West of England
Local Industrial
Decarbonisation Plan

West of England Industrial Cluster

Local Industrial Decarbonisation Plan

Acknowledgements

The West of England Industrial Cluster's Local Industrial Decarbonisation Plan is funded through the Local Industrial Decarbonisation Plans competition, a UK Government Department for Energy Security and Net Zero initiative delivered by Innovate UK, part of UK Research and Innovation (UKRI). It has been co-created by its Partner organisations, which include businesses, social enterprises, industry bodies, combined and local authorities and universities active in the West of England and, specifically, the Portbury, Avonmouth and Severnside region.

It has been informed and enabled by Cluster supporters; public, private, non-profit and community organisations across industries, sectors and disciplines.

Funded by UK Government

UKRI Innovate UK

Moving forward

The Plan is based on work funded by UKRI and undertaken over 12 months between March 2024 and February 2025. It is intended to be a platform for future collaboration: a baseline strategy to be enhanced, expanded, updated and modified over future years to reflect the best available data and up to date circumstances.

We welcome the ongoing input and support of the many current and future stakeholders in our region with an interest and expertise in industrial decarbonisation.

Core partners

West of England Combined Authority

Hydrogen South West

UWE Bristol

Black Country Industrial Cluster

7 CO_2

SevernNet Business & Community Together

copper

North Somerset Council

Bristol City Council

AMERESCO

South Gloucestershire Council Delivering for you

THE BRISTOL PORT COMPANY

Foreword

The West of England has always been a place of industry, innovation, and ambition. From our rich maritime heritage to our leading role in the modern green economy, we have long been a region that embraces change and drives progress. Today, we stand at the forefront of one of the most pressing challenges of our time: decarbonising industry to create a cleaner, more sustainable future while ensuring economic prosperity for our businesses and communities. The West of England Industrial Cluster Local Industrial Decarbonisation Plan (LIDP) is a testament to our collective ambition. It reflects a year of collaboration, research, and engagement with industry leaders, local authorities, academia, and community stakeholders. This plan sets out a practical, evidence-based pathway to achieving net zero emissions by 2040 across our region's industrial heartlands, with the Portbury, Avonmouth, and Severnside (PAS) area at its core. Our approach is built on partnership and innovation. We are bringing together businesses of all sizes, from global enterprises to local SMEs, to explore cutting-edge decarbonisation solutions — ranging from hydrogen and carbon capture to renewable energy and circular economy initiatives. By working together, we can share infrastructure, reduce costs, and accelerate the adoption of low-carbon technologies in a way that is both economically viable and environmentally responsible.

This plan is about more than just reducing carbon emissions. It is a blueprint for industrial growth, job creation, and economic resilience. Delivering this plan has the potential to unlock £3.5bn in economic value and create over 15,000 jobs — ensuring that the West of England remains a thriving hub for industry, innovation, and clean growth.

As we embark on this journey, we acknowledge that the path ahead is complex, and the challenges are significant. But our region has always thrived by being bold, forward-thinking, and collaborative. With the right support from government, industry, and investors, the West of England can set a national and international example of how to deliver industrial decarbonisation in a way that strengthens both the economy and the environment. This is a defining moment for our region. By embracing this plan and working together, we can build a cleaner, greener, and more prosperous future for generations to come.

Nick Hibberd,
CEO of Bristol City Council and Chair of the West of England Severn Estuary Growth Zone.

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Executive Summary

This West of England Industrial Decarbonisation Plan is an enabler for decarbonisation and economic growth. We estimate that delivery **between now and 2040** could contribute **c.£3.5bn to GVA** and **create over 15,000 jobs**.

Our Cluster is unique in its breadth and diversity. It brings together leading public, private and third sector expertise in industry and across multiple technologies. It connects nationally significant projects and partnerships with local, place-based initiatives and goals. From resource and energy efficiency and the circular economy, to renewable energy, hydrogen and alternative fuels, carbon capture and shipping, and nature-based solutions, our Cluster has the potential to be a beacon for decarbonisation, public-private partnerships and sustainable industrial growth across the UK.

Bristol and the West of England's historic role at the centre of national and global trade routes, means that our plan is uniquely framed around a hub and spoke model. The industrial area of Portbury, Avonmouth and Severnside (PAS) is the hub, at the centre of spokes across the West of England and stretching as far afield as Rugby, the Midlands and South Wales. The Port of Bristol is at the centre of this Hub.

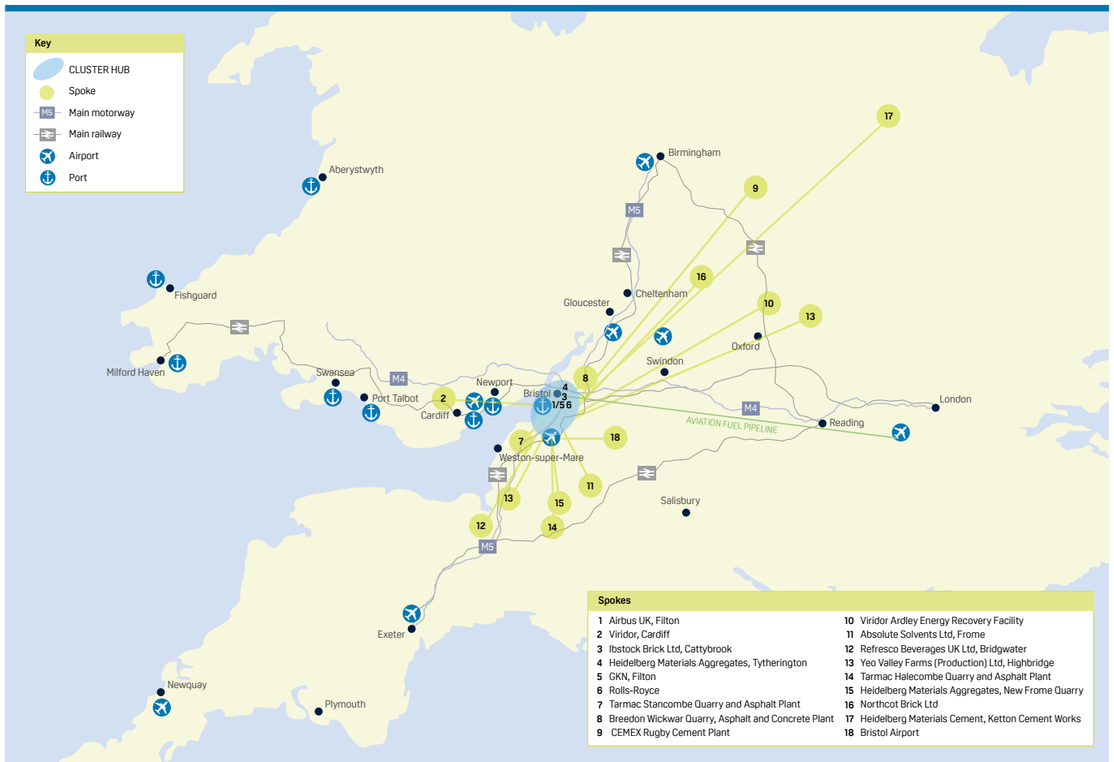


Figure 1: West of England Industrial Cluster – Hub and Spoke Model.

At its heart, our Local Industrial Decarbonisation Plan is a platform for collaboration and growth. By working together, we can enable the cost-effective development of shared infrastructure, de-risk the adoption of low carbon solutions and accelerate circular economy practices. We can contribute to national emissions' reduction targets, while expanding our region's status as an attractive and competitive place for large and small industry to do business.

Across our Hub and Spokes, which represent emissions of up to 7 million tonnes of CO_2 p.a., Net Zero by 2040 is technically possible. Achieving this will require a full range of industrial decarbonisation interventions at every scale, from individual company and community-led nature-based initiatives through to nationally-significant infrastructure projects. These initiatives will include carbon capture and transport; clean power; energy and resource efficiency and circular economy programmes; generating, supplying and switching to alternative fuels; development of clean growth hubs, and support for nature-based solutions. All of these will need to be carried out in a way that supports a just transition to net zero, retains the support of, and creates opportunities for, local communities, and respects the internationally-significant natural environment of our region.

The projects, partnerships and programmes highlighted in our plan reflect groundbreaking efforts by industry, developers, academia and communities to take the first steps towards this. They demonstrate the enormous potential of our region.

Many of the projects outlined in this plan cover multiple categories of intervention, which is one of the distinctive characteristics of our Cluster. The table below highlights six of the larger projects, with a more complete pipeline included as appendix IV and one page summaries of these major projects included in section 3.

'Estimated investment' in the table below represents amounts that may come directly or indirectly from a combination of private and public sources.

Reference	Project	Estimated investment	Operational	Lead partner/supporters
P1	Severnside Carbon Capture and Shipping Hub	Up to £200m at the Hub, enabling up to £1.6bn investment at emitting sites and across supply chains	2030-2035	7CO_2 and partners
P2	Bristol City Leap (for industry)	£65m (clean power) plus industry and supply chain investment in REEE, heat and EV charging	2025-2030	Ameresco
P3	Bristol Offshore Wind Terminal	£400m enabling investment across supply chains	2030	The Bristol Port Company
P4	Decentralised hydrogen production and infrastructure	£140m+	2027-2040	Wales and West Utilities, Hydrogen South West and individual project partners
P5	Local Efuel Production	Up to £1bn across hydrogen and e-fuel production and distribution, subject to final scale	2035	7CO_2 and strategic partners
P6	Clean Growth Hub	£200m across co-located technology, low carbon solutions and industrial development	2027-2030	Bristol City Council, CR Plus and developer partners

The expansion of the Vattenfall heat network to the industrial hub and further exploring links with SevernEdge Small Modular Reactor (SMR) and data centre development are also important priorities.

A wealth of investment is already being undertaken by industry and developers across the region in, for example: industry trials of hydrogen produced on site; hydrogen refuelling stations; bio-fuel production and distribution; low carbon plant and machinery development and acquisitions; smaller scale carbon capture and use; waste pyrolysis; nuclear and renewable power generation. Our region's existing technical and economic excellence means we are also home to a range of start-ups, spin outs and technology innovators.

The LIDP project funding has created the opportunity to bring all these initiatives and partners together. It has catalysed planning and development of multiple projects and wider private sector and community engagement as well as immediate public sector bridging funding for ongoing co-ordination.

Our project pipeline is supported by a small number of priority programmes, focussed on the circular economy, the development of clean growth hubs and nature-based solutions.

'Estimated cost' in the table below represents annual funding required to continue, grow and co-ordinate our programmes.

Reference	Initiative	Estimated cost per annum	First step	Lead partner
R1	Circular Economy Programme, Hub and Centre of Excellence	£100k	Continue 2025 programme with stakeholders and advance plans to develop circular economy hub with potential partners	SevernNet
R2	Clean Growth Hub expansion	£100k	Continue and expand targeted site surveys. Enable knowledge, insight and information sharing	CR Plus
R3	Nature based solutions	Programme funded by a combination of public and private sources. Integration covered by Cluster co-ordination as an 'enabler' below	Integrate and align West of England Nature Partnership project pipeline for joint promotion	West of England Combined Authority

Enablers

We recognise, however, that pathways to Growth and Net Zero are uncertain and that all industry, large and small, face significant choices and challenges along the way. The following factors are key to our Cluster's success:

1) Continued national commitment to the business models, policies and funding sources[1] that have enabled UK wide progress to date and make the UK an attractive investment proposition internationally;
2) Ongoing public and private commitment to developing the enabling environment that underpins many project, industry, investment and innovation decisions, including skills and supply chains, data management, efficient planning frameworks and ongoing research and innovation.

An essential enabler is that our Cluster is supported to continue – identifying, advocating, co-ordinating, communicating, engaging with the partners and communities on the ground that are essential to delivering growth and net zero.

Our Cluster will develop in three phases, with the continued commitment of partners.

[1]Examples include the ongoing deployment of business models and regulatory frameworks supporting new markets such as carbon capture, hydrogen, sustainable fuels and floating offshore wind, sector based legislation stimulating demand for low carbon interventions or products and funding sources – in particular the Industrial Energy Transformation Fund (IETF)

Phase 1: Establishment (6 months)	This phase will establish a sustainable, long term governance and operational framework for the Cluster including the many partners and supporters who have developed our plan. It will see the key partnerships and projects developed to date continue.
Phase 2: Delivery (6-18 months)	Priority project and programme support, implementation and delivery takes place in this phase including key enabling actions
Phase 3: Ongoing support and growth (18 months +)	Continued engagement with members and stakeholders, ongoing project and programme implementation and expansion of activities

This phased approach will provide a flexible framework for ongoing collaboration. All timescales are estimates and subject to external forces. However, coupled with the broad partnership and large number of projects and programmes we've identified through this planning project, we believe this provides a firm foundation for success.

If we are successful, our projects, programmes and ongoing collaboration will accelerate growth and make a key contribution to UK wide climate targets, including waste reduction, clean power generation, hydrogen production, carbon capture, the decarbonisation of road transport, aviation and shipping and rail freight growth.

The wider social, environmental and economic impacts of innovation and investment will make the Cluster an even better place to live and work, benefitting our 12 adjacent communities, workers, local supply chains and the natural environment.

The table below summarises our immediate tasks to enable delivery of the plan. Enablers are described more broadly in section 3.

Estimated costs in the table below represent the minimum annual funding required to continue co-ordination and catalyse ongoing funding across our fuller range of Cluster projects, programmes and enablers.

We anticipate the investment required to deliver the plan, across projects, programmes and enablers, as these evolve and grow, will come from a variety of private and public sources.

