappointment and concerns about the town centre. The town was described as in decline from actual or threatened closures of shops and public facilities (e.g. the town hall, library, hospitals), little investment, and a general lack of progress in proposed development initiatives. For example, one resident reflected: *"they used to say that every day was a payday in Milford. There was a whole row of banks, and there are no banks left in the town… Main Street has just gone. It was a lovely town and it's just a wreck now, isn't it?"* Thus, there was a desire for the revitalisation of spaces that are important to residents. Residents who have returned to Milford for retirement have found a decreasing supply of public services and

infrastructure vital for the wellbeing of an aging population, which stands in contrast to the costs of revitalising the waterfront area aimed at tourists.
Participants raised questions about the contribution to local development from industry. While some acknowledged the economic importance of the oil and gas industry, others thought that most economic benefits have gone elsewhere, and the approximate number of local people employed by energy industries was not widely known. Several participants had clear memories of negative environmental impacts in the past (e.g. smells) and strong awareness of ongoing risks connected to energy industries. Even with current improvements in environmental regulation and performance, concerns over actual and potential industrial hazards remained. Some participants expressed concern that the detrimental effects of the oil and gas industry on the area's reputation for natural walking and beautiful rural scenery could pose challenges for the local tourist industry.

A 'just transition' in Milford Haven and surrounding area requires recognising the lived experiences and safety concerns of past (oil spills, water pollution) and current (flaring and air pollution) industrial activities. These experiences and concerns influence host communities' expectations of their future, such as the potential for hydrogen (H_2) explosions, and leaks from carbon capture and transportation infrastructures. Industry and cluster developers need to demonstrate that they have learnt from or will redress these negative impacts when deploying decarbonisation projects. Despite concerns, participants recognised the positive potential of Milford Haven having an identity as a green hub.

> *"…every time I used to come back on the train, I saw the big Gulf signs and the smell of sulphur, rotten eggs, that always reminds me of Milford."* [Milford Haven resident]
>
> *"I've grown up and the [oil and gas facilities] have just been there. You can see them, but I forget they're here sometimes."* [Milford Haven resident]

(3) Genuine community engagement: Community engagement is not one-way communication that focuses on messaging and educating residents. Rather, it is to create opportunities and space for mutual learning amongst stakeholders, and to include and respect local knowledge and diverse place visions held by host communities.

Evidence from our research

Genuine interest in learning about plans for industrial decarbonisation exists, but risks being dissipated, inefficient, and contributing to consultation fatigue if engagement is fragmented and short-term. Despite the close network among several energy companies in this area, leading industrial operators have different levels of commitment to industrial decarbonisation and have engaged in SWIC and with host communities to varying degrees. Most community participants were unaware of plans for industrial decarbonisation but were interested in learning about them, and most were unaware of energy company liaison officers and how to access funding and community programmes offered by energy companies. This suggests a lack of effective community liaison and engagement about plans for industrial decarbonisation thus far.

> *"Sometimes I think that consultations are a waste of time and money if you already have an idea that's approved and you're sitting with process."* [MH resident]
>
> *"I do wonder though if they take the view that locals are stupid and don't know what's good for them. They're the big boys with the money. They clearly know what's best for us."* [MH resident]

Several participants gave examples of feeling excluded from both decision making and benefits arising from industrial activities, e.g. insufficient information disclosure about planned industrial activities and impacts to the environment and host communities. In parallel, many participants

recounted frustrating experiences participating in previous consultation activities held by local authorities and the Port Authority, for example, "*they consult ad infinitum, but they take no notice*". The combination of the lack of tangible results or information from previous consultations and a feeling of little influence of over decision making contributes to the indifference that some residents have towards engagement activities and the 'consultation fatigue' observed by some industrial stakeholders. In contrast, many participants expressed appreciation of engagement with academic researchers through the research workshops, where they felt heard and treated "*like real people*".

Genuine community engagement is an investment in time, resource and community, and will be an ongoing process. Given the requirement to deliver social benefit from both industrial decarbonisation and the Celtic Freeport developments, there is a need for integrated engagement that combines the upcoming development plans. Appendix 3 contains an overview of principles for genuine engagement.

(4) Localised benefits & fairness: Specific measures are needed to translate the general benefits from industrial decarbonisation into tangible improvements in community wellbeing and a more reciprocal industry-community relationship, particularly in deprived areas. A holistic approach to industrial decarbonisation is required to consider how the costs of industrial decarbonisation are distributed across places (e.g. neighbourhoods, regions, and nations).

