



# PCC Net Zero Carbon, Biodiversity, Regional Energy, Climate Adaptation

Steve Keating, Energy & Sustainability  
Team Manager

20<sup>th</sup> December 2023



## **Sustainability Advisory Programme Board established**

First meeting February 2023. Meets bi-monthly.

Member Sustainability Champion appointed – Cllr. Joshua Beynon

Chaired by Assistant CEO - Richard Brown

### **Purpose:**

To provide advice and oversight regarding the Council's decision making with respect to climate change, decarbonisation, and biodiversity obligations; to embed the principle that officers and decision-makers need to evaluate the environmental and social impacts of projects and policies from the very start of decision-making and project development processes; and to facilitate the delivery of the Authority's programme for administration.

# Sustainability Advisory Board

Current work:  
Communications – social media & web pages



**Newsroom**

## Children challenge MP on Climate Injustice

The children of Broad Haven Community School have been displaying their artistic talents and their debating skills for their local MP as part of a project looking at climate change.

As part of the 'Letters for Creation' project, undertaken with Broad Haven Baptist Chapel, pupils were given the chance to explain how they feel about climate injustice through artwork, rap, drama and speeches. On Friday morning, they were able to present this work to Preseli Pembrokeshire MP Mr Stephen Crabb.

The children gave Mr Crabb a tour of the exhibition in Broad Haven Chapel, explaining the artwork, their feelings about climate change and the injustices of poor countries being more affected than the wealthy.

**COMING SOON**

**Green Pembroke** @GreenPems

4 Tweets

**Green Pembroke** @GreenPems · 4 May

#NoMowMay

**Green Pembroke** @GreenPems · 4 May

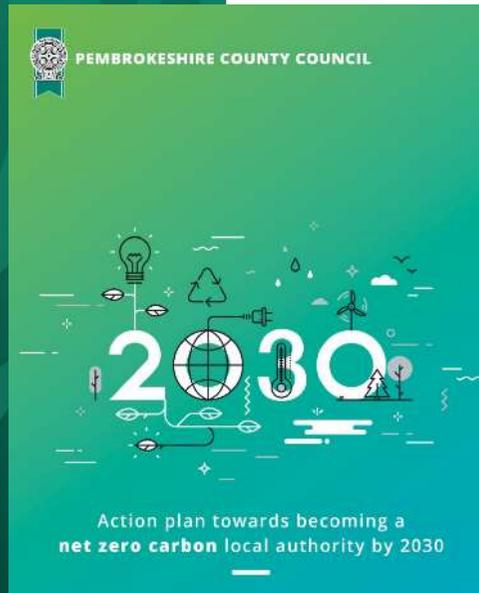
No Mow May / Mal Di Dor

Instagram - @greenpems

**Green Pembroke Retweeted** Joshua Beynon @joshuaboynon97 · 24 Apr

It was a pleasure to deliver a talk today in @PemsCollege around climate change, sustainability and biodiversity. I'm looking forward to continuing to work and engage with people all across Pembrokeshire on behalf of @Pembrokeshire

# Net Zero Carbon Action Plan Towards Becoming a net zero carbon LA by 2030



- In May 2019 members of PCC voted to declare a climate emergency, and in July 2019 members voted to create an action plan to steer Pembrokeshire County Council towards becoming a net zero-carbon local authority by 2030.
- The 38 actions in the plan are the first step in a range of measures the Council is looking at, to help address climate change.
- It is intended to be a living document and will evolve over time.