Our Local Industrial Decarbonisation Plan provides the platform for us to continue to engage with financiers across the public, private and blended capital spectrum, promoting opportunity and innovation where possible (see Appendix VI).

Reference	Initiative	Estimated cost per annum	First step	Lead partner
E1	Cluster organisation	£100k	Establish governance and operating model	West of England Combined Authority
E2	Stakeholder engagement and communications	£90k	Continue 'on the ground' engagement, communications, events, knowledge and data sharing	SevernNet
E3	Data	Integration with funded regional programmes covered by Cluster co-ordination	Update and integrate LIDP information into Mission Net Zero regional platform	Bristol City Council / Mission Net Zero
E4	Skills	£30k	Update regional green skills assessment and progress Skills Academy without Walls	SevernNet, Universities, Colleges, West of England Mayoral Combined Authority
E5	Investment	Integration with funded regional programmes covered by Cluster co-ordination	Integrate pipeline with regional pipelines developed by Mission Net Zero and Bristol and Bath Regional Capital Promote public and private funding opportunities Amplify project potential within Regional Growth Plan	West of England Combined Authority
E6	Co-ordinated Research and Innovation	Co-ordination of separately funded research covered by Cluster co-ordination	Kick off priority studies and initiatives	West of England Combined Authority

1. Introduction

The West of England Industrial Cluster is a major industrial area, home to a diverse range of industries such as power generation, waste management, manufacturing, goods supply, transport and logistics. For centuries, our Cluster has been a logistics hub for the South West of England and parts of the Midlands and South East, home to one of the major UK sea ports and connected to major inland industrial and commercial regions via the motorway and rail networks.

A significant head start

Our Cluster sits in a region where significant public and private investment, partnerships and innovation are already underway. These give a head start to our industrial decarbonisation plan and ambition to enable sustainable, inclusive growth.

- Established in 2008, SevernNet is a well-established business and community network run by and for the businesses and communities of Portbury Avonmouth and Severnside, with a wide network of relationships and activities across its key themes of climate, circular economy, skills and transport. This level of engagement is a critical precursor to success in this type of project and has been vital for our success.
- Bristol City Leap is a world first, game-changing approach towards decarbonisation at scale. It is a twenty-year, £1bn joint venture partnership between Bristol City Council, Ameresco and Vattenfall Heat UK, focussed on energy efficiency, renewable energy generation and electrification of heat networks.[2]
- The SevernSide Carbon Capture and Shipping Hub ($7CO_2$) aims to be one of the UK's first 'Non Pipeline Transport' shipping hubs for captured carbon, enabling multiple local and dispersed emitting sites flexible access to carbon storage facilities.[3]
- The South West region is a national focus area for new nuclear in the UK. Hinkley Point C in Somerset is a new large scale nuclear reactor developed by EDF Energy; and small modular reactor development at the SevernEdge sites of Berkley and Oldbury are supported by the Western Gateway, Great British Nuclear, Chiltern Vital Group and Rolls-Royce.[4]
- 24GW of floating offshore wind (FLOW) is to be deployed in the Celtic Sea, with 4.5GW targeted before 2035. The Bristol Port Company is developing plans for a major terminal to support the manufacturing and assembly of turbine components. A range of clean power projects are in development, including renewables and a Western Gateway led upcoming commission report on the potential for tidal power.[5]
- Our region has an emerging Hydrogen economy, represented by Hydrogen South West, and partners across hydrogen producers such as EDF Hynamics, infrastructure providers such as Wales and West Utilities, industry, road, aviation and maritime transport. A number of partnerships exist promoting innovation within the region, including in aviation and maritime.
- Avonmouth is a key location for HyHaul – one of four beneficiaries of the UK Government's £200m investment to decarbonise freight vehicles through the delivery of 57 hydrogen refuelling and electric charging sites across the UK. Avonmouth is also home to Europe's largest biomethane refuelling station, operated by CNG Fuels, and a number of producers and distributors of alternative fuels.
- The Gravity Smart Campus near Bridgewater is home to Agratas (a Tata Group company). This is a £4bn, 40GWh battery Gigafactory development, one of Europe's largest.[6] By the early 2030s, Agratas will contribute almost half of the projected battery manufacturing capacity required for the UK automotive sector directly creating over 4000 jobs.
- Ambition Community Energy CIC owns the UK's tallest onshore 4.2MW wind turbine, for the benefit of the residents of Lawrence Weston.[7] Ambition Lawrence Weston has brought in over £12.5m in investment to the local area.
- Our region is also known for ground-breaking public, private and third sector partnerships, thriving research and innovation, all of which can be built upon in the delivery of our local industrial decarbonisation plan. In a region known for its academic and technological advancement, our plan can amplify the key role that innovation, technology and artificial intelligence could play in industrial decarbonisation, making the most of the skills available in the West of England's people and institutions to make this a reality.

[2]About – Bristol City Leap
[3]Severnside Carbon Capture & Shipping Hub Ltd
[4]New figures show nuclear industry now supports 3,500 jobs in Bristol | EDF
[5]Bristol Energy Transition Hub – Bristol Port Company
[6]Gravity welcomes Agratas Gigafactory as first site occupier
[7]Ambition Community Energy | Lawrence Weston

This plan draws on all these regional advantages and partners, integrating industrial decarbonisation with the wider clean energy agenda of the region. The expertise and commitment of local industry and partners to a circular economy give our Cluster the potential to be a UK leader and demonstrator of best practice across a wide range of sectors. This report sets out how we propose to approach both the decarbonisation of local industry and support the industrial decarbonisation of our historic hinterlands. We propose a 'Hub and Spoke' approach, with Portbury Avonmouth Severnside (PAS) as the natural hub, and our spokes reaching out as far inland as Rugby.

Industry within the Cluster is directly responsible for around 3.1MtCO_2 emissions, and there are at least 4 MtCO_2 of additional industrial emissions from the neighbouring and connected geographies. These could be aggregated and routed through the cluster as the most efficient pathway for these industries to decarbonise. For consistency of terminology throughout this report, we use the terms 'Hub', 'Cluster' and 'Spokes' to represent:

- At least 2.5 million tonnes CO_2 per annum emitted at the major industrial area of Portbury, Avonmouth and Severnside **(Hub)**
- Up to 600,000 tonnes estimated at larger industrial sites within or immediately outside the West of England region[8] (together with the Hub, the **Cluster**)
- Up to 4 million tonnes of CO_2 emissions that could be abated at a combination of more remote industrial sites with existing rail connections to the Hub, via carbon capture and rail (non-pipeline) transport to the Hub, for onward shipping to storage or use (Carbon Capture and Storage (**CCS Spokes)**

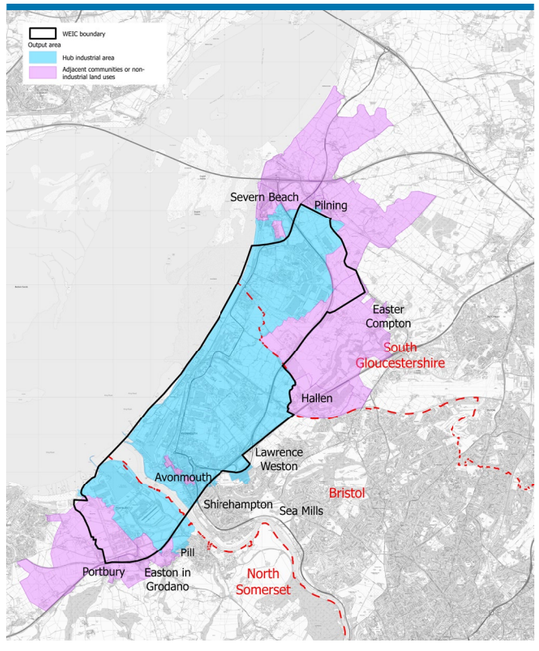
The rest of this introduction sets the scene for the report by outlining the industrial activities and character of the WEIC Hub; describing the Spokes we see emerging as our local industrial decarbonisation plans become a reality; and finally summarising how we've structured this report so stakeholders can decide how they can best support and engage in our plans.

The Hub

The Cluster Hub of Portbury, Avonmouth and Severnside (PAS) is one of the largest and most diverse industrial zones by area in Northern Europe, extending over approx. 1,800 hectares, situated and 5 miles to the north west of Bristol. Thirty-one industrial estates form an extended zone from Royal Portbury Dock to the new Severn Crossing. These are home to up to 1000 businesses, from multinationals to SMEs operating across a large and diverse 'light' industrial base.

The Hub geography spans three Local Authorities – Bristol City Council, North Somerset Council and South Gloucestershire Council - and includes the Port of Bristol, the UK's most strategically-located deep water port. The area benefits from major road and rail connections (M4, M5 and M49) making it an internationally significant transport centre, within touching distance of the capital cities of Cardiff and London and with 43 million people within a 250km radius. It also has a number of regional and national airport connections, including links to Bristol Airport and aviation fuel distribution to Heathrow and Gatwick.

These attributes make the Hub a strategic centre for growth in the West of England, being part of the Avonmouth Enterprise Area and now a key future part of the West of England Combined Authority's Growth Strategy for the region.



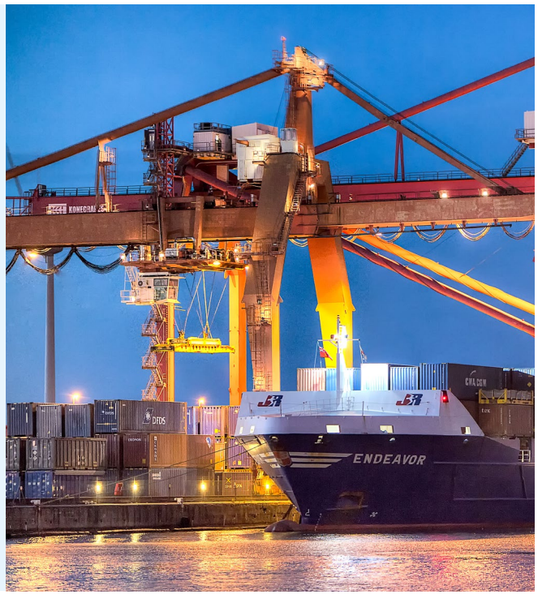
[8]West of England Combined Authority and North Somerset

Spotlight: The Bristol Port Company

The Port of Bristol spans a 2600 acre estate, handling over 3 million tonnes of dry bulk goods, 27% of all aviation fuel imports to the UK, 25% of all animal feed imports and 550,000 motor vehicles. The Port contributes over £1bn to UK GVA and more than 10,000 jobs depend on port-based business.

The Bristol Port Company was formed in 1991 when entrepreneurs purchased the Port of Bristol from Bristol City Council. Since privatisation over £600 million has been invested to create a modern, thriving business offering the full range of shipping, distribution and logistics services. Bristol City Council remains a co-shareholder.

Bristol Port's Energy Transition Hub is at the centre of a number of industrial decarbonisation projects and activities in our region.



Hub industry

The Hub has a small number of large emitters and a large number of smaller and medium-sized enterprises (SMEs).

Gas fired power and energy from waste

The area is home to a major Combined Cycle Gas Turbine (CCGT) power station and two large scale energy from waste facilities, together representing emissions of over 2 million tonnes of CO_2 p.a.

The 1.2GW Seabank Power Station, located at Hallen Marsh is one of the largest power stations in the UK. It was constructed in two phases in 2000/2001, it directly employs c.65 individuals and supports many more local jobs. Seabank is a highly flexible gas-fired power station, able to adjust generation level very quickly to support more intermittent renewable generation. It also plays an important role in providing electrical grid ancillary services to National Grid in the Southwest region.

There are also two much smaller gas-powered generators in the Hub, exporting power to the National Grid during peak demand period or covering shortfalls.

Two major energy from waste (EfW) facilities are operated by Viridor at Avonmouth and SUEZ at Severnside.

SUEZ's Energy Recovery Centre, built in 2016, has the capacity to divert 370,000 tonnes of waste p.a. from landfill and generate 37MW of electricity. This covers the electricity needs of the site (c.10%) and enables export of the excess (c. 90%) to the grid.

Viridor's Avonmouth facility was opened in 2022, with the capacity to divert 427,000 tonnes of non-recyclable household waste p.a. from landfill and to generate a net electricity output of 32MW of electricity. Bottom ash is recycled and used in the production of aggregates.

Much smaller energy from waste plants (including pyrolysis) also exist in the area for the treatment of medical and clinical waste. These are operated by local businesses such as CliniPower and Stericycle.

Waste water treatment and other waste management

Wessex Water's water recycling centre in Avonmouth treats over 700,000 tonnes of sewerage and wastewater from the local authority areas of Bristol, parts of South Gloucestershire, Bath and North East Somerset and North Somerset.

The facility includes an advanced anaerobic digestion (AD) system that processes sewage sludge to produce biogas, which is used to generate power and heat. In 2024, construction commenced on a £100m expansion of the site to accommodate expected population growth in these areas in the next 25 years; and reduce storm overflows.[9]

The Hub is also home to a plethora of organisations dedicated to recycling and waste treatment, forming the backbone of an innovative, local circular economy.[10] Key industrial materials including aggregates, gypsum, metals, bottom ash, dry mixed recyclates, wood and asphalt are already recycled and reused by manufacturers at the Hub. Large organisations including SUEZ, Viridor, Geneco (Wessex Water), Encirc and Etex[11] all

[9]Bristol's water recycling centre | Wessex Water
[10]https://severnnet.org/our-work/circular-economy
[11]Our services | GENeco / Promote circular economy: repair, reuse and recycle - SUEZ Group / Water

encourage and promote the circular use of resources; and SevernNet runs an active circular economy forum, resource synergy workshops, a resource sharing platform and tools for shared learning.