Evidence from our research

Visions of how ID can benefit Milford Haven: *Participants would like to see visible industrial investment in the communities, leading to localised benefits such as better public transport; better access to healthcare; better education for adults and children; and cheaper energy to reflect the unique position as an energy gateway. They would like to see increased wealth in the area, with increased opportunities to be involved in or access culture, the arts, and thoughtful debate.*

Despite some existing energy company charity activities and local employment, participants were unclear about the current level of social and economic impacts from industry, and uncertain about how the current workforce could access or benefit from a range of job promised by industrial decarbonisation.[15] This contrasted with some participants' memories of a more beneficial and integrated relationship with industry in previous decades. Some participants reflected that recent onshore wind energy projects consulted with the community and promised local benefits, but they have yet to see evidence of benefits. This reinforces the need for a rebalanced relationship between industry and the host community.

> *"… they [gas industry has] had a windfall over the last two years, and we, local people don't see any benefit from that at all."*
> [Milford Haven resident]
>
> *"A bit more supportive of the local community, put more money into things that matter to us."*
> [Milford Haven resident]

What host communities want and need:

- An improved and revived town centre with open shops and a town hall;
- Educational and training opportunities for youth and adults to enable them to access highly paid and skilled jobs;
- Opportunities to access culture, the arts, intellectual debate;
- Support for disabled and additional learning needs (ALN) children;

[15] Note: Research which explores the skills supply chain includes the IDRIC project and report on 'Enabling skills for the industrial decarbonisation supply chain' (available at: https://idric.org/resources/report-enabling-skills-for-the-industrial-decarbonisation-supply-chain/)

- Better access to healthcare services and local hospitals;
- Decarbonised, accessible, and affordable transport links, more active travel, hydrogen vehicles;
- Less pollution and a healthier environment;
- Removal of refineries and storage tanks;
- Secured energy supplies within UK, and cheaper energy for the local community;
- Forms of community owned energy which provide benefits to the local community.

What workers /unions want and need:

- Knowledge about timelines for training workers, supply chains, climate goals, etc.

Context: 3 context themes

(5) Trust, credibility & legitimacy: Trust is vital for public acceptance and support for the cluster approach and selected technologies. This involves demonstrating to the public the legitimacy as well as the technical and economic credibility of these proposed solutions and visions. Host communities' levels of trust in industrial decarbonisation proposals and claimed benefits are influenced by past and existing relationships with industry and need to be constantly maintained.

Evidence from our research

The planned development projects have a mandate to build trust and prosperity. Participants felt that trust was lacking in both government and industry. This was compounded by a distrust of local authority, which was perceived to be a greater distance away from the local community compared to the past, as well as a perceived secretiveness from industry, which has led to a sense that industry has something to hide. Some participants felt that relationships between the port and local community in Pembroke Dock required improvement.

> *"They hide a lot of information with posh words."*
> [Milford Haven resident]

(6) Connecting top-down & bottom-up governments: Each industrial cluster requires an innovative governance structure that accommodates the existing political structure and resources in the place/region/nation, while being flexible enough to attend to the dynamic expansion of industrial decarbonisation projects that often span political boundaries. This requires a multi-level collaboration that recognises that local industrial decarbonisation activities can inform and are influenced by national decision-making and are conditioned by international factors.

Evidence from our research

Participants would like clarity on what the uncertainty of shifting UK government support for net zero means for Milford Haven and industrial decarbonisation plans. Town and county councillors could help increase accessibility and advocacy for residents concerning industrial decarbonisation, as they are an existing point of contact with residents, understand the local community, and can represent the local community to industry. Meaningful engagement and forums for collaboration could be integrated into key initiatives such as the Milford Haven Waterway Future Energy Cluster, and Celtic Freeport. Participants emphasised the need to devolve the Crown Estate in Wales and highlighted the importance of developing social benefits from infrastructure development.

(7) Trade-offs & tensions: The process of industrial decarbonisation is accompanied by various trade-offs and tensions resulting from the competition between different technologies, places, priorities, and worldviews. The point is not to build consensus among all stakeholders, but to recognise and respect their differences and to take the diversity as a strength (e.g. an opportunity to develop mutual understanding) to make industrial decarbonisation more resilient and inclusive.