## Two NZC strands

- Decarbonise assets within our direct control - council buildings, street lighting, council transport fleet, business mileage.
- Drive and influence the decarbonisation of the wider Pembrokeshire area through showcasing, collaborating and engaging the community.
- Our net zero 2030 plan recognises that however energy/carbon efficient our services become they will inevitably still have a residual carbon footprint. This residual carbon footprint could be compensated for by the generation of renewable energy and/or via carbon offsetting

<b>Carbon Footprint reduction (energy efficiency / net zero buildings/ alternative transport fuels etc)</b>	<b>-</b>	<b>Renewable-energy Generation Carbon Offsetting</b>	<b>=</b>	<b>Net Zero Carbon</b>
---	----------	--	----------	------------------------

# Action Plan Towards Becoming a net zero carbon LA by 2030

## Progress

Net Zero Carbon 2030 - CO2 Emissions Progress Summary					!Pandemic year!					
Key Measures of Success	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2021/22 v 2022/23 <sup>1</sup>		
	Result	Result	Result	Result	Result	Result	Result	Progress	% change	
<b>Non-Domestic Buildings<sup>2</sup></b>										
Consumption (kWh)	49,217,855	48,446,196	48,272,333	46,243,055	38,962,782	42,339,035	39,307,973	Improved	-7.16%	
Carbon emissions (tCO <sub>2</sub> e)	12,765	11,762	10,285	9,651	7,858	8,326	7,449	Improved	-10.53%	
<b>Streetlighting</b>										
Consumption (kWh)	2,993,488	2,953,158	2,883,115	2,596,207	2,221,101	1,934,651	1,053,130	Improved	-45.56%	
Carbon emissions (tCO <sub>2</sub> e)	1,345	1,135	886	719	562	447	222	Improved	-50.34%	
<b>Fleet Mileage</b>										
Mileage (miles)	3,255,494	3,307,554	3,463,415	4,006,230	3,762,644	5,002,287	4,024,816	Improved	-19.54%	
Carbon emissions (tCO <sub>2</sub> e)	3,734	3,714	3,848	3,936	3,776	3,665	3,938	Deteriorated <sup>3</sup>	+7.44%	
<b>Business Mileage</b>										
Mileage (miles)	1,841,242	1,786,730	1,858,148	1,853,126	1,152,411	1,657,004	1,995,909	Deteriorated	+20.45%	
Carbon emissions (tCO <sub>2</sub> e)	692	659	681	657	402	566	716	Deteriorated	+26.50%	
<b>TOTALS</b>										
Consumption (kWh)	52,211,343	51,399,354	51,155,448	48,839,262	41,183,883	44,273,686	40,361,103	Improved	-8.84%	
Mileage (miles)	5,096,736	5,094,284	5,321,563	5,859,356	4,915,055	6,659,291	6,020,725	Improved	-9.59%	
Carbon emissions (tCO <sub>2</sub> e)	18,399	17,137	15,563	14,963	12,598	13,004	12,325	Improved	-5.22%	
Notes:										
1 Progress comparison is 2021/22 v 2022/23										
2 For Non-Domestic Buildings PCC have collected data back to 2003 when emissions were 18564 t CO <sub>2</sub> pa. Compared to 2022/23 a 60% reduction has been achieved since 2003										
3 Although fleet mileage decreased the carbon conversion factor increased so emissions are higher even at decreased mileage. PCC also aquired a bus company in 2022/23 thus expanding the fleet and making the MPG efficiency of the overall fleet deteriorate (fewer miles but increased fuel consumption). <i>For consistent comparison non-domestic/streetlighting energy does not include WTT (but does include T&amp;D losses for power), transport does include WTT</i>										
4 Business mileage increased substantially in 2022/23. This is likely in part due to a change of policy to to allow staff to claim mileage direct from their home base rather than having to deduct commuting emissions to and from County Hall/work base as in previous years.										

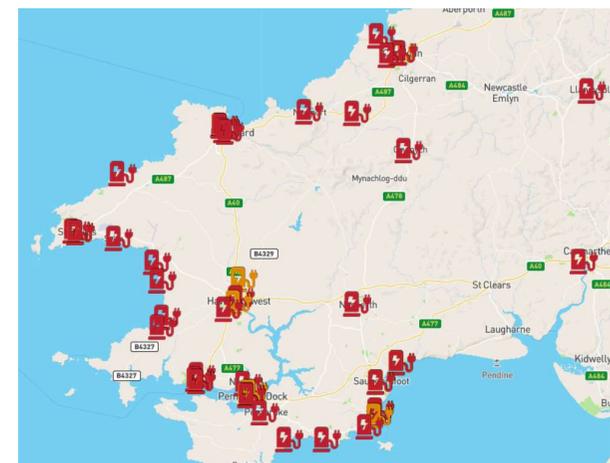
# What are we doing?