Plasterboard Recycling Group, B&A Group and Bristol Waste Company, are also based at the Hub, amongst at least 25 other small and medium sized businesses, as well as larger operators such as Biffa and Veolia. These operations process materials ranging from wood, electrical and electronic materials, demolition materials, through to refrigerants and oil. These activities have comparatively low emissions.

Manufacturing

The primary products manufactured at the Hub are for the construction industry, including plasterboard (e.g. Etex), asphalt (e.g. John Wainwright), aggregates and bitumen blending (e.g. Continental Bitumen), as well as shoring and structural equipment and metal/plastic tubing made by various manufacturers such as Sanoh.

Of the construction manufacturers in the area, Etex is the largest, having recently invested in a £140m 57,000m^2 expansion at its Portbury site, doubling its existing size.

In the food and beverage space, Encirc Bristol provides a beverage manufacture and packaging solution for multiple international customers at the Hub. Flour, bread, natural food ingredients and coffee are produced by international and local producers including ADM Milling, Hovis, Warburtons, Plant X, Barts Ingredients and Clifton Coffee.

In advanced manufacturing, GKN Aerospace manufactures aviation parts such as wing spars for aircraft, operated by Airbus amongst others. The facility serves as a centre for excellence in composite wing structure design and production.

A wide range of smaller organisations specialise in value added vehicle processing, or high-tech manufacturing such as Framatome's 3D printing, forming and welding steel for use in the nuclear industry, Oxford Instruments Plasma Technology's high tech plasma processing equipment used in the semi-conductor and nanotechnology industries and Herschel's infrared heating solutions.

Looking forward, The Bristol Port Company is developing a new offshore wind terminal, capable of the manufacture or assembly of floating sub-structure for offshore wind in the Celtic Sea.

Supply, Logistics and Transport

As a strategic transport centre, goods supply, logistics and transport are major industries at the Hub, employing around 49% of the workforce. In particular the Hub is home to suppliers and distributors of;

- **Cement, aggregates, steel, metals and other materials for construction** such as.: Heidelberg Materials, Cemex Avonmouth, Day Aggregates, Unimetals (recycled metals), Wright Minimix and OCL Regeneration.
- **Fuel and lubricants** such as Valero Energy (petrol, diesel, kerosene and gasoline), FloGas (LPG); Exolum (multiple fuels); Air Liquide and CNG (biomethane and compressed natural gas), Certas Energy (fuel and lubricants) and Esso.
- **Fertilisers, food and beverages** with major distribution centres such as.: Yara UK (fertilisers), Asda, Apetito, Ocado, Lidl, Tesco and Wild Water Group.
- **Other equipment** including (amongst many); Molson Group (plant and machinery) and Nisbetts (catering equipment) who also host the National Catering Equipment Centre.

In addition to the Port of Bristol, companies of various sizes are dedicated to multi-product storage, logistics and transport such as: The Range Distribution Centre, Wrings Transport, Davies Turner and Co, Expeditors International UK, DHL, UPS, Maritime Transport Ltd. and Europa Worldwide Group,

Employment

Businesses at the Hub employ around 30,000 people, of whom 80% work in industrial sectors. The number of industrial employees has grown steadily since 2016. This is expected to grow further in coming years, with cost effective decarbonisation enabling our industry to remain competitive and preserve its associated jobs. Employment throughout industry in our wider cluster as a whole is closer to 50,000.

Almost half the working population of the Hub work in the Logistics and Transport sectors.

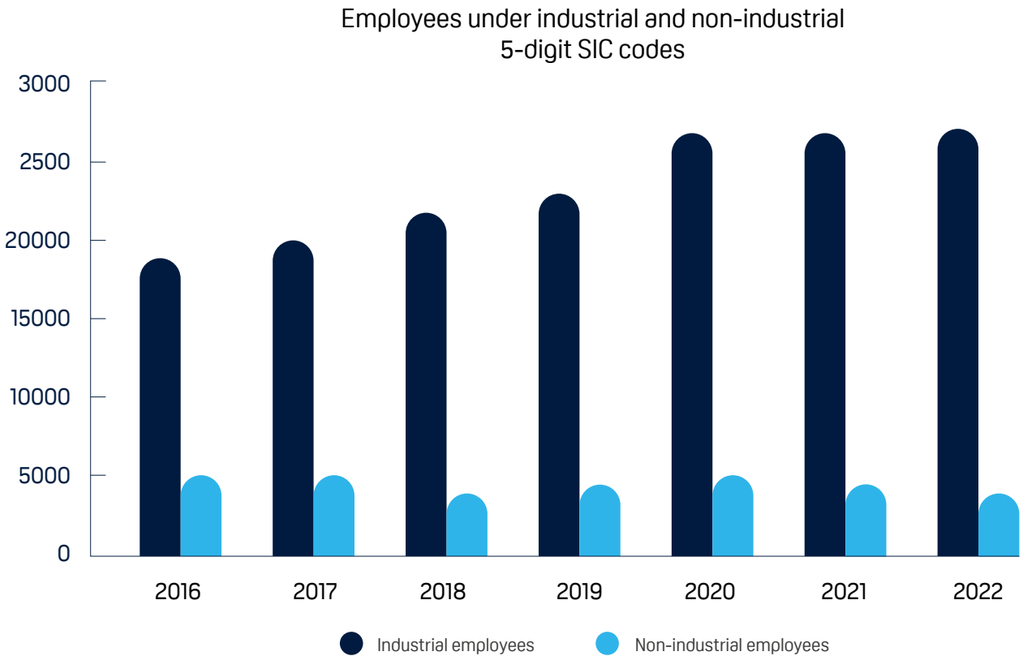


Figure 2: Employment mix across the Cluster.

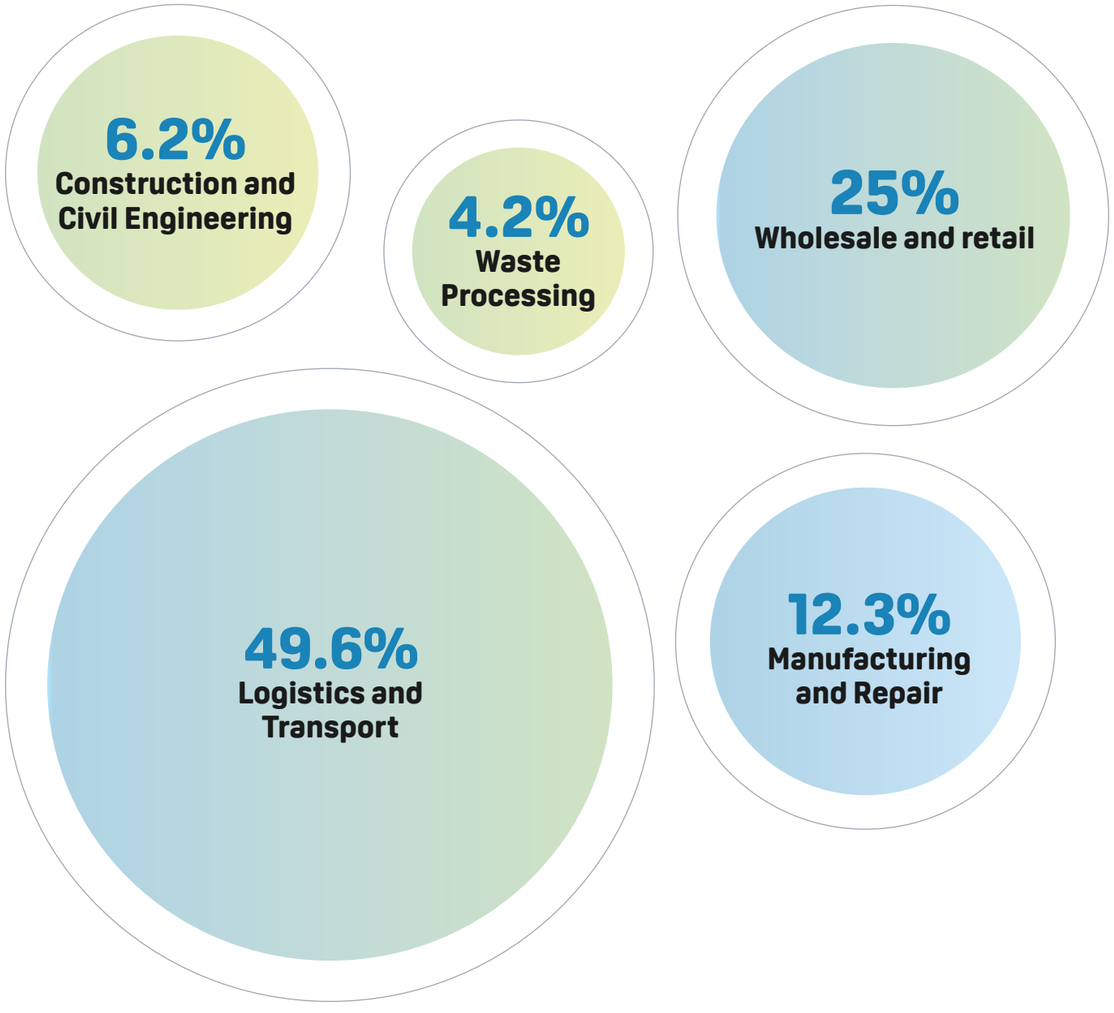


Figure 4: Sectoral mix of employment

Smaller and mid-sized enterprises (SMEs)

Out of a Hub with nearly 1000 businesses, the vast majority (over 90%) are SMEs.[12] SMEs pose a particular decarbonisation challenge in terms of engagement, analysis, knowledge, resources and application of complex technologies. The momentum and co-ordination enabled by our Cluster has the potential to make a significant contribution to SME decarbonisation.

SevernNet has mapped over 100 organisations within the Hub highlighting sectors and sub-sectors relevant to the LIDP. This mapping is not exhaustive and requires ongoing refinement and expansion to incorporate additional industries as appropriate.

A live version of this mapping is available at:

https://www.google.com/maps/d/edit?mid=1buDT80boBgjbXznlnzYkSoMJbV3BARA&usp=sharing

[12]This means a company with fewer than 250 employees and annual sales of less than EUR50M.

Spokes
West of England Region – Cluster

Our network of potential spokes includes fourteen larger manufacturing and supplier sites located within the West of England Combined Authority region and broader South West (see Figure 5 Major sites adjacent to the Hub).

While each site will pursue its own decarbonisation strategy, co-ordinated energy or distribution infrastructure, or Clean Growth Hub expansion could enable cost-effective decarbonisation. We expect our West of England network of spokes to expand over time, taking into account sites and clusters of activity in neighbouring authorities.

These include sites in the traditional manufacturing space, such as clay and concrete bricks manufactured by Ibstock Bricks in Cattybrook; quarries, operated by Heidelberg Materials and others, extracting and mixing aggregates for construction, and sites in the food and beverage and chemicals industries. Some of these sites have integrated local operations shipping and railing materials in and out via Hub-based manufacturing and distribution sites.

They also include a number of manufacturing sites for aviation, aerospace and defence within the Filton Enterprise Area, for example, GKN Aerospace manufactures and assembles wing components, while Airbus focusses on engineering for wings, fuel systems and landing gear. At Rolls Royce's new advanced manufacturing hub, engineers are using robotic technology to make composite fan blades and cases.

Bristol Airport, our closest regional airport currently services 10.5 million passengers a year and expects demand to increase to 15 million passengers by 2036. The Airport has over 4000 people working across 50 organisations on site.

The existing commitment to sustainability and innovation shared by many of these sites, combined with the potential for shared physical or energy infrastructure, create significant opportunities for collaboration, knowledge sharing and de-risking.

The net zero ambitions of Bristol Airport and its local partners such as Easyjet, coupled with the Exolum-operated aviation fuel supply pipeline connecting the Port of Bristol to the airports at Heathrow and Gatwick, are invaluable assets in the Cluster, offering a regional advantage in the production of sustainable aviation fuel (SAF) for distribution to local and major airports to help decarbonise UK aviation.

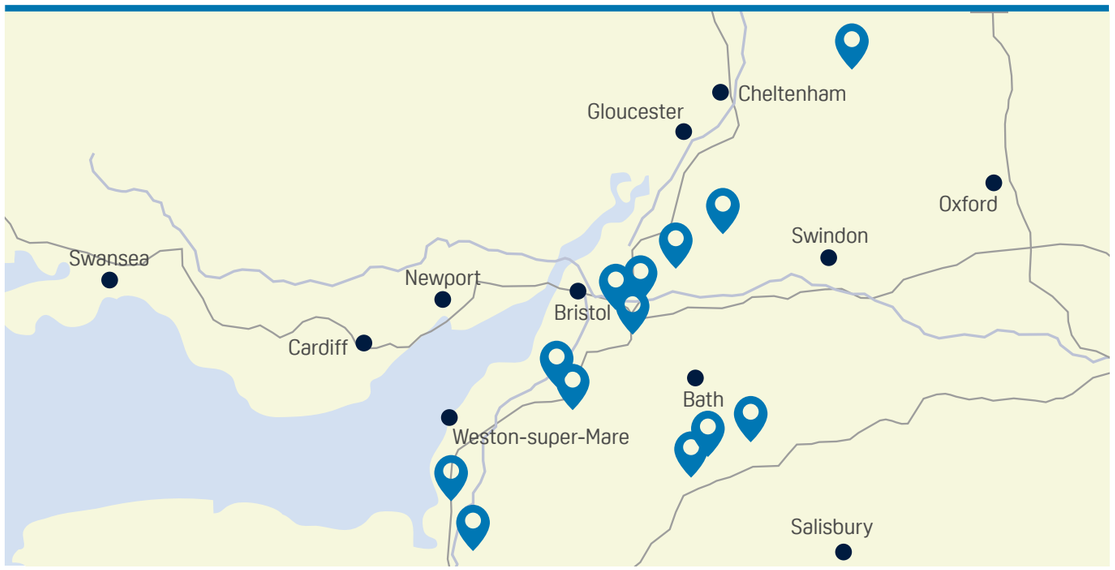


Figure 5: Major sites adjacent to the Hub.