Evidence from our research

The following trade-offs and tensions were identified in the research workshops:

- Localised benefits: Industries minimising costs and maximising profits is in tension with sharing value with host communities.
- How to meet the cost of investing in jobs and skills training in advance of the jobs being available?
- Engagement: Industry wants to minimise risk, controversy, and negative attention, which is in tension with the community's need for information and opportunity for informed discussion and debate. The perception of consultation fatigue is partly due to tokenistic consultation activities in the past.
- Engagement costs money and is insufficiently funded, which is in tension with distributing benefits to needs identified by local communities.
- How to distribute benefits fairly between different host communities within and surrounding Milford Haven, Pembroke Dock, and broader Pembrokeshire.
- Some participants and local government councillors reflected on a tension between addressing competing priorities, such as the need to devote time and funding to addressing pressing social care issues, or net zero and industrial decarbonisation. This is exacerbated by recent UK government announcements.[16]

4. Action recommendations

With these local context and challenges for a just transition in mind, this section introduces several action recommendations suggested by participants of the local stakeholder workshop and informed by our broader research findings. Some of the recommendations (and challenges they aim to address) were also raised by participants in other research sites. This suggests that they are, in part, shaped by broader socio-economic factors and decision making at the UK level and common to other industrial clusters.

We acknowledge that the cluster plans are influenced by national government policy decisions, commitments to net zero, and other priorities, particularly in advance of an expected general election in 2024. Parallel to the production of local action plans, we have produced recommendations for UK government policy which highlight the importance of allocating more resources to increase the capacity for engagement by government at host community and cluster levels. The Policy Brief is available at our project webpage along with the PBJT framework and the action plans.[17]

The full list of recommendations for Milford Haven is below, organised by sectors.

General recommendations for industry and government stakeholders

Place sensitivity

- Develop a place-sensitive approach to industrial decarbonisation, that is grounded in the lived experiences of host communities such as Milford Haven.
- A place-sensitive approach treats local residents of host communities as stakeholders in industrial decarbonisation, and takes account of their concerns, connections to the place, perceived threats to local ways of life and livelihoods, and visions of the future.

[16] Prime Minister's speech on Net Zero: 20 September 2023 available from: https://www.gov.uk/government/speeches/pm-speech-on-net-zero-20-september-2023

[17] See https://idric.org/project/ia-3-1-delivering-a-place-based-just-transition-in-industrial-clusters/

Engagement [underpinned by the Principles for Genuine Engagement, see Appendix 3]

- **Undertake sustained and genuine engagement with stakeholders and host communities**. Engagement opportunities need to include and be accessible to the different communities and sectors within and between Milford Haven, Pembroke Dock, and the surrounding villages and areas. Suggested channels for engagement include creating a dedicated website focused on Plain English content around industrial decarbonisation that shows the impacts as well as opportunities for host communities; advertising via community-wide Facebook groups; engaging with the youth via schools and projects such as Milford Youth Matters; and engaging alongside actions related to local benefits, such as through diverse jobs and skills training. Methods could include inviting representative samples of the local community to be involved in planning and decision making, such as 'collaboration forums' and residents' panels.
- To rebuild trust between host communities, industries, and local government, we recommend developing long lasting relationships using timely, clear communications designed to reach multiple audiences.
- Hold regular public meetings and a variety of engagement opportunities about industrial decarbonisation to enable:
  a) Publics to ask questions and get answers concerning issues such as details of industrial decarbonisation plans, risks, and operations;
  b) Provide more balanced information about industrial decarbonisation (e.g. addressing known concerns and risks, justifying the industrial decarbonisation approach, and being honest about negative aspects of or uncertainties about proposed plans);
  c) Involve local experts and specialists (e.g. geologists) to explain plans and initiatives to their fellow residents in clear terms;
  d) Acknowledge existing trade-offs and tensions at a local level and provide opportunities to address these tensions, e.g. through carefully facilitated forums for learning, knowledge exchange and deliberation.
- **Partner with Universities** to inform the design, delivery, and evaluation of engagement.
- **Be accountable and build capacity of host communities to contribute to consultations:** demonstrate how local participants have contributed to consultations, motivate, and value participation (and budget for it), and build a culture of involvement with host communities.
- **Create a Milford Haven Engagement, Education and Communication Hub and/or visitor centre** to learn about industrial decarbonisation and green technology deployment, serving as a 'one stop shop' for a range of formal and informal engagements about existing and planned local industrial activities including industrial decarbonisation. This could ideally be located in the town centre, and include engagement with young people aimed at developing an interest in innovative approaches to decarbonisation industries and technologies.
- **Develop an identity as a national green hub** with a good track record of environmental health and safety with less risk and more benefit from clean environmental goods.