- Energy & water efficiency - CO2 emissions from fuels used in over 300 non-domestic council buildings has been reduced by 60% to date. Over 400 schemes – insulation and fabric upgrades, LED, heating & lighting controls, new boilers, variable speed drives, pool covers, CHP, renewables, ventilation heat recovery, rainwater harvesting etc.
- Design for net zero carbon new buildings and low life cycle embodied carbon – Solar PV, ASHP's, Battery storage, 'fabric first' etc.
- Council home energy efficiency – average EPC C rating. Net zero carbon new homes/Homes as Power Stations – EPC rating to be 'A' under new WHQS.
- Purchasing 100% renewable electricity 100% of this now being sourced from within Wales.

Renewable Electricity Type	% Split
Biomass	1.25%
Hydro	0.00%
Off shore Wind	58.70%
Photovoltaic	7.65%
Wind	32.40%
Grand Total	100.00%

# What are we doing?

- Renewable energy generation - small and large scale – PV retrofit, new build, PV partnering with community sector, PV ‘farms’, solar hot water, biomass, ASHPs etc
- Streetlighting switch off/conversion to LED.
- Battery EV charging hubs in 38 geographically dispersed car park locations (Phases 1, 2, 3 & 4)
  - 167 x 22 kW Fast sockets
  - 18 x 53 kW Rapid sockets
  - In addition the new Haverfordwest Multi Storey design includes 32 Fast EV chargepoints with infrastructure installed to allow that to expand to 100 chargepoints as demand increases.
  - We have also installed 4 x further 124 kW Rapids in 4 separate depots around Pembrokeshire to aid fleet transition (Phase 5).
  - Working on home charging solutions for fleet vans
  - EV charging Phases 6 & 7 planned 2023-2025.





## Fleet decarbonisation

- As of summer 2022, PCC operates a fleet of approximately 500 vehicles and over 1,100 items of plant.
- On average, PCC has an annual renewal of 40 vehicles, to the value of an estimated £1.5 million.
- 8 Vauxhall Vivaro e vans were delivered in December 2022 for the building maintenance department. Feedback has been mainly positive with the only concerns being duration of charging.
- Scheduled to replace up to 30 small diesel vans with BEV's in 23/24.
- Scheduled to replace up to 15 3.1T diesel vans with BEV's in 23/24.
- Ultra rapid 124kw chargers have been installed at 4 operational depots across the county (charge to 80% in 35 minutes).

**WGES to support a fleet study based on PCC telemetry data. The outputs of the study will be a classification of suitability of various vehicle options with a ranking order of 1) BEV 2) Range extender BEV with fuel cell 3) HFCEVs.**

**Green H2 production in Pembrokeshire. H2Bay project. Green Travel Plan, Expand Council EV charging network, carry out fleet van home charging trial, investigate staff ULEV leasing.**