CCS Spokes

Our CCS spokes are dispersed cement and energy from waste sites across the UK with existing and historic rail linkages to the Hub which can be 'CCS enabled'. This existing infrastructure, the modular nature of the $7CO_2$ terminal and the flexibility of CO_2 shipping (i.e., ships can send CO_2 to any CO_2 store, compared to pipelines that have fixed destinations) means that non-pipeline transport to the $7CO_2$ terminal could be the most attractive and economic pathway to decarbonise these (and other) identified sites.

An assessment undertaken by Apollo Engineers identified over 40 dispersed industrial sites with rail connections to the Port of Bristol that could potentially transport captured carbon by rail to $7CO_2$ for onward shipping to storage or use.

These initial sites were screened, removing sites with alternative decarbonisation options such as electrification or hydrogen and sites currently in development, leaving approximately 15 sites – as well as clusters of smaller emitters around these sites - for consideration.

For the purposes of this Plan, a network of five (non-exclusive) existing sites were prioritised for further feasibility, due to their scale, existing rail freight connections with the Hub or active partnership with $7CO_2$. These are:

- Viridor's Cardiff and Ardley Energy from Waste sites
- Heidelberg Materials' Ketton site
- CEMEX cement manufacturing site in Rugby
- Enfinium's Energy from Waste site in Ferrybridge

As a multi-party terminal, with both local and rail connected emitters, $7CO_2$ is the enabling infrastructure for local and national industrial decarbonisation within our Cluster. It is not dependent on CCS being pursued at particular sites but provides the infrastructure for multiple connections over time. Connections may include, for example, sites at other industrial clusters, such as the Solent Cluster, with which $7CO_2$ has been working in partnership as part of the LIDP programme.

Figure 6: Dispersed industrial sites with rail connections to the Port of Bristol.

Report structure

This report is structured in three main sections: the West of England Cluster vision **(section 2)**; our plan to deliver this **(section 3)**; and how we envisage this plan impacting our local economy and society in a positive way **(section 4)**. Our conclusions and recommendations for next steps are provided as a final section 5. Appendices provide supporting materials including summaries of feasibility studies and work packages carried out and delivered as part of this LIDP project.

2. Our Vision and Approach

Vision

Our vision is to deliver a circular, net zero industrial economy across the Cluster by 2040 and to enable net zero at CCS Spokes. We aim to offer a sufficiently attractive and economic model to spur regional growth as well as to enable industrial decarbonisation across the region and beyond.

We aim for a transition that is fair and inclusive, maximises co-benefits for communities and the environment, enables best practice to be demonstrated and knowledge to be shared.

Our vision sees our industries becoming a blueprint for decarbonisation across the UK, and the Cluster becoming a recognised best practice model for collaboration and innovation across sectors (business, public sector, third sector and academia) working together towards environmental and societal benefits.

Collaborative plan development

The cluster was launched in March 2024, and the plan was published in March 2025. The Cluster formation was enabled by part-funding for the first year from Innovate UK. Throughout the development of the plan, we have developed a way of working, centred on multi-stakeholder collaboration and engagement, that will facilitate achievement of our vision.

Our plan builds on a significant stakeholder engagement, and is informed by original research including surveys, qualitative foresight workshops, forecasting and modelling), an emissions baseline study, a project pipeline study and technical feasibility studies.

Collectively, these activities have allowed WEIC to:

- Enhance collaboration between partners and with external stakeholders;
- Identify the most appropriate model for our cluster (Hub and Spokes);
- Identify decarbonisation approaches tailored to the local context;
- Identify evidence gaps that need to be addressed in the next phase;
- Identify co-benefits, as well as strategies to maximise them, that will benefit the local area, in line with our place-based principles;
- Future-proof our plan to make it, as much as possible, resilient to long-term challenges, as well as adaptable over time, effectively to respond to risks and opportunities and to maximise the environmental and societal benefits from long-term industrial sustainability and net zero.

Our integrated principles allowed us to identify some of the challenges that may arise (see Appendix I) and how to take action to overcome them.

University of the West of England, Bristol - Foresight

Foresight is a methodology which embeds long-term thinking and external insight into strategic thinking.

To future-proof our plan, we conducted Foresight workshops and analysis to consider the impact that long-term global trends will likely have on our ability to achieve net zero, as well as considering best-case and worst-case scenarios.

These have been used as a basis to conduct a wind-tunnelling/stress-testing exercise, for the identification of additional actions to minimise the risks emerging from the worst-case scenario, and maximise the opportunities that emerged from the best-case scenario.

Through Foresight, we have strengthened our place-based approach through a bigger-picture perspective that shed lights on potential co-benefits for the wider regions.

SevernNet - Stakeholder Engagement

SevernNet is a non-profit business and community stakeholder organisation which has been operating in PAS since 2008.

Building on its relationships with hundreds of local businesses and stakeholders, SevernNet has undertaken 'bottom up' stakeholder engagement over 12 months including: surveys; supporter meetings; local business breakfasts; focussed LIDP and circular economy themed workshops; one-on-one meetings, update and engagement sessions; canvassing at local events and awareness raising at regional and national conferences.

SevernNet's business breakfasts have seen more than 200 attendees come together to discuss e.g. decarbonising non-road mobile plant and machinery, decarbonising energy from waste and place-based skills.

Figure 7: SevernNet and Molson Group Business Breakfast 2024.

Alignment with regional and local priorities

To achieve decarbonisation, it is vital to align our plan with regional strategies and plans and, where possible, actively contribute to developing and delivering these.

The West of England Combined Authority's emerging Local Growth Plan will prioritise clean energy generation and innovation, and look to grow this sector and the industries supporting it over the next 10 years. The Hub is a key area in of focus for the Local Growth Plan.

The WEIC Plan aligns with the direction set out in the Bath and North East Somerset Economic Strategy, the South Gloucestershire Council Plan and the forthcoming Bristol City Council Economic Strategy. It also aligns with the plans of the two Integrated Care Partnerships operating in our region, supporting their long-term goals to improve health and wellbeing across the West of England.

A number of local neighbourhoods and community action groups have produced or will be producing local plans including;

- The Ambition Lawrence Weston Community Plan and Neighbourhood Development Plan.[13]
- Shirehampton Community Action Forum (SCAF) has obtained funding to develop a Community Climate Action Plan in 2025, building on an existing Community Plan.[14]
- Avonmouth Village Community Plan, developed by the Avonmouth Community Centre Association and Avonmouth Projects Group.[15]
- Easton-in-Gordano and Pill Neighbourhood Plan for 2020-26.[16]
- Pilning and Severn Beach emerging neighbourhood plan and Aecom's 2022 Report Strategic Environmental Assessment (SEA).[17]

Our vision and expectation is that delivery of the WEIC Plan and projects within it will consider and take account of further local plans as they evolve over time.

Co-Benefits

A Just Transition is one which considers climate action with the parallel aim of eliminating existing inequalities and enabling social inclusion. It considers the impact of the transition on workers, communities and supply chains.

Our stakeholder engagement during plan preparation identified a number of place-based priorities to be considered as the region capitalises on its industrial decarbonisation opportunity. Surveys and polls highlighted energy cost reduction, community investment and regeneration, improved transport links, access to nature and improved air quality ranking highly, alongside ensuring not just the availability of jobs and skills training, but access to them for local residents.

Our goal is to maximise co-benefits of decarbonisation, including income growth, jobs and skills, use of local supply chains and improved air quality and to minimise negative impacts, promoting a just transition. This is covered in more detail is section 4.

[13] ambitionlw.org/wp-content/uploads/2020/01/Amb-LW-community-plan-2018-2023.pdf. The Neighbourhood Development Plan is new and currently under review.
[14] About - Shirehampton Action
[15] avonmouthcca.org.uk and apgcic.com
[16] Neighbourhood Plan | psb
[17] Report Strategic Environmental Assessment (SEA) for the Pilning and Severn Beach Neighbourhood Development Plan 2022-11-15

3. The Plan

Our plan is to deliver or enable a portfolio of projects and programmes of work that enable industrial decarbonisation in line with a credible pathway for the Cluster and Spokes (see appendices III and IV). Our projects and programmes will also support the abatement of Scope 3 emissions from road, aviation and maritime transport and the preservation of nature.

These projects and programmes will be supported by undertaking essential collaborative work using the Cogs and Roots model developed by CR Plus.

Projects

In common with some other industrial clusters (specifically South Wales, North East Wales and Bradford) we have applied CR Plus's Cog and Roots model to shape our approach to decarbonisation.

This is summarised in the diagram below.

This approach sees a hierarchy applied, starting with Resource Efficiency and Energy Efficiency (REEE), typically quickest, lowest cost and based on readily-available technology - a key low cost driver of decarbonisation in our Cluster.

REEE is followed by fuel switching – either electrification, enabled by clean power production, or clean alternative fuels such as hydrogen.

Where emissions cannot be abated by REEE or fuel switching, carbon capture and storage or use can enable decarbonisation of process or hard to abate emissions such as those from energy from waste or cement production. Given the makeup of our Cluster, this is also a key driver of emission reduction.

Nature-based solutions can play a role in both ecosystem management (e.g. temperature control) and carbon sequestration of any remaining residual emissions, as well as enhancing the resilience of industrial decarbonisation related projects to the threats of global warming, including floods.

Clean Growth Hubs, which co-locate or facilitate two or more technologies or approaches, can enable efficient access to shared infrastructure and circular use of resources across several adjacent industries.

Some of our key current projects are outlined over the following pages, together with the 'Cog(s)' that they contribute to turning across our Cluster.

Our project pipeline will be maintained, updated and expanded over the coming years to facilitate access to public, private debt and equity and community finance over time.

6 Cogs that can be turned:

1. Resource and Energy Efficiency and the Circular Economy (REEE)
2. Fuel Switching
3. Clean Power
4. Carbon Capture, Storage and Use
5. Nature Based Decarbonisation Solutions
6. Clean Growth Hubs

Effective implementation of Cogs 1-6 will lead to Net Zero Carbon

6 Enabling Roots:

A. National and Regional Policy
B. Resourcing, Skills and Supply Chain
C. Investment
D. Public / Private Collaboration and Partnerships
E. Stakeholder Engagement
F. Research and Innovation

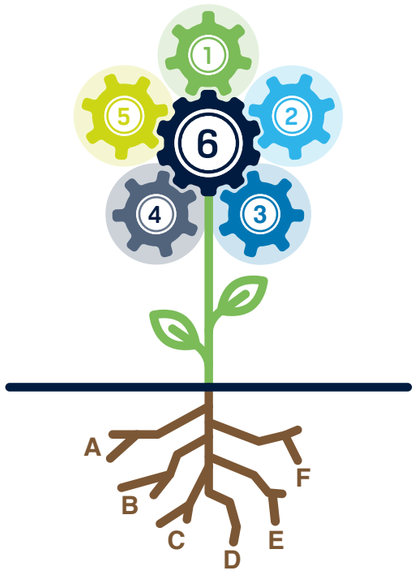


Figure 8: CR Plus Cogs and Roots Model for Industrial Decarbonisation.

1) REEE, 2) Fuel Switching, 3) Clean Power

Cluster and Bristol City Leap partner Ameresco has developed a pipeline of potential opportunities at the Hub for **built environment energy efficiency,** including building and process efficiency interventions, **clean heat solutions, clean power and onsite EV charging** opportunities.

These include the options below, which can be applied under a range of contract and finance models:

- Building and energy efficiency upgrades, such as building fabric upgrades and insulation, building management systems, control optimisation and LED lighting
- Heat Pumps, supporting the UK Government target to install 600,000 heat pumps annually by 2028 or electric radiant heaters which can be cost effective in warehouse situations; and
- On site renewable energy generation and battery energy storage systems (BESS)

Ameresco's pipeline includes delivering or enabling **65MW new clean power generation** across the PAS area complementing a number of other clean power generation projects in the region (outlined further in appendix IV).

To mitigate against potential grid constraints, there are options for local microgrids where power is delivered through "private wire" connections from the renewable source to point of demand. Where private wire may not be available due to commercial or technical factors, Bristol City Leap is developing a "sleeved pool" whereby excess renewable generation may be sold into a pool and - using a grid sleeving arrangement - delivered to meet local demand, either in the PAS area or its hinterland "spoke" areas.

Bristol City Leap has also focused on the potential for the electrification of LCVs and HGVs for the purposes of the Local Industrial Decarbonisation Plan, the PAS area being a major distribution hub across the south and south west of the UK. There are a number of projects for e-HGV charging points currently being reviewed in the PAS area, and as the technology develops, in particular with the advent of 1MW charging capabilities these are likely to increase.

Vattenfall is working with Bristol City Leap to expand the existing heat network in Bristol, develop new networks and ultimately interconnect them to create a single Bristol Heat Network. Prior concept and feasibility studies, updated by SevernNet's more recent heat ecosystem analysis have identified diverse current and possible future heat and cooling sources at the Hub. These present opportunities for heat circularity, heat cascading and the development of cool networks, in addition to the potential to continue developing proposals for a strategic heat main route from the Hub to a Heat Network Zone such as Filton or Bristol City.