Localised benefits and fairness

- Consider providing additional funding initiatives for community projects, similar to the MHPA's Community Fund and Green Energy Fund.[18] Ensure that funds are visible, accessible, inclusive, and impactful to host communities.
- Evaluate community benefit fund delivery and outcomes to ensure they are fit for purpose.
- Provide clarity about how industrial decarbonisation and industry contributes to a circular economy at the local level.

[18] For information about Port of Milford Haven's Community Fund, see https://www.mhpa.co.uk/resource-library/community-fund-application-form/. For information about Green Energy Fund, see https://www.mhpa.co.uk/latest-news-and-blog/port-of-milford-haven-launches-green-energy-fund/.

- Ground local benefits within technology deployment plans, via long-term planning for employment and skills. Clarify how the local workforce could access and benefit from promised industrial decarbonisation jobs, identify and address skills gaps to enable the local workforce to benefit from promised industrial decarbonisation jobs, and provide timelines for training and supply chain planning. Engage with young people to develop interest in innovative approaches to decarbonising industry and technologies.

Recommendations for local government

Localised benefits and fairness

- Explore mechanisms to channel funding to address locally determined needs, e.g. retaining business rates, infrastructure levy.[19] This could include exploring the application of approaches in other areas, e.g. Shetland Community Benefit Fund.[20]
- Instigate a new County Council post: Local Champion for new energy industry. This new post could be an accessible contact point for the community and industry in the County Council (and/or relevant local councils); advocate for host community benefits; liaise between host community and relevant industry and industrial decarbonisation cluster bodies. Additional roles could involve ensuring synergies with non-energy local issues or initiatives and identifying opportunities to leverage additional resources for host communities or combine funds for greater added value.

Connecting levels of government

- **Parish, town, and county councils**: Improve local governance for industrial decarbonisation by ensuring parish/town/county councillors act as point of visible contact and advocacy for residents about ID.

Recommendation for Milford Haven Waterway Future Energy Cluster developers

Engagement

- Consider how sustained and genuine stakeholder and community engagement opportunities could be integrated across industrial decarbonisation and Celtic Freeport initiatives.

Connecting levels of government

- Devise appropriate governance structures to coordinate joined up engagement and consultation activities, and embed these within existing initiatives such as the Milford Haven Waterway Future Energy Cluster and the Celtic Freeport.

Recommendations for Milford Haven Port Authority

Localised benefits and fairness

- Provide more transparency regarding how much economic benefit is being generated from industrial decarbonisation, and what proportion of this goes back into the host community.

Recommendations for The Crown Estate:

Connecting levels of government

- Increase community visibility of and trust in The Crown Estate in Milford Haven.
- Consider devolving The Crown Estate to Wales, with similar arrangements to Crown Estate Scotland regarding grounding local benefits.[21]

[19] Currently under consultation. See the UK Government webpage 'Technical consultation on the Infrastructure Levy', available at https://www.gov.uk/government/consultations/technical-consultation-on-the-infrastructure-levy.
[20] See https://scbf.org.uk/.
[21] See https://www.crownestatescotland.com/.

5. Conclusion and next steps

This guidance for action provides preliminary suggestions on what a place-based just transition in Milford Haven - and surrounding areas - could look like and how it can be delivered. It should be taken as a beginning point of the ongoing endeavour to deliver a place-based just transition in Milford Haven and surrounding areas. These recommendations need to be communicated with and agreed upon by a wider base of people who will be involved in or affected by the process of industrial decarbonisation. We recognise that some recommendations may require further clarification and discussion with stakeholders before becoming concrete steps, and that an entity or organisation needs to have ownership and oversight for implementing and reporting on these recommendations.

We recognise that more participatory and extensive consultation can increase costs, extend deployment project timescales in the short term, and necessitate the involvement and coordination of many organisations. However, failing to address residents' concerns risks perpetuating negative relationships with industry and government, which could lead to: backlash and delayed implementation of industrial cluster plans; not achieving decarbonisation aims; and further backlash against other net zero plans that are not perceived as just or fair. Thus, the potential benefits of this place-based social investment in engagement and action for industrial decarbonisation could lead to increased perceptions of justice and fairness, a social licence and increasing trust in – and accountability of - industry and government, which could ultimately contribute to a smoother transition to net zero and realisation of policy goals. This approach could be of benefit to future industry and government developments in the area.

Additionally, while the PBJT framework successfully captured a range of opinions from participants of diverse age and genders in the four partner projects, we recommend that further data generation is conducted by governments and cluster developers with a more extensive methodological approach and a longer timeframe. For example, this could include surveys with representative samples of local residents, local businesses, and workers.