# What are we doing?

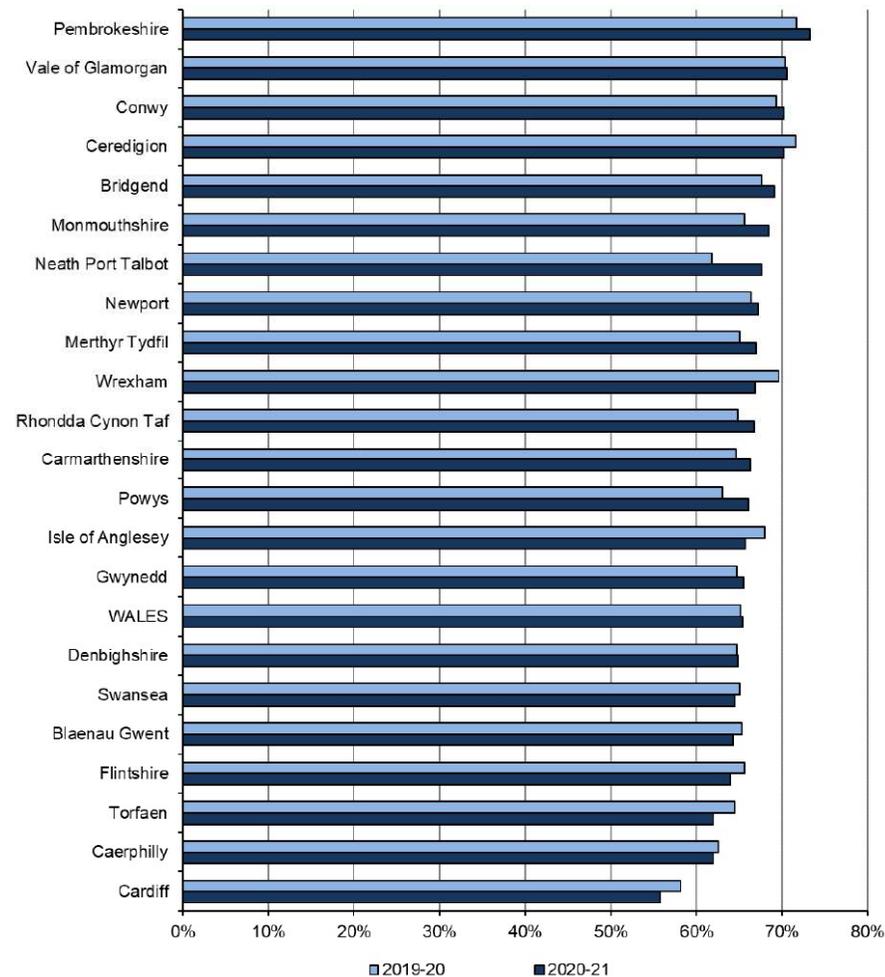
- **Active travel** – e.g. in recent years, PCC has constructed over 11 km of footways and 76 km of shared-use paths (walking and cycling) and developed an ‘Integrated Network Map’ (INM) for Pembrokeshire that sets out its long-term aspirations for active-travel route development for the next 15 years.
- **Carbon sequestration, green spaces, tree planting and biodiversity**- e.g. Biodiversity and Ecosystems Resilience Plan, green infrastructure study, Pembrokeshire Nature Partnership, ‘dark skies’ initiative, and many nature-enhancing projects.
- **Sustainable Schools Award Scheme** - seeks to promote sustainable development and global citizenship-in Pembrokeshire’s schools. It takes a holistic approach to this and encourages schools to embed sustainability and a global outlook throughout their activities. Topics: Biodiversity, Global Citizenship, Energy, Water, Waste and Litter, Health, Transport, Community Citizenship.



# What are we doing?

- **Re-using and recycling** - Pembrokeshire has the best recycling rate in Wales, improving from 72% to 73.5% in 2020/21. Notably this is one of the best recycling rates in the world.

Chart 3: Combined local authority municipal waste reuse/recycling/composting rates, by local authority, 2019-20 and 2020-21



## NZC (in-house emissions) next phase 2023 -2026

### Measure

Further phase of a Re:fit energy efficiency work for multiple measures in multiple buildings. Re:fit offers scale and pace. LED, H2 ready boiler upgrades, insulation, heat pumps etc. Funded via in-house invest-to-save or Salix interest free loans (NZC-03)

All new builds to be NZC in operation (NZC-04)

WG Backlog maintenance funds/Invest-to-save for LED lighting/H2 ready boiler upgrades (NZC-02)

Streetlighting – continue LED upgrade/decommission (NZC-10/11)

PV/Wind farm. Numerous opportunities on PCC land (NZC-19)

Perspective 47 MW of solar or 22 MW wind offsets emissions from all corporate buildings, streetlighting, fleet and business mileage