The Bristol City Leap pipeline can be actioned immediately in many areas and further developed **between 2025 and 2030**.

3 Clean Power

A number of clean energy projects are being pursued by Plan supporters, as part of the region's wider clean energy agenda, which could

a) Accelerate the decarbonisation of the grid and
b) Provide direct power sources for large scale projects.

Our industry and Cluster are supportive of these projects, including, in the case of The Bristol Port Company, of being an integral part of the clean power supply chain.

Severn Edge SMR

Severn Edge consists of large parcels of land at two decommissioned power stations, some 3 miles apart on the banks of the Severn at Oldbury and Berkeley. Great British Nuclear have acquired the 150ha+ site at Oldbury with the expectation that this will host the UK's first deployment of small modular reactors. SMRs are expected to reduce costs and construction timelines, with up to 90% off-site manufacturing. When operational they provide a carbon-free, always-on baseload energy to the grid. Aside from electricity to the grid SMRs could also provide private wire power for high-energy consumers such as data-centres or industrial sites, could provide a sustainable solution for district heating and could facilitate the net zero manufacture of green hydrogen and synthetic fuels to support the decarbonisation of transport.

Proving SMR technology at Oldbury will grow the already large nuclear sector in the LIDP area with 3,500 nuclear jobs already, just in Bristol alone. This could present a whole range of related benefits and R&D opportunities through the life of the LIDP. **Contracts are expected to be awarded in 2025 and energy production from mid-2030s**.

Bristol Wind Terminal

The next generation of wind farms is moving closer with The Crown Estate's Offshore Wind Leasing Round 5 which aims to establish floating offshore wind in the Celtic Sea. Round 5 will create 4.5GW of new renewable energy capacity, enough to power more than 4 million homes, with the potential to unlock a further 12 GW of capacity in the Celtic Sea in future rounds. Our Cluster is optimally placed to support these developments.

The Bristol Port Company is developing plans for a major new terminal to support the development of offshore wind in the Celtic Sea which will help the UK meet its 2050 net zero target.

The terminal will be constructed at Avonmouth Dock on the foreshore and will incorporate new and existing dock infrastructure. The new deep-water terminal will include a new quay wall, slipway for launching floating sub-structures and extended breakwater. The facility will be capable of handling the assembly or manufacture of floating sub-structures, the integration of turbine components and deployment of completed units to deep-water sites. The project builds on the crucial role Bristol Port plays in the logistics supply chain for local projects including the multi-billion pound Hinkley C and the Gravity Smart Campus. It is a critical hub for the infrastructure required to develop the region.

The project intends to be a **net zero development, beginning construction in 2027, with full operations commencing by 2030**.

2 Fuel Switching

An Alternative Fuels Eco-system

Plan supporters are developing an ecosystem of projects spanning the full value chain of production, distribution, the manufacture of hybrid and hydrogen capable plant and machinery, and innovation. The Cluster has drawn on the expertise of Hydrogen South West and its members in this area.

Hydrogen Production

Distributed green (electrolytic) hydrogen production is being explored actively by Cluster supporters including the potential for on site production for key industrial users and for production located next to clusters of industrial activity, or 'clean growth hubs'. Innovative organisations are exploring novel methods of producing hydrogen, including from waste and wet biogenic materials.

Projects under development supplement existing innovation in the region, including the multi million hydrogen production facility developed by IAAPS (University of Bath), GW Shift's collaborative programme with the Combined Authority and Western Gateway which has already funded twelve sprint projects and proof-of-concept hydrogen technology applications.

Targeted industrial access to hydrogen is expected by 2030.

IAAPS green HR hydrogen manufacturing facility opening in 2024.

Hydrogen Distribution

Cluster supporter Wales and West Utilities is assessing the nature and potential route for local hydrogen transmission systems in the South West, alongside partners across the hydrogen value chain. Within the Cluster, partners are working together to define optimal new infrastructure requirements and how WWU's existing natural gas network can be repurposed, considering the South West's relatively dispersed industrial demands. This includes the viability of more radically decentralised hydrogen infrastructure, based on intermittent renewable generation and / or serving smaller clusters of industrial activity. Wales and West Utilities is supporting hydrogen trials and innovation across the region, alongside major infrastructure development. **Hydrogen distribution at scale is targeted between 2035 and 2040**.

For transport, supporters such as HyHaul are deploying zero-emission HGVs which will pave the way for a cleaner, more efficient transportation industry. HyHaul is delivering 3 fixed hydrogen refuelling stations (1 in Avonmouth) supplied by multiple hydrogen projects, and 30 hydrogen fuel cell electric trucks (FCET) by **2026**.

Hydrogen for Plant and machinery

Amongst other local innovators, locally based Plant force and Element 1 are adapting construction NRMM engines to run on 30-50% hydrogen, testing the feasibility of rolling out hybrid hydrogen-diesel engines to existing machines and showcasing these solutions on live construction sites. South West based Hydrostar is designing and developing an integrated hydrogen and electric maritime vessel refuelling system.

Biofuels

Cluster supporters are also developing or expanding projects focussed on the production and distribution of biogas and biofuels, for industry and transport. For example, CNG Fuels operates Europe's largest biomethane fuel station in Avonmouth with plans to expand in 2026 and consider multi fuel hubs. Wessex Water has developed trucks powered by sewage and food waste which run on bio-CNG, reducing emissions equivalent to more than 100 cars from the road and is further expanding its operations. Flogas's pipeline network expansion will enable the transport of large quantities of LPG and Bio-LPG, directly from ships to the Avonmouth facility for supply to off grid domestic, transport and industrial users.

5 Carbon Capture, Storage and Use

Cluster partner 7CO_2 is developing a pioneering project set to be one of the UK's first carbon capture and shipping hubs. It will be the **enabling infrastructure** for CCS in the South West, enabling the capture of up to 5.5 million tonnes of CO_2 per year by energy from waste, dispatchable power and cement manufacturers at the Hub and across Spokes.

Via 7CO_2, CO_2 captured by local and rail connected businesses can be transported by pipeline or rail to Avonmouth docks. There, it can be liquified, stored, and shipped to long-term geological storage, permanently removing it from the atmosphere. CO_2 may alternatively be used, in the production of alternative fuels for maritime or aviation.

A high proportion of 7CO_2 emitters are EfWs, 50% of whose CO_2 is 'biogenic', **so 7CO_2 can enable carbon dioxide removals (CDRs) at scale**, significantly contributing to Government's carbon removals targets.

Carbon capture at large local emitters at Avonmouth could also be linked with the provision of **district heating** to the city of Bristol or a Heat Network Zoe. With a heat source capturing biogenic carbon, such as energy from waste, district heating schemes could potentially become 'net negative'.

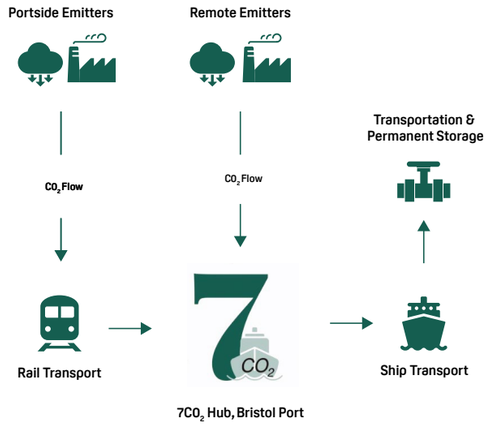
Having undertaken concept and feasibility studies with Petrofac and Apollo, **7CO_2 is ready to proceed to Pre-FEED and FEED and targeting operations by 2030-31**.

The capture of biogenic CO_2 also creates an opportunity to produce **synthetic fuels** for use by local industry, maritime and / or aviation. Other strategic assets within the Cluster include aviation fuel distribution facilities at Hallen and the national pipeline network connecting Bristol Port to major airports such as London Heathrow and Gatwick.

7CO_2 and its strategic partners consider the combination of the attractive UK policy environment, the presence of strategic infrastructure and the commitment of potential regional partners across a range of potential fuel products, gives the West of England Industrial Cluster a significant opportunity to pursue the production and distribution of eFuels at scale.

Up to 2 million tonnes at the Hub

Up to 3.5 million tonnes at CCS Spokes



6 Clean Growth Hubs

Plan partners Bristol City Council and CR Plus are developing a concept for a Clean Growth Hub on a 16 hectare site at Hallen Marsh, owned by the Council.

Clean Growth Hubs (CHGs) involve multiple companies coming together in a small geographical area, to share or pool resources, with the aim of decarbonising in a more efficient manner than they might have done alone. CGHs can include any combination of

- Shared clean energy generation/storage systems,
- Sharing low-grade waste heat,
- Localised cleaner energy generation facilities, catering to local demand such as CHP or H2 production, or
- Utilising industrial symbiosis. e.g. connecting waste streams to maximise recycling efficiency or to those who can use them as raw materials; or
- Shared carbon capture storage and use.

A concept study based on detailed analysis and surveys by CR Plus has been developed, which includes potential for co-located:

- Green hydrogen production, acting as an 'enabling' technology for those nearby industries, operators wishing to pursue decarbonisation of processes or heating via this route
- New manufacturing, such as diesel HGV conversion to enable hydrogen fuel capability
- Hydrogen refuelling on-site or adjacent, in order for hydrogen to be available to road transport users in general
- Efuel production
- On site renewable energy generation
- Symbiotic use of waste resources, such as the production of sustainable animal feed
- Waste heat recovery and utilisation

Our Cluster is likely to eventually include multiple CGHs across the region, developed and tailored to the specific needs of small clusters of industrial occupiers in key locations.

Programmes

Our projects sit alongside Programmes of work focussed on Cogs 1) REEE, 5) Clean Growth Hubs and 6) Nature-based solutions.

1 Circular Economy (REEE)

SevernNet set out in 2008 to encourage businesses and stakeholders to get to know and work with their neighbours through collaboration and cooperation. The Hub has since developed into a circular economy centre of expertise through the practices of many of its world leading businesses and cluster of resource and energy management businesses.

Building on years of experience, partnerships and dedicated work in the context of the Plan, SevernNet has developed a comprehensive programme of studies, initiatives, pilots and potential projects outlined below:

- **Network Facilitation/ Communications / best practice sharing –** including networking breakfasts, workshops, industry & policy updates and 'How To Guide'(s)
- **Resource Sharing Platform Pilot –** reducing materials going to landfill or incineration via the establishment of a real time resource exchange platform, particularly addressing the challenge of sporadic waste material flows
- **Circularity in Construction –** research assessing likely future demand for materials, sourcing, circularity and sustainability at the Hub and wider region
- **Circular Economy for SMEs –** supporting SMEs through Simpler Recycling legislation and piloting simplified waste management solutions for clusters of organisations
- **Hard to treat waste streams –** research focused on identified hard to treat waste at the Hub including silicone, paper from gypsum and carbon wastes and their reduction, re-use or recycling
- **Circular interventions in clean energy transition –** enabling stakeholder connections, assessing infrastructure and enabling circular energy solutions alongside Bristol City Leap
- **Trade local –** shortening supply chains and increasing potential for circularity
- **Circularity metrics –** developing place-based circularity metrics to support measurement and monitoring of demand and waste reduction, and decarbonisation

In addition to accelerating emission and cost reductions, our Circular Economy Programme will generate investable projects.

For example, in partnership with Bristol City Council, UWE, and Bristol Repair Coalition, SevernNet is currently developing a concept for a physical **Circular Economy Hub & Centre of Expertise**. Potential partners and locations for the Hub are being considered within the Cluster to integrate circular economy support and the necessary infrastructure. The CE Hub could house or support a combination of activities including resource aggregation, storage and treatment, reuse & repair centre, start-up incubator, matchmaking and network development services, academic collaboration for R&D, and local supply chain development.

6 Clean Growth Hubs and Clean Growth Hub expansion

Building on the methodology and conclusions arising from the original concept CR Plus, Cluster partners and supporters will explore additional hubs, where place-based co-location of low carbon solutions, at or near industrial activity can support decarbonisation, growth and the development of major infrastructure.

This programme will include assessing clusters of activity within the Hub and around Plan spokes and is likely to generate or connect a number of proposed projects and partnerships as a result.

5 Natural infrastructure and Nature Based Solutions

Plan partner, the West of England Mayoral Combined Authority's Local Nature Recovery Strategy was the first of its kind to be published in England.[18]

The Combined Authority is working within the West of England Climate and Nature Partnership to deliver and highlight priority programmes, including in the Cluster Hub, that could have a combined carbon sequestration, climate resilience and nature recovery impacts.

These include the Severn Shoreline Levels and Moors programme, which aims to work with expand key intertidal habitats, improve climate resilience, preserve carbon rich peatlands and link with shoreline management schemes led by the Environment Agency.[19]

Within the West of England Climate and Nature Partnership's programmes, investment opportunities are developed on an ongoing basis. Opportunities are supported by pioneering mature market platforms such as Bristol Avon Catchment Market[20] established by the Avon and the Wiltshire Wildlife Trusts and operated by Entrade – the UK's leading nature market place.

[18]The Local Nature Recovery Strategy (LNRSs) are 'a new, England-wide system of spatial strategies that establish priorities and map proposals for specific actions to drive nature's recovery and provide wider environmental benefits', as set out by Government in the Environment Act 2022.
[19]WENP
[20]Building investment ready programmes

Plan enablers

Enabling **'Roots'** reflect the underpinning systems, actions and collaborations that are most essential to making the application of Cogs a reality in the West of England Industrial Cluster. Cluster partners have undertaken consultation via survey, workshop, business breakfasts and one-on-one discussion with businesses, developers and local and combined authorities, on matters which could either enable or hinder plan delivery over the coming years.