Special acknowledgements:
The research team would like to thank everyone who contributed to the workshops and interviews that this plan builds on, and those who commented on earlier drafts of this plan.

The authors gratefully acknowledge the academic input from the other team members of the 'Delivering a Place-based Just Transition in Industrial Clusters' project: Diarmaid Clery and Sarah Mander (University of Manchester); Imogen Rattle and Peter Taylor (University of Leeds); and thanks to Shihmei Lee for the visual design of the PBJT framework figure.

Appendix 1: Links to background information, reports and further outputs from the research projects

Information and other outputs of this impact accelerator project

- 'Delivering a Place-based Just Transition in Industrial Clusters' project. IA3.1 https://idric.org/project/ia-3-1-delivering-a-place-based-just-transition-in-industrial-clusters/

Info & outputs of 4 partner projects

- 'Net Zero Sense of Place' project MIP3.4 https://idric.org/project/mip-3-4/
- 'Just Transitions for Industrial Decarbonisation in the UK' project MIP2.4 https://idric.org/project/mip-2-4/
- 'Protective Space and Social Licence to Operate Industrial Decarbonisation' project MIP6.5 https://idric.org/project/mip-6-5/
- 'Learning from International Experience in Decarbonising Industrial Clusters' project MIP9.1 https://idric.org/project/mip-9-1/

Appendix 2: Overview of key industrial decarbonisation projects related to Milford Haven **(updated to 31/10/2023)**

Projects/plans	Location	Timeline	Description	Status

South Wales Industrial Cluster (SWIC)	Industrial areas in South Wales
	
	(Newport, Cardiff, Barry, Port Talbot, Milford Haven)
		Cluster plan:
		Phase 1 (04-07/2020) & Phase 2 (02/2021-03/2023)
		Deployment:
		Phase 1 (04-07/2020) & Phase 2 (03/2021-03/2024)
			• Led and run by Industry coalition, involving more than 30 partners from industry, public bodies, and academia.
			• Supported by Welsh Government
			• Second phase investment (public + industry)
			  ○ Cluster plan: £2.2m in total (around £1.5m ISCF)
			  ○ Deployment project: £37.6m in total (£20m ISCF + £17.6m Industry match finding)
			• Involving 35 deployment projects, with an aim to have 1+ project completed by 2025.
			• Focus of Phase 2: feasibility and engineering design studies for financial investment decisions, including identifying
			  ○ H2 production and use
			  ○ CCUS
			  ○ Transport and utilities networks to enable the above
			  ○ Changing Industrial Processes
				Cluster plan finished. Deployment ongoing

Milford Haven Waterway: Future Energy Cluster	Milford Haven waterway & Celtic Sea	Ongoing collaboration. Stated milestones are 20% of UK Gov low carbon hydrogen production target by 2030. And at least 10% of UK Gov FLOW target by 2030.	• A coalition of energy companies, renewable developers, green technology innovators, Pembrokeshire County Council and the Port of Milford Haven (i.e. SWIC, RWE, Dragon LNG, Valero, Blue Gem Wind, Cambrian Offshore, DP Energy, ERM, Marine Energy Wales, Prosperity Energy, Catapult Offshore Renewable Energy) • Contents (selection)	Ongoing

			○ Expanding South Wales' grid capacity by 10GW by 2030 ○ Back a South Wales Green Freeport bid ○ Back a South Wales FLOW (floating offshore wind) infrastructure bid and de-risk development ○ Hydrogen production (blue & green) ○ CCS and CO2 shipping ○ Alternative fuels ○ Back a Skills Accelerator programme & a Supply Chain Accelerator programme	
FLOW – Celtic Sea Floating Offshore Wind	Celtic Sea	400MW by 2030 Additional 4.5 GW by 2035	• The Crown Estate in charge of identifying project development areas and leasing programme. • MHPA submitted a £multi-million funding application to the UK Government's FLOWMIS (Floating Offshore Wind Manufacturing Investment Scheme) initiative to expand Pembroke Port • An initial target of 1GW • The development of a new clean energy centre at Pembroke Port, delivered by the Pembroke Dock Marine.	- 3 Project Development Areas (PDAs) were outlined in Sep 2023 (up to 4.5 GW) - Development Areas has been undertaken simultaneously with the plan-level Habitats Regulations Assessment - 1st contract in technical and environmental surveys awarded in Dec 2022 & 2nd set surveys in Sep 2023 - MHPA submitted to the UK Government's FLOWMIS initiative in Oct 2023.
Pembroke Dock marine	Celtic Sea, Milford Haven Waterway	08/2022-	• A £60m development, funded by Swansea Bay City Deal, the European Regional Development Fund, and private investment. • A collaboration between the Port of Milford Haven, Marine Energy Wales, ORE Catapult, and Celtic Sea Power • Offshore wind, tidal, and wave energy	Business case approved by the UK Government and Welsh Government. -Enlarged slipway and workboat pontoons to be completed in late 2023