1.6 MW of rooftop PV (we currently have 0.5 MW on roofs) – community funded (NZC-22)

Solar car parking canopies

Proposals for Fleet ULEV transition – depot EV charging/hydrogen (NZC-12 & 16)

Business mileage (Grey Fleet) carbon reduction (NZC – 15, 16, 17 & 18)

## Well-being plan for Pembrokeshire - Carbon & Nature Literacy Training

- The PSB Pembrokeshire Nature, Decarbonisation and Climate Group are working to deliver Pembrokeshire Wellbeing Plan 'Well-being Objective 3' to *'Promote and support initiatives to deliver decarbonisation, manage climate adaptation and tackle the nature emergency'*.
- ***'Deliver carbon literacy training, or equivalent, to all levels throughout PSB partner organisations to raise awareness of the issues and the action that will be required to reduce carbon use'***.
- ***'Raise the profile of and change the way we think about acting for biodiversity, and the role that all PSB partners have in tackling the nature crisis'***.

Llythrennedd  
Carbon yn Sir Benfro

Carbon Literacy in  
Pembrokeshire

Cod achredu'r cwrs: CC000588

Accredited course code: CC000588



# Pembrokeshire Nature Partnership



- **Membership**

- **23 Organisations:** new members RSPB and Folly Farm
- **915 subscribers across all mailing lists**





# Biodiversity

- Wales is now ranked 16th from the bottom of the 240 countries assessed under the biodiversity intactness index (BII) . Wales' BII stands at 51%. 90% is generally considered the threshold below which ecosystems can no longer reliably meet the needs of society.
- Natural systems underpin our society and economy . These ecosystems provide essential services such as temperature regulation, flood attenuation, pollination of crops, air purification and carbon sequestration

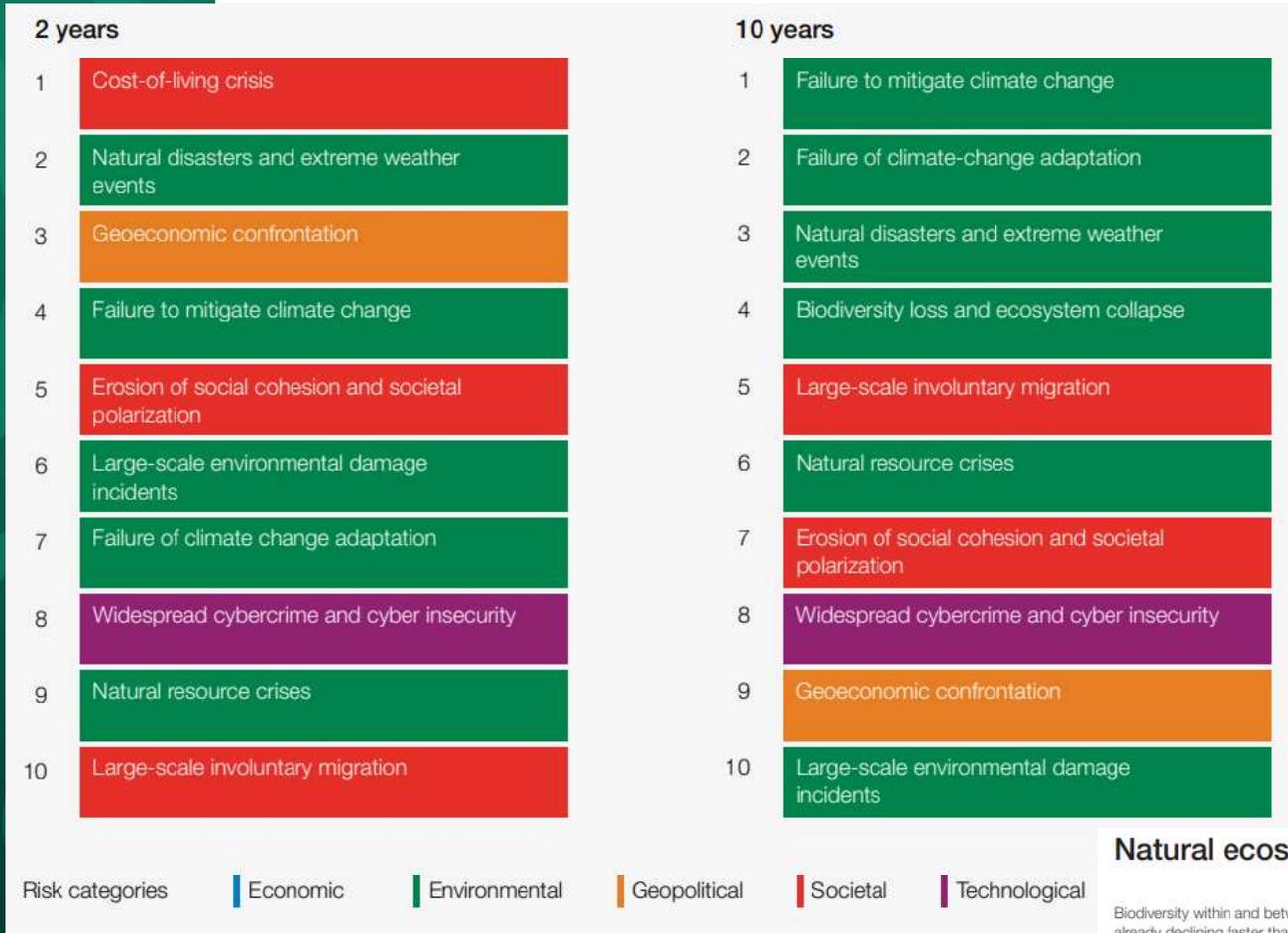
Biodiversity Loss – The UK's Global Rank for Levels of Biodiversity Loss. RSPB (2019):