Perspectives on material enablers differ between small emitters, large emitters, project developers across sectors and between public, private and third sector stakeholders. The price of decarbonising (i.e., the comparative costs of electricity, gas, hydrogen and carbon and new equipment needed to use these) is a consistent and material consideration which we have sought to address in forecasting with realistic assumptions.

Aside from this, the most material themes are summarised in the Cog and Root Model as the following 'Roots':

1. National and regional policy and infrastructure
2. Skills and supply chain
3. Investment
4. Public/private collaboration
5. Stakeholder engagement
6. Research and innovation

Within the Foresight framework, Cluster partners have considered and agreed enabling actions in each of these areas, as set out below.

These will be prioritised and actioned within our phased Cluster exploitation plan summarised in the Executive Summary and Section 5.

National and regional policy and infrastructure

1. **Co-ordinating and aligning national policy interactions** with Government and relevant departments, providing information and insight to promote policies aligned with regional industrial decarbonisation and growth.
2. **Supporting Network Operators,** including Wales and West Utilities, National Grid, Vattenfall and bodies such as NESO, and project developers, to analyse supply and demand data and further develop strategic proposals (see also research and innovation below).
3. Illustrating and promoting the **opportunity for local authorities** to use their planning.

Skills and supply chain

1. Working in partnership with local and regional partners and stakeholders to update our regional skills need and gap analysis to reflect the aims of the Plan and promote regional programmes that **ensure skills availability for delivery**.
2. Developing and aligning individual skills initiatives and partnerships at the Hub, some of which are illustrated below, creating an virtual academy without walls which enables **greater accessibility** of training and job opportunities relevant to the Plan to local residents.
3. Undertaking an assessment of likely **supply chain risks** for key project or plan related areas; exploring the potential for cross-project or cross-cluster procurement of sustainable components and materials.
4. Working with partners to further develop a local supply chain directory, **promoting provision of good and services by local suppliers**, particularly local SMEs, drawing learnings from large projects in the region such as Hinkley Point C and partners such as Bristol City Leap to ensure local supply chain development opportunities are identified and supported as far as possible.

PAS Skills Academy Without Walls - A collaborative skills ecosystem

Stakeholders are coming together with a number of supporting initiatives/services to better understand, deliver and maintain the skills ecosystem required

Bringing together employers, local authorities, communities, educators and other stakegolders; skills requirements, trainers and trainees, curricula, courses, training facilities (online and face-to-face), career and job opportunities and supporting resources into a place based and collaborative skills ecosystem.

PAS Colleges Collaboration and Study[1]	Lawrence Weston Renewable Energy & Green Skills Academy	West of England Combined Authority Growth Hub and skills initiatives	LIDP Skills plan to enable exploitation and delivery of LIDP[2]
SevernNet Skills Forum	SevernNet Pilot Online resources	City Leap Rollout UWE Initiatives	Bristol Wind Terminal & other planned projects
CUA - Place based green skills	Support for schools inc. Bristol Future Talent Partnership, Green Schools Project	Avonmouth Spear Centre & Space4Makers	Mission Net Zero + BCC Skills and Learning Service - Employment Skills Team

[1]City of Bristol College, South Glos and Stroud College and Weston College are working collaboratively with SevernNet to develop more comprehensive skills delivery across PAS
[2]LIDP - Local Industrial Decarbonisation Plan

Investment

1. Working with partners to **disseminate information about grant funding** opportunities available in areas aligned with the Plan, particularly at the Hub where 97% of businesses are SMEs.
2. Integrating our project pipeline into the regional project pipeline being established by Mission Net Zero, to **jointly promote regional opportunities**.
3. Supporting, alongside Bristol and Bath Regional Capital, project partners, programme partners and industry to **engage with our growing network of investors** across the range of capital types most appropriate for their needs.
4. Working with regional impact and community energy focussed investors including the West of England Growth Fund to enable **inclusive access to funding** opportunities and local ownership.

Public/private co-ordination and collaboration

In particular in relation to **planning and transport** – key identified enablers:

1. Establishing a **single industrial point of contact** at each of our three local planning authorities.
2. Establishing a **quarterly planning forum**, comprised of industry and local government representatives, to enable knowledge sharing on new technologies, projects and risk management.
3. Aiming to effectively use the West of England Mayoral Combined Authority's powers and influence to enable the strategic assessment of land use for nature and facilitate access (where needed) to offsite **biodiversity gains**.
4. Prioritising a **transport strategy for the Hub** which enables sustainable continued growth, minimises disruption and promotes accessible, active travel building on existing work by SevernNet and the Western Gateway's Rail Deal.

Stakeholder engagement

1. Maintaining momentum amongst **local stakeholders,** sharing information, progress and encouraging participation.
2. Undertaking **site surveys** with targeted industrial sectors and emitters, supporting economic, low carbon choices and helping them to find their most economic route to net-zero.
3. Maintaining momentum and relationships with **regional and national stakeholders,** promoting partnerships and joint-working and funding opportunities .
4. Building on work undertaken by Hydrogen South West in the transport space, further **assessing local demand** for hydrogen in industry and non-road mobile machinery (NRMM).

Research and innovation

- Working with Mission Net Zero to update **improve and streamline access to energy and emissions data** across the region via a shared platform.
- Collaborating with the wealth of partnerships and fora in our region to enable **scientific, academic and research partnerships** with industry, projects and programmes.
- **Sharing information** with other Clusters and industrial areas, enabling collaborative knowledge sharing and continued learning.

Contextual Emission pathways

In developing the plan, we have taken into account publicly available pathway (or scenario) information from the Intergovernmental Panel on Climate Change (IPCC), the UK Climate Change Committee (CCC), the Department for Energy Security and Net Zero (DESNZ), Department for Transport (DfT), the National Energy Systems Operator (NESO) and sector regulators.[1]

Led by the University of the West of England (Bristol), potential carbon abatement pathways for the Cluster were assessed based on the analysis of relevant enterprises (or types of enterprise), the type of industrial process, amount of CO_2 emitted, size of the enterprise, availability of infrastructure, energy, current trends, government strategies, policies and incentives, maturity level of each technology, and social and environmental sustainability to estimate future scenarios for reducing greenhouse gas (GHG) emissions across various sectors.

This analysis was supplemented with insight gained from stakeholder engagement and site-based surveys which employed the Cogs and Roots approach described above, as well as the achievements to date of local businesses and partners committed to decarbonisation.

The nature of our largest businesses and their likely pathways to net zero means that Carbon Capture and Storage (CCS) will have the greatest impact on overall emissions, due to the statistically overwhelming emissions from power generation and energy from waste facilities.

However, the diversity and number of businesses across other industries in our Cluster means resource efficiency and energy efficiency (REEE), electrification enabled by renewables and access to hydrogen will benefit the greatest number of companies. Whilst these industries contribute significantly fewer emissions in our cluster than the power producers, decarbonising them in a viable way across our cluster will have the largest impact on retaining jobs and growing GVA within our region; due to the relative number of people employed.

We have developed specific pathways for different elements of the plan and these are summarised below. Appendix II outlines out the baseline we have used to inform development of the pathways and appendix III summarises the analysis that lies behind them.

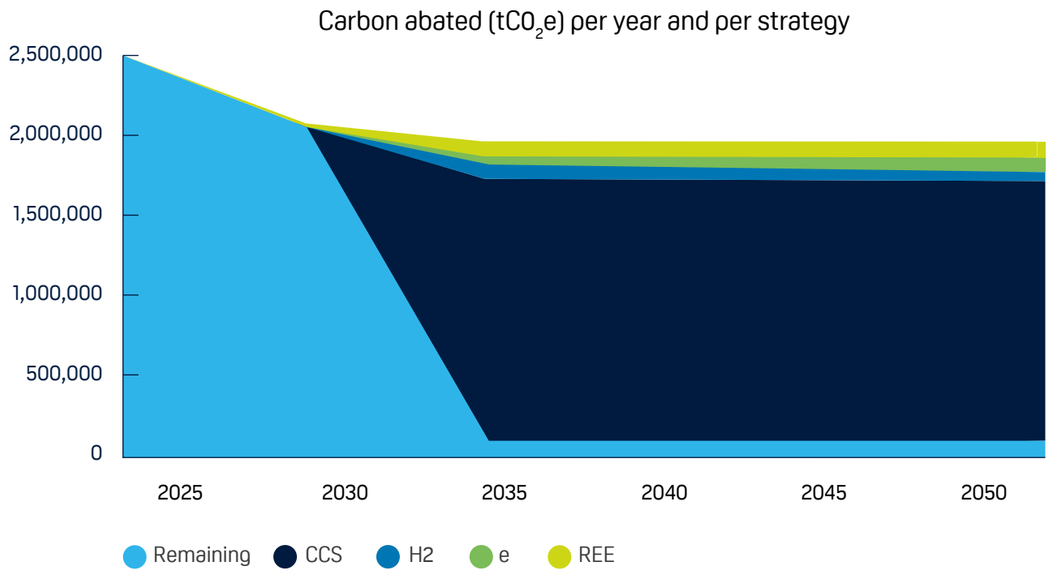


Figure 9: Pathway for the Hub.

Hub

Our Hub pathway sees CCS scaled up from 2030 to decarbonise the two energy from waste sites and Seabank Power station, which becomes part of the UK's network of dispatchable power stations with CCS. The 7CO_2 terminal and non-pipeline transport infrastructure is modular, so can be built to accommodate the required level and combination of connections at the Hub, Spokes or both.

The majority of industry at the Hub decarbonises through a combination of REEE (from 2025), electrification and hydrogen (by 2035), which is utilised for more intensive industrial processes (such as plasterboard manufacturing), some heavy goods transport (scope 1) and NRMM.

Minimal residual emissions remain which could be offset with negative emissions (GGRs), including from local energy from waste sites implementing carbon capture (see below) or nature based solutions.

The technology attribution chart below is based on known energy consumption data derived from a small subset of key stakeholders and active Cluster supporters. However, when data is extrapolated to the up to 1000 businesses at the Hub it is likely that a) the share of Logistics and Supply will be higher and b) that the demand for all solutions, save for CCS, will increase.

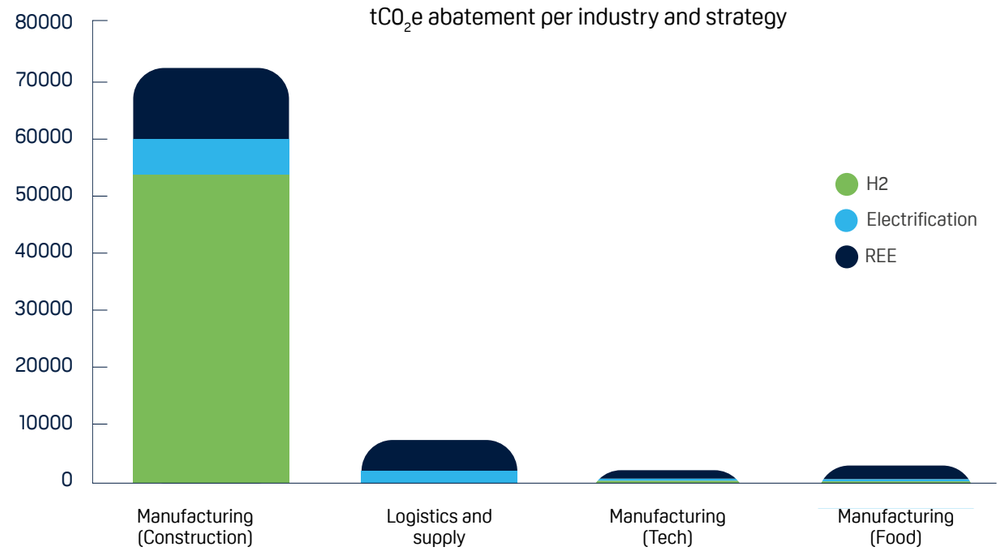


Figure 10: Abatement strategies by sector.

Spokes – West of England Cluster

At Spokes within and just outside the West of England Region decarbonisation is likely to occur with a combination of REEE, electrification (lighter manufacturing) and hydrogen in more intensive industrial processes such as brick manufacture, heavier goods vehicles (scope 1) and non-road mobile machinery (NRMM).

At these sites our forecast sees some access to hydrogen for industrial processes is available from 2030 with onsite production and blending, scaling up from 2035, complementing electrification and REEE as drivers of decarbonisation.