			• 4 elements
			  ○ Pembroke Port developments delivered by Port of Milford Haven
			  ○ Marine Energy Test Area (META) project delivered by Marine Energy Wales
			  ○ Marine Energy Engineering Centre of Excellence (MEECE) delivered by ORE Catapult
			  ○ Pembrokeshire Demonstration Zone (PDZ) delivered by Celtic Sea Power
				-New office and workshops facilities are coming online in 2023

Pembroke Net Zero centre (RWE)	Pembroke Power Station	• Blue H2 production and CCS in Pembroke Power Station. • CO2 shipping from Haven by 2030 • Green Hydrogen Production: construction begin in 2025 with completion late 2026/ early 2027 (ideal scenario) • Floating offshore wind	3 pillars: • Pembroke Power Station including Carbon capture and storage (shipping): 2.2 GW Up to 2.2 GW of decarbonised, 5 Mt/year of CO_2 capture. • Green Hydrogen Production: initial 100-300 MW 'pathfinder' electrolyser on the Pembroke site + GW-scale opportunities • Floating offshore wind development in Celtic Sea	• CCS in Pembroke Power Station: progressing early development work and preparing information. • Green hydrogen project: - Completion of a feasibility study in April 2022 and that of further engineering and supporting studies for planning and permitting and developing the procurement strategy. - Aim to submit planning and permitting applications in early 2024. - Will apply for financial support from the UK Government
Dragon LNG's decarbonisation projects	Dragon LNG site	2022-	• Solar farms: 14.67 hectare, 18,500 ground solar panel park (9.9MW) to provide up to 9% of its electricity needs. • 3 wind turbines next to the Wear Point Wind Farm	• Solar farm went life in Q4 2022 • Wind turbines: public consultation events in May 2022, January 2023 and an

			• Energy efficiency projects (e.g. warm water exchange with RWE)	online community consultation in May 2022
H2 Energy's green hydrogen fuel generation scheme	Puma Energy site	2023-2027	• 20MW electrolyser in development. • A 20 MW hydrogen fuel generation scheme to generate 5 tonnes of hydrogen a day, using electricity generate on site and wind energy from UK.	Active project - Shortlisted for funding under the UK governments' Net Zero Hydrogen Fund (Round 2022) - Submitted planning application to PCC in 2023 - Expected to be commissioned within 2 years
HyLine- hydrogen pipeline	Between Milford Haven and Port Talbot		• Led by Wales and West Utilities in collaboration with ABP, Dolphyn Celtic Sea Development, LanzaTech, National Grid Gas Transmission, PCC, RWE, Shell, Tata Steel UK. • A major hydrogen pipeline in south Wales, to accelerate decarbonisation plans for industry and gas customers in the region. • Repurpose an oil pipeline linking from Milford Haven to Port Talbot • Can connect to National Grid's Project Union	Feasibility assessment in July 2022
Haven Skills Gap Study Report			• Conducted by Milford Haven Port Authority for SWIC	

Information sources for key decarbonisation projects:

SWIC
https://www.swic.cymru/
Milford Haven Waterway: Future Energy Cluster
https://www.mhpa.co.uk/media/fyilv1u3/milford-haven-waterway-future-energy-cluster.pdf
https://www.mhpa.co.uk/latest-news-and-blog/uk-s-energy-capital-maps-out-low-carbon-vision-in-wales/
FLOW
https://www.thecrownestate.co.uk/en-gb/what-we-do/on-the-seabed/floating-offshore-wind/
https://www.westerntelegraph.co.uk/news/23873346.port-milford-submits-funding-floating-offshore-wind/
https://www.mhpa.co.uk/about/our-vision-for-the-waterway/