<https://www.rspb.org.uk/globalassets/downloads/about-us/48398rspb-biodiversity-intactness-index-summary-report-v4.pdf>

# World Economic Forum Global Risks Report 2023

[https://www3.weforum.org/docs/WEF\\_Global\\_Risks\\_Report\\_2023.pdf](https://www3.weforum.org/docs/WEF_Global_Risks_Report_2023.pdf)

# Context



## Natural ecosystems: past the point of no return

Biodiversity within and between ecosystems is already declining faster than at any other point during human history.<sup>1</sup> Unlike other environmental risks, **Biodiversity loss and ecosystem collapse** was not seen as pressing of a concern by GRPS respondents over the short term. Yet it accelerates in perceived severity, rising to 4th place over the 10-year time frame (Figure 2.1).

Human interventions have negatively impacted a complex and delicately balanced global natural ecosystem, triggering a chain of reactions. Over the next 10 years, the interplay between biodiversity loss, pollution, natural resource consumption, climate change and socioeconomic drivers will make

for a dangerous mix (Figure 2.3). Given that over half of the world's economic output is estimated to be moderately to highly dependent on nature, the collapse of ecosystems will have far-reaching economic and societal consequences. These include increased occurrence of zoonotic diseases, a fall in crop yields and nutritional value, growing water stress exacerbating potentially violent conflict, loss of livelihoods dependent on food systems and nature-based services like pollination, and ever more dramatic floods, sea-level rises and erosion from the degradation of natural flood protection systems like water meadows and coastal mangroves.

# 2022/23



- **Projects**

- 7 projects delivered through the year with LNP funds drawing in a further cash or in-kind partner contributions.
- **PCNPA Threatened Butterflies** – Production of conservation strategy for threatened butterflies in Pembs;
- **Brown Hairstreak Survey** – covering the cost of volunteer mileage to facilitate survey of this S7 species;
- **Habitat Creation, Manorowen** - Woodland creation, native bulb planting and meadow management on private land;
- **Stop! Think Biodiversity** - Refresh and re-print of site marker signs & stickers. 30 of each;
- **Pembrokeshire Yellowhammer Group** - Purchase of feeders and feed to support yellowhammers in remaining core areas;
- **Lamphey School** – Hedge creation and pupil engagement;
- **Plant! Pembrokeshire** – purchase of ATV mounted flail and weed mats for grass management at the flagship tree planting site;