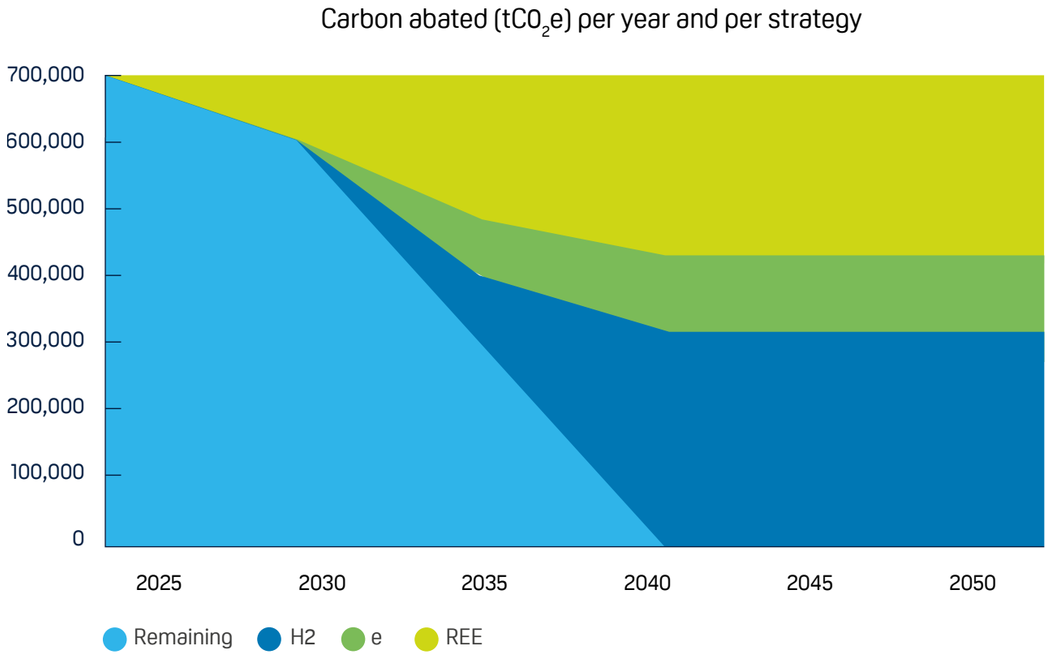


Figure 11: Pathway for the wider West of England Region beyond the Hub.

Spokes - CCS

There are only certain sites – EfW and Cement spokes - that are likely to require CCS under all scenarios.

At CCS spokes, the 7CO_2 terminal scales up from 2030 enabling Net Zero at CCS spokes by 2040. Our forecast reflects the potential for rail and local emitters to connect at the same time or in any combination to the 7CO_2 terminal. Demonstrating the potential of both rail and shipping as close as possible to 2030 would enable 7CO_2 to act as a model for non-pipeline transport and a catalyst nationally.

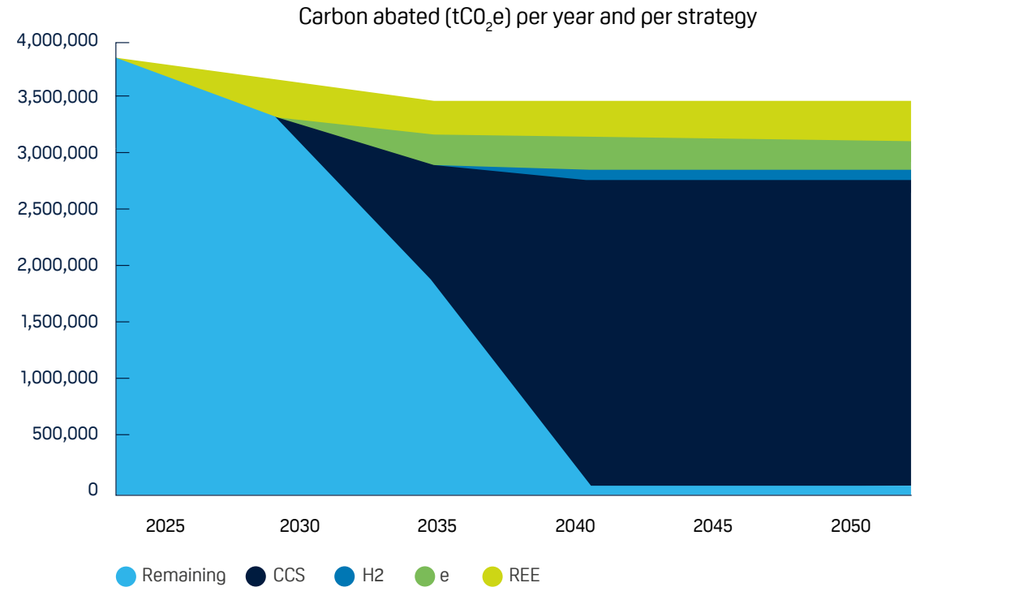


Figure 12: Pathway for the CCS Spokes.

Negative emissions and efuels

Around 50% of the CO_2 emitted at energy from waste sites at the Hub and at CCS Spokes is biogenic, meaning it comes from non-manmade sources that would have otherwise degraded into the atmosphere. When biogenic carbon is captured and stored, CO_2 is removed from the atmosphere.

A 2024 study undertaken by Isometric for Viridor, Enfinium and partners at the Coalition for Negative Emissions established that there is a clear pathway for EfW with CCS to generate high quality and high durability Carbon Dioxide Removal (CDR) Credits, subject to robust monitoring and verification.[21] The report confirms that revenues from sale of CDR credits are expected to compensate for the overall costs of the selected carbon capture technology, transport and storage.

Sending the biogenic 50% of the CO_2 captured from energy from waste sites to store could generate negative emissions (CDRs) of over 1mtpa from the five suggested energy from waste sites.

These negative emissions could play a role in a local market, supporting Cluster industry with offsetting where this is unavoidable (e.g. for minor EfW residual emissions or aviation).

Carbon capture at any of the proposed sites also enables some CO_2 to be used, alongside green hydrogen, to produce carbon neutral alternative fuels such as Sustainable Aviation Fuel.[22] The Department of Transport has confirmed that it will only provide incentives for SAF made from wastes, residues or low carbon energy. This ensures that the risks of using crop-based feedstocks which could result in deforestation and competition with food are avoided.

A feasibility study undertaken by Apollo Engineers as part of the LIDP indicated that the volumes of CO_2 capture enabled by the 7CO_2 terminal at energy from waste sites are likely to far exceed demand for CO_2 for sustainable e-fuels, even produced at scale, meaning both CCS and CCU are possible. CCU would further reduce or compensate for the overall cost of capture, transport and storage (if applicable).

[21] Final_Energy-from-Waste as a carbon removal pathway in the United Kingdom_CLEAN
[22] https://assets.publishing.service.gov.uk/media/66cf1f76a7256f1cd83a89c0/pathway-to-net-zero-aviation-developing-the-uk-sustainable-aviation-fuel-mandate.pdf?utm_source=chatgpt.com

Transport and alternative fuel (scope 3 emissions)

As a key transport hub for the South West, South Wales and the entire M4 Corridor, our Cluster is likely to have significant demand for power for electric vehicles and charging, as well as hydrogen and alternative fuels to power heavy goods transport. Our Port based location and proximity to national airports mean we have potential to connect projects and contribute to the decarbonisation of maritime and aviation sectors.

In October 2024, Hydrogen South West undertook a study demonstrating that in a low-demand scenario, (2% hydrogen uptake), potentially 7,000 commercial vehicles in the South West could be running on hydrogen by 2030 within the region requiring 88 tonnes of hydrogen per day to support their operations.

Bristol Airport is one of the fastest growing airports in the UK, with existing and new routes seeing exceptional demand in recent years. It is also spearheading a number of initiatives, investments and partnerships with airlines such as Easyjet and manufacturers such as Airbus to accelerate the adoption of zero carbon fuel (hydrogen and SAF), technologies and aircraft.[23]

The University of Exeter's Centre for Clean Mobility, a Hydrogen South West member, is undertaking UK wide forecasting of demand for clean maritime fuel over a 5-15 year period, alongside the UK's proposed expansion of the energy trading scheme to domestic maritime fuel, which could result in crystalised demand in Port regions in the South West for alternative bunker fuels.[24] Vessels serving Bristol Port's offshore wind terminal are likely to require clean fuel options.

The scale of this demand and decarbonisation potential of projects relevant to transport does not appear in our forecast, as most transport emissions are scope 3 for industry (and thus not often measured consistently or well enough to baseline and forecast). However, delivery of our plan will result in heavy goods transport, aviation and shipping also benefiting from local hydrogen, alternative and e-fuel production, enabled by key industrial decarbonisation projects and the significant presence of carbon with potential for capture in the region.

Risks and mitigations

The key risks and mitigating actions associated with delivery of this plan have been reviewed within the Foresight framework led by the University of the West of England (Bristol) and are summarised in appendix I. Three key macro risks identified are described briefly below.

National policy and infrastructure

Across the country, major projects, industry decisions, investment and local government actions are enabled by national policy and the ongoing attractiveness of the UK as an investment jurisdiction.

National policy and business models are particularly significant for major regional infrastructure projects, such as carbon capture and storage (non-pipeline transport), hydrogen production (low carbon) and alternative fuel (e.g. SAF) production where markets are nascent and globally competitive. Building on its leadership to date, continued policy commitment, certainty, consistency and pace are essential contributions to the project fundamentals that enable continued private investment.

Policy commitment and certainty are also highly relevant to industry. This will respond to incentives, disincentives and schemes that make choosing low carbon options more affordable than high carbon alternatives. This is particularly the case for small and medium sized businesses.

Continuing schemes such as the IETF is essential to make access to decarbonisation technologies for SMEs cost effective.

Country wide constraints in grid capacity could be a risk to decarbonisation if upgrades cannot be prioritised. As a Cluster focussed on the growth of its green economy, it is essential that our national grid is able to support nationally significant projects of scale, recognise the particular need for power in port regions and support the transition by industry and transport to electrification and hydrogen.

Where possible, our Cluster will aim to de-risk investment linked to policies or Government decision making through co-ordinated action, risk sharing and collaboration. Our power options across a range of projects include private wire connections where possible, including from significant new power generation projects such as nuclear and renewables.

[23]bristol-airport_sustainability-report_2023_final-version_1223-pdf.pdf
[24]Maritime Clean Fuel Forecasting – Centre for Future Clean Mobility

Climate resilience

Resilience to climate-related risks including flood, extreme temperatures and storms is a global risk, which could impact the development of projects and the resilience of the industrial built environment and transport.

The West of England Combined Mayoral Authority (MCA) welcomed the UK Government's invitation to participate in the Adaptation Reporting Power 4th round Local Government pilot (or ARP4) which invites infrastructure providers and bodies with functions 'of a public nature' to provide reports on how they are managing climate risk.

The ARP4 report covers the MCA region (covering the Unitary Authorities of Bath & North East Somerset, Bristol, and South Gloucestershire) including the major cities of Bristol and Bath, the large towns of Yate and Radstock and a Severn Estuary coastline. It sets out how the MCA is approaching climate risk management through a new climate resilience work programme.[25]

In 2024, 17 kms of new and improved flood defences (designed to protect against a 1 in 200 years tidal or fluvial flood event) were completed under a £90m project funded by the West of England Economic Development Fund and the Environment Agency.[26] The Government has recently committed a further £43m to a Bridgwater Tidal Barrier Flood Defence Scheme, in Somerset. Finally a range of nature restoration focussed projects have been carried out in the area which also serve to improve flood resilience.

Collectively, these make the West of England Cluster amongst the most resilient places to undertake projects. Ongoing resilience, particularly to sea level rise and extreme temperatures will be kept under review by the local and combined authorities.

Resource scarcity

Water

Data from the UK's third national climate change risk assessment (2021) in relation to South Gloucestershire (and other parts of our area in the South-West) show that we are likely be far less impacted by water scarcity than other regions of the UK (although we will still be in water deficit by 2100). Natural resource, particularly water scarcity, remains, a potential risk for industrial decarbonisation and local ecosystems, however particularly where projects may require significant amounts of (for example) cooling water.

Geneco (Wessex Water) provides liquid waste treatment services at 11 sites across the South West, using an end-to-end process that produces renewable energy, bio-fertilisers and grey water for industrial use. Geneco already works actively with industrial partners on potential for water conservation via 'grey' or wastewater supply. Wessex Water supplies wastewater to, for example, Seabank Power station for cooling operations. As a member of SevernNet and a Cluster supporter, Geneco is actively working with partners and supporters on potential future collaborations.

In addition, local success stories that have illustrated the potential to enable the re-use of rainwater, storm overflow and industrial wastewater as feedstock, for example, the production green hydrogen, could see each of the environmental barriers, operational barriers and costs of green hydrogen production in our region reduced.[27]

Land

Recent growth and development across the Hub, coupled with increasing demand for land for housing and the need to preserve nature, means that a strategic approach to land management is required across the region, particularly where land is in Local Authority ownership. We recommend collaboration and investment in (or development of) shared tools to support optimal land use both across the Hub and wider region.

[25]South Gloucestershire Council Adaptation: ARP4 report
[26]Map and Timeline – Avonmouth and Severnside Enterprise Area (asea-flood-ecology.co.uk)
[27]Waste water to hydrogen: WWU's success story | The Institution of Gas Engineers and Managers (IGEM)

4. Plan impacts

Industry

For industry, our plan will enable access to the infrastructure and technologies required to reduce carbon emissions and ultimately reduce costs. Ongoing collaboration will enable increased knowledge sharing, access to expertise and guidance, as the efficiencies that arise from shared information and joint investment. Co-ordinated focus on enablers including skills, supply chain, public-private collaboration, research and innovation will present opportunities and improve the operating environment for all sectors.

Economic

Our LIDP is also an enabler for both decarbonisation and economic growth. We estimate that delivery between now and 2040 could contribute c.£3.5bn to GVA and create over 15,000 jobs, as well as supporting the preservation of the existing 30,000 jobs at the Hub and more, at Spokes beyond.

The West of England region has a proud history of creativity and innovation, and a strength in engineering that has driven the success and development of our region for generations. It is the most productive city region in England outside London: 53% of our workforce hold higher-level qualifications and Bristol is ranked the top UK city for tech jobs, with 33,000 jobs in 2023.

The West of England Mayoral Combined Authority Local Growth Plan is being developed in support of the Government's mission to secure the highest sustained growth in the G7 – with good jobs and productivity growth in every part of the country. It will look to build on regional successes, prioritising clean energy generation and innovation and the growth of sectors and the industries supporting it over the next 10 years.