Pembroke Dock Marine
https://www.swanseabaycitydeal.wales/projects/pembroke-dock-marine/
https://www.mhpa.co.uk/our-services/pembroke-dock-marine/
https://www.ccatproject.eu/green-light-for-60-million-pembrokeshire-marine-energy-project/
Marine Energy Test Area (META)
https://www.pembrokeshirecoastalforum.org.uk/projects/meta/
RWE
https://uk.rwe.com/rwe-generation-uk/rwes-carbon-capture-projects/
https://uk.rwe.com/innovation/hydrogen/
https://uk.rwe.com/innovation/pembroke-net-zero-centre-pnzc/
Dragon LNG
https://www.dragonlng.co.uk/general/ground-broken-at-dragon-lng-marks-another-step-in-its-energy-efficiency-and-decarbonisation-plan
https://www.solarpowerportal.co.uk/dragon_lng_partners_with_anesco_on_renewables_drive_with_first_solar_asset/
https://www.dragonenergypark.co.uk/
H2's green hydrogen scheme
https://www.herald.wales/west-wales/pembrokeshire/major-hydrogen-fuel-scheme-could-be-up-and-running-in-milford-haven-in-2025/
HyLine
https://www.wwutilities.co.uk/news-and-blog/major-hydrogen-pipeline-planned-to-decarbonise-welsh-industry/
Haven skills Gap Study Report (Deliverable 19)
https://www.swic.cymru/publicreports

Appendix 3: Principles for genuine engagement with ID

These principles are drawn from the combined insights of the research projects, and informed by existing research and practice.

Genuine engagement with ID is:

- **Systematic, timely, and ongoing**. Engagement activities provide opportunities to learn and feedback about cluster plans and individual deployment projects. Proposed development timescales should be provided, together with an explanation that ID plans are subject to policy change and funding availability. Where feasible, engagement about ID could be integrated with engagement about wider locally relevant developments, such as Freeports.
- **Two-way.** Engagement activities enable mutual learning between cluster stakeholders through: providing information about ID and deployment projects alongside opportunities to enable resident stakeholders to deliberate about technically complex issues; and providing opportunities for host communities to determine their own needs and for industry/government stakeholders to receive feedback from residents and learn about local knowledge and perceptions of ID. This mutual learning can be used to design ID in ways that take local needs and concerns into consideration.[22]
- **Transparent and accountable.** Engagement activities provide transparency concerning: the rationales, progress, and current status of the cluster plans and technology projects; and clarification regarding which organisation is responsible and accountable for deployment projects, alongside the timeframes locations, and formats of engagement. Accountability is provided through demonstrating how feedback from engagement and consultation exercises has been used and acted on, or reasons provided to explain why feedback was not acted on.[23]
- **Accessible and inclusive.** Engagement activities should be proactive to enable opportunities for online and in-person participation that is accessible to people with different levels of understanding of ID and from a variety of backgrounds; enables people to participate at different times of day, evening or weekend, in a variety of locations; and offers recompense for in-depth engagement and consultation exercises to recognise and value participants' time.
- **Balanced, independent, and addresses concerns.** Engagement should address known and emerging concerns and risks about ID approach and technologies, and provide balanced information independent from specific project planning processes, with a range of perspectives from academia, civil society, and industry.
- **Open to diverse channels of receiving feedback.** Consider how to receive feedback from a variety of publics, through formal (e.g. public meetings organised by cluster stakeholders) and informal channels (e.g. feedback from critics). Individuals and groups who may be opposed to/critical of ID approaches, technologies or deployment projects, will have their reasons. These reasons contain information about needs that are not being met, which include the need for: balanced information; better regulatory structures; increased trust in government and industry; information about alternative pathways to reach net zero (e.g. energy efficiency projects) and how ID relates to wider action on net zero. Whilst a variety of stakeholders had concerns about technologies and approaches to ID, the intensity of their concern (or opposition) varied according to their trust in government and industry.[24]

[22] In this case, 'two-way' is used to describe engagement that lies between consultation controlled by cluster stakeholders, and dialogue with equal status held by cluster stakeholders, residents, and other participants, which can help shape cluster visions and narratives. See Rowe and Frewer 2005, as cited in Soutar, I., Devine-Wright, P., Rohse, M., Walker, C., Gooding, L., Devine-Wright, H. and Kay, I., 2022. Constructing practices of engagement with users and communities: Comparing emergent state-led smart local energy systems. *Energy Policy*, *171*, p.113279.