# 2022/23



- **Projects**
- **A further 17 projects supported with advice / networking:**
  - **Growing Better Connections;**
  - **PCF Phosphates;**
  - **Cleddau Community Garden;**
  - **EcoDewi – letter of support;**
  - **Bug Farm Tree Planting;**
  - **Bug Farm – A Connected Peninsula funding application;**
  - **PCC Cleddau Reaches HLF Bid for Land Purchase;**
  - **Tir Coed Community Growing, Narberth;**
  - **MPA Officer Patnership – letter of support;**
  - **Bee Friendly Tenby;**
  - **Shrill Carder Bee element of Naur am Byth project;**
  - **Newport for Nature;**
  - **NRW Marine Opportunity Catchment natural solutions for water quality;**
  - **Coastal Capacity Challenge Fund – Recycle Mor;**
  - **Coastal Capacity Challenge Fund – Wild Coast;**
  - **Coastal Capacity Challenge Fund – PCF CAPE;**
  - **Coastal Capacity Challenge Fund – MPA Officer Engagemenet**



# MH<sub>2</sub>

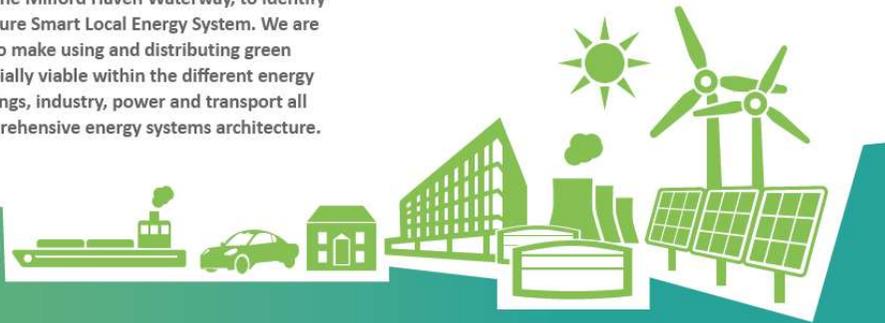
ENERGY KINGDOM  
DEYRNAS YNNI

## MILFORD HAVEN:ENERGY KINGDOM

MH:EK is exploring the potential of zero carbon hydrogen alongside renewable electricity to meet all of our future energy needs for buildings, power generation and fuelling transport.

MH:EK is one of the chosen "detailed design" projects within the Prospering from the Energy Revolution (Pfer) programme of works funded by UKRI as part of their Industrial Strategy Challenge Fund (ISCF).

MH:EK is gathering detailed insight into the whole energy system around the Milford Haven Waterway, to identify and design a future Smart Local Energy System. We are exploring how to make using and distributing green hydrogen financially viable within the different energy sectors of buildings, industry, power and transport all backed by comprehensive energy systems architecture.



MILFORD HAVEN:ENERGY KINGDOM  
READ MORE: [www.pembrokeshire.gov.uk/mh2-energy-kingdom](http://www.pembrokeshire.gov.uk/mh2-energy-kingdom)

<https://milford-haven-energy-kingdom.virtual-engage.com/>



### Project partners



### Electrolyser and refueller providers



# Why here Milford Haven Waterway/South West Wales?

South Wales has the UK's 2<sup>nd</sup> largest Industrial Cluster. Milford Haven is the UK's largest Energy Port - Circa 20% of the UK's energy imports.



- Tata Steel in Port Talbot - UK's biggest single point emitter
- RWE's Pembroke Power Station - UK's third biggest single point emitter
- Valero's Pembroke refinery – in the UK's top ten single point emitters



A once in a generation opportunity to support the transition to a renewable energy based economy by utilising the abundant renewable energy resources (FLOW, tidal, wave, green hydrogen) off the SW Wales coast, Swansea Bay and the Severn Estuary.



# The South Wales Industrial Cluster (SWIC) collaboration

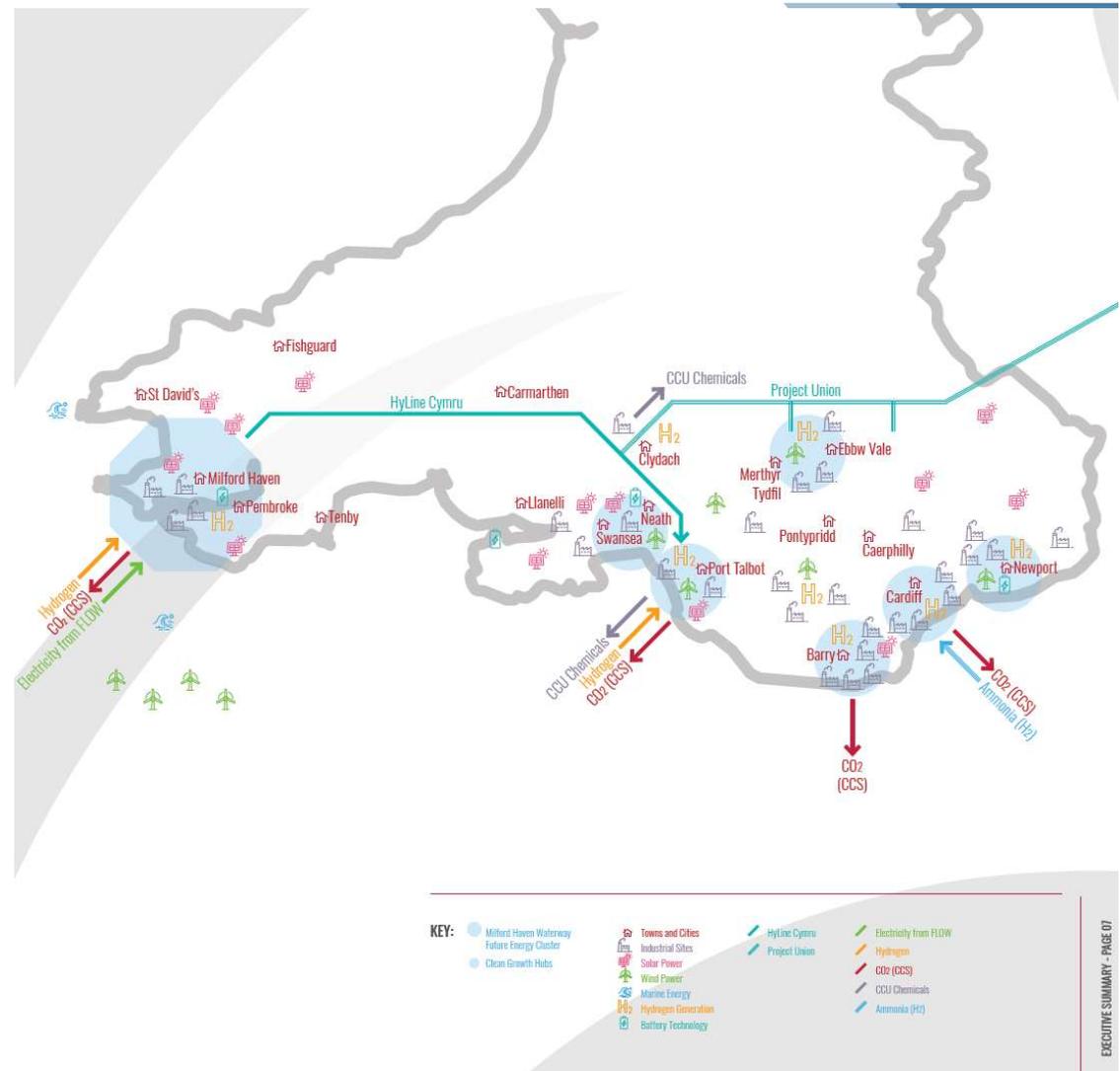
South Wales is home to a significant industrial base, including the UK's largest integrated steelworks, one of the UK's seven oil refineries and one of only four nickel refineries in Europe.

## The SWIC Vision