The West of England Industrial Cluster will be at the heart of this growth. It is already home to major employers and anchor institutions that create jobs and economic growth - not only within the region but across the country. Supporting industry to decarbonise will be key to delivering on our goals, reflecting our proud history of energy innovation and promoting economic growth across the region.

While our region is prospering, 150,000 residents live in some of the most deprived neighbourhoods in the country and further positive impact opportunities arise as a result of the Plan, discussed below. Our Local Growth Plan and LIDP represent opportunities to ensure that economic growth and development are inclusive, sustainable and benefit all.

Social

The future evolution and delivery of our Plan is an opportunity to promote a Just Transition at the Hub and the West of England Spokes. This can then be an exemplar to others. Our transition will seek to maximising positive impacts and anticipate or mitigate any negative impacts on regional workers, communities and supply chains.

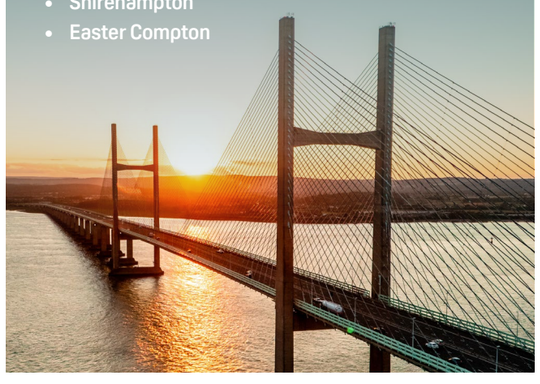
There are 12 villages in and adjacent to the Hub, the resident population of which is estimated to be around 30,000. The majority in the key ward of Avonmouth and Lawrence Weston are of working age. The population of the wider West of England Combined Authority region is over 1.1 million people.

The Hub itself is home to a number of thriving community groups and residents' organisations ranging from supported community centres, food banks and jobs, through to training and enterprise Hubs. These have implemented significant plans in the area (e.g., a £2.2m community hub in Lawrence Weston) and have ambition for more (e.g., see Lawrence Weston case study).

At the same time certain communities at the Hub such as Avonmouth and Lawrence Weston rank relatively highly on national deprivation metrics and specific measures such as: children living in low income families (23%); children known to social care or with child protection plans; adult educational attainment levels; healthy lifestyles and premature mortality compared to other Bristol and West of England regions.

Our villages

- Pill
- Easton-in-Gordano
- Portbury
- Portishead
- Avonmouth
- Shirehampton
- Easter Compton
- Sea Mills
- Lawrence Weston
- Hallen
- Severn Beach
- Pilning



Case study

Ambition Lawrence Weston is driven by residents striving to make Lawrence Weston a better place to live and work. Amongst other achievements, it has:

- Developed England's tallest onshore wind turbine as a 4.2MW community owned asset
- Established a new Community Hub – Ambition House
- Brought £12.5m investment into the local area
- Supported the delivery of Lawrence Weston Solar Farm

Positive impacts of delivering the plan are likely to include improved access to good quality training and employment opportunities, increased income resulting from economic growth, improved indoor and outdoor air quality, and improved health outcomes as a result of both the reduction in CO_2 and (for example) transition away from diesel plant and vehicles over time. Our analysis will be deepened and metrics monitored in the delivery phase.

The opportunity to increase community investment, regeneration and to develop an increased sense of ownership and pride in place is fundamental to the plan. A number of plan partners and supporters already run or contribute to community schemes in the wider region, from more traditional grant funds such as EDF's Hinkley C £20m community impact fund[28] and SUEZ Communities Fund[29] to revenue share arrangements including Bristol City Leap's £2.8m Community Benefit Fund generated from heat sales and matched by Ameresco.

The West of England also already has a thriving community energy network, supported by partners. The West of England Mayoral Combined Authority runs a local energy scheme enabling project development and cost reduction[30] and plan partner Bristol City Leap operates a £750,000 Community Energy Fund supporting community-led energy projects through a combination of grants and loans.

Delivery of the projects within this plan should build on existing initiatives and structures across the Cluster, encouraging and exploring innovations and synergies as the plan delivery evolves. We will do this by, for example:

- Supporting access to local corporate grants, whether CSR, Section 106 or other similar schemes, by encouraging providers to link up with a one-stop shop platform such as 'Quartet,' which reduces the administrative burden for community organisations.
- Encouraging consideration of revenue sharing approaches between corporates and community groups.
- Encouraging accessible co-investment opportunities with minimum investments that are within the reach of everyone (£ not £00s).
- Recognising that communities of neighbourhood (as compared to communities of interest that may come from outside a local area) have limited capacity and may need support in capacity-building, but typically offer longer-term and more sustainable local benefits.
- Seeking to consult on and explore potential for community engagement in infrastructure and energy projects to a greater extent than is often the case on development projects, building a sense of partnership and common interest between industrial and community stakeholders.

[28] HPCCF_2023FundReport_MR.pdf
[29] SUEZ Communities Fund Accepting Applications for First 2025 Funding Round - VSI Alliance
[30] Local Energy Scheme - Combined Authority

Potential negative impacts, to the extent identifiable at the date of this plan, include short-term increases in traffic and construction activity arising from development. To the extent possible with projects at an early stage these have been considered and potential preventative steps included in the plan's priority enablers (for example, in the transport strategy for the Hub).

Finally, while jobs and skills are a priority, fair terms and well-paid work and access to opportunity for all, are essential. At a minimum, delivery of the plan will be an opportunity to promote and check adherence to the West of England Mayoral Combined Authorities' Good Work Charter. The Charter is a free tool designed to support organisations boost productivity and achieve higher growth while promoting seven key benefits of good employment including security, flexibility, wellbeing and development. Organisations can pledge to become an 'employer of choice' within the scheme.[31]

We will encourage employers to consider and where possible go beyond the charter by offering work that would particularly suit some parts of our community, for example, by offering flexible work that accommodates single parents or childcare hours; apprenticeships for adults that do not require GCSEs (taking advantage of recent rule changes), and straightforward, local, application processes. The plan is also an opportunity to collaboratively build on diversity and inclusion programmes and implement the recommendations of studies undertaken regionally by Cluster partners such as Hydrogen South West [32] and the University of the West of England (Bristol) and nationally by, for example, the National Infrastructure Commission.[33]

A project bringing together academics across different disciplines from UWE and the University of Bath has recently been funded to explore the interface between community, industry, and environmental concerns in the PAS area in relation to decarbonisation and just transition. The project will enhance collaboration between universities and key WEIC's partners and stakeholders and will strengthen the inclusion of communities' voices and perspectives to support a successful place-based decarbonisation.

Environmental

The West of England region has five National Character Areas (NCAs) and one river catchment. Our region is a place of great natural diversity, with two National Landscapes (previously called Areas of Outstanding Natural Beauty), 5,000 hectares of onshore Sites of Special Scientific Interest, and important marine habitats and tidal resources in the Severn Estuary. Alongside these special interest areas, other areas of the Hub are longstanding brownfield sites at, or adjacent to, the Port.

Environmental impact assessments are expected to be required for all significant projects related to industrial decarbonisation and many (if not all) subject to mandatory Biodiversity Net Gain requirements. The co-benefits of nature, including health related benefits, are significant in our region, and we will maintain a focus on this in all projects.

The West of England Mayoral Combined Authority's UK leading Local Nature Recovery Strategy, alongside strong local authority, stakeholder and regulator relationships and expertise are expected to enable decarbonisation projects to be undertaken in a way which fully anticipates, best preserves and enhances our natural environment. Public access to nature will continue to be a priority.

[31]The West of England Good Employment Charter | HomeWest
[32]Hydrogen South West launches Women in Hydrogen report — Hydrogen South West
[33]Infrastructure-Diversity-Charter-Five-Principles-Poster.pdf

Case study - Severn Shoreline, Levels and Moors

The Severn Estuary is one of the most important coastal ecosystems in the UK, with one of the largest tidal ranges in the world. It is internationally recognised for its significance to wildfowl and wading birds and migratory fish species. Many other species rely on the intertidal habitats, levels, and moors, including otters, water voles, bats, and great crested newts, as well as rare plants and invertebrates.

The areas within this programme are recognised by Natural England as Coastal Floodplain Grazing Marshes, a priority habitat made up of a mosaic of grasslands and wetland features. They complement The Environment Agency's Shoreline Management Plan for managing flood and coastal erosion risk and we are already working closely with the Environment Agency to explore opportunities.

Cultural

We expect the plan to enhance the West of England's sense of place as a region where creativity, independence, economic growth, individual wellbeing and green initiatives and sustainability initiatives co-exist together. We also expect projects, developments and activities related to our plan to engage with and work to enhance the heritage, cultural, tourism strengths of the region.

Culture and tourism at the Hub centre around nature and the outdoors. The Hub is home to leisure and tourist exemplars from Bristol Zoological Society (Wild Place Project) and the Wave, to heritage assets such as Kings Weston House. Walking and cycling is popular at the Hub, particularly at and around Severn Beach and ongoing drives to improve access across all wards exist including Severn Ride and Stride.

Recent precedents highlight that development can successfully consider local archaeology, monuments and heritage in design and surveys as well as work to improve foot and cycling paths adjacent to any activities.[34] South Gloucestershire's strategic infrastructure-led masterplan for Severnside (which has now been superseded by the Local Plan) is a rich resource which notes a variety of sites of historic significance designated by trails, memorials or preserved by local groups.[35]

Our Local Authorities and community and business networks such as SevernNet will work collaboratively with industry and developers to promote local culture alongside decarbonisation and low carbon development.

[34]Bristol's water recycling centre | Wessex Water The Mere Bank | Wessex Water
[35]Strategic infrastructure led masterplan for Severnside

5. Recommendations and next steps

The West of England Industrial Cluster will grow over the coming years, becoming a nationally and regionally recognised advocate for decarbonisation and growth in the West of England. The Cluster will be a focal point for collaboration on industrial decarbonisation across technologies, a knowledge bank and a conduit for funding where appropriate.

This report makes seven immediately actionable recommendations to support delivery of this vision and the wider benefits and impacts. These are summarised in the table below.

Priority	Recommendation	Responsibility	First steps
1	Establish the **Cluster** as a self-sustaining model, able to grow, oversee and co-ordinate delivery of the plan (see below)	West of England Combined Authority	Establish Cluster governance, oversight and future operating model within 6 months (Phase 1);
2	Continue 'on the ground' **stakeholder engagement** and partnership building	SevernNet	Support the Cluster dissemination plan and ongoing project and programme delivery
3	Improve and streamline **data** gathering, management and monitoring for future phases and broader use	Bristol City Council	Integrate LIDP data with Mission Net Zero's regional platform
4	Support **funding** applications, fund raising and policy support for projects	West of England Combined Authority	Integrate pipeline with regional pipelines developed by Mission Net Zero and Bristol and Bath Regional Capital Promote public funding opportunities Amplify project potential within regional Growth Plan
5	Anticipate **skills** need, consider availability and improve accessibility at Hub and for projects	SevernNet, Universities, West of England Combined Authority and local colleges and skills leaders	Update regional green skills assessments and establish academy without walls
6	Commence **programme delivery** (Circular Economy, Clean Growth Hub expansion and Nature)	West of England Combined Authority and programme leads	Co-ordinated kick off (where funded)
7	Undertake priority follow on **research** in partnership including Skills, Just Transition and NRMM/maritime	Lead partners	Co-ordinated kick off (where funded)

These immediate recommendations fit into a wider framework of planned development phases for the Cluster as follows (timescales are our current intentions, acknowledging that funding horizons and decision timescales can be uncertain):

Phase 1: Establishment (~6 months – starting in March 2025)	This phase will establish a sustainable, long term governance and operational framework for the Cluster including the many partners and supporters who have developed our plan to date. It will see key 'on the ground' initiatives continue, including stakeholder engagement, circular economy network development, data management, skills and the identification of smaller clusters of opportunity (clean growth hubs) – building on work to date. It will support projects and industry through ongoing communication, advocacy and partnership identification. Phase 1 will be funded by the West of England Combined Authority alongside resources from key Cluster partners and supporters.
Phase 2: Delivery (6~18 months)	Priority projects and programme support, implementation and delivery take place in this phase. The Cluster operates as a platform for public, private, third sector and community members to co-ordinate, accelerate, communicate and further develop key project and place-based priorities.
Phase 3: Ongoing support and growth (18 months +)	Continued engagement with members and stakeholders, ongoing project and programme delivery, impact measurement and expansion of activities with consequent local supply chain and community benefits

Glossary

CCC	Climate Change Committee
CCS	Carbon capture and storage
CCU	Carbon capture and utlisation
CDR	Carbon dioxide removal
CNG	Compressed natural gas
CO_2	Carbon dioxide (chemical symbol CO_2)
CSR	Corporate social responsibility
DESNZ	Department for Energy Security and Net Zero
EfW	Energy from waste
FLOW	Floating offshore wind
GHG	Greenhouse gas
GGR	Greenhouse Gas Removal
GVA	Gross value added (an economic term that combines salaries and shareholder returns)
H_2	Hydrogen (chemical symbol H_2)
LIDP	Local Industrial Decarbonisation Programme
LPG	Liquid petroleum gas
MCA	Mayoral Combined Authority
NESO	National Energy System Operator
NRMM	Non-road mobile machinery
PAS	Portbury, Avonmouth and Severnside
REEE	Resource efficiency and energy efficiency
SAF	Sustainable aviation fuel
SCAF	Shirehampton Community Action Forum
SEA	Strategic Environmental Assessment
SME	Small or medium-sized enterprise (normally less than 250 employees)
UWE	University of the West of England
WEIC	West of England Industrial Cluster