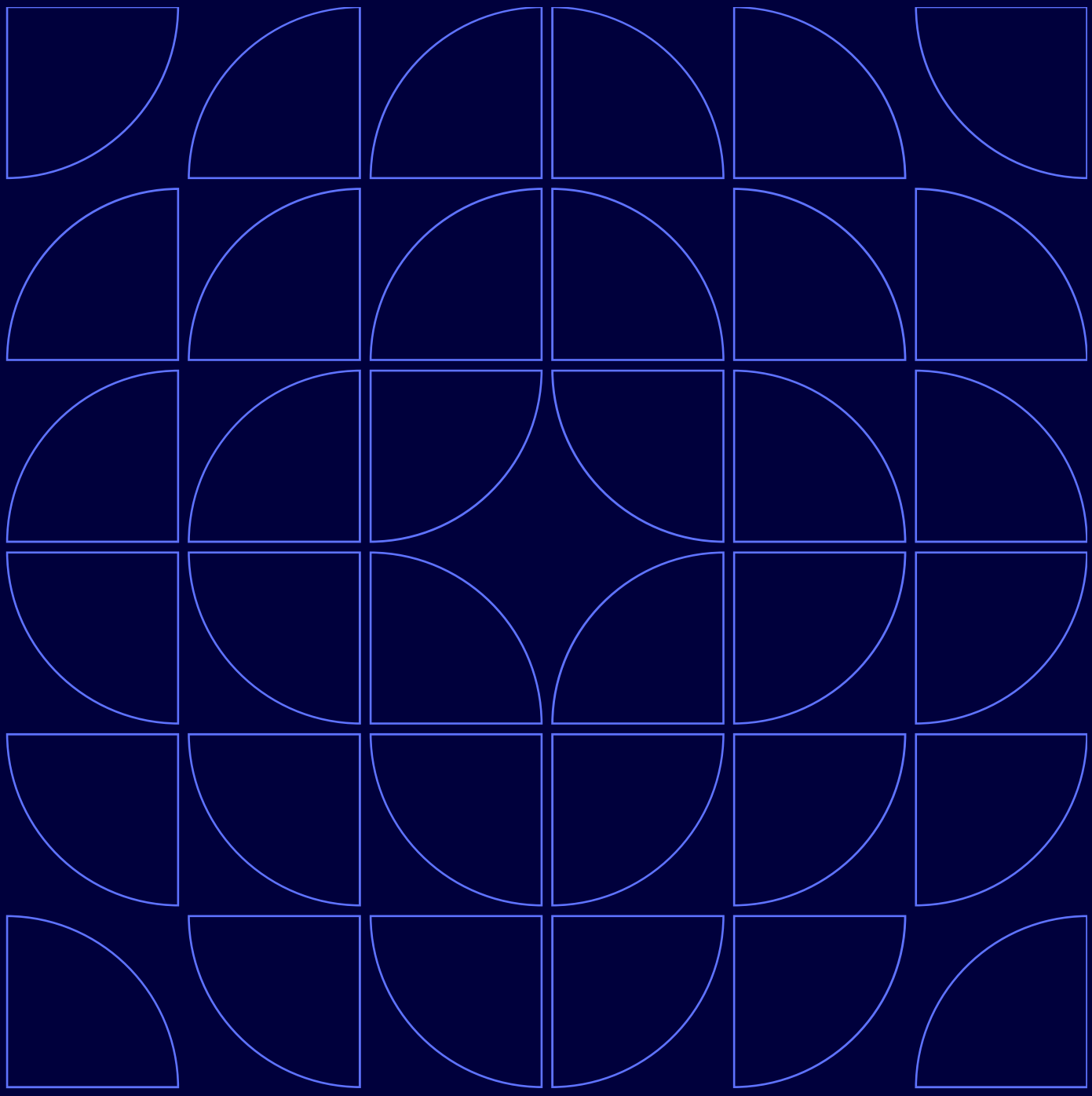
[23] This suggestion aligns with the 'Consult' aspect of the International Association for Public Participation's 'Spectrum of Public Participation', available at: https://iap2.org.au/wp-content/uploads/2020/01/2018_IAP2_Spectrum.pdf

[24] See NZSoP Report: How does the sense of place of host communities shape people's views on Net Zero industrial clusters? Available from: https://idric.org/resources/report-how-does-the-sense-of-place-of-host-communities-shape-peoples-views-on-net-zero-industrial-clusters/ .

IDRIC

UK Research and Innovation

This work was supported by the UKRI ISCF Industrial Challenge, through the UK Industrial Decarbonisation Research and Innovation Centre (IDRIC) award number: EP/V027050/1, under the Industrial Decarbonisation Challenge (IDC)

This report is an output from IDRIC Impact Accelerator project IA3.1 Delivering a Place-based Just Transition in Industrial Clusters.

Find out more at idric.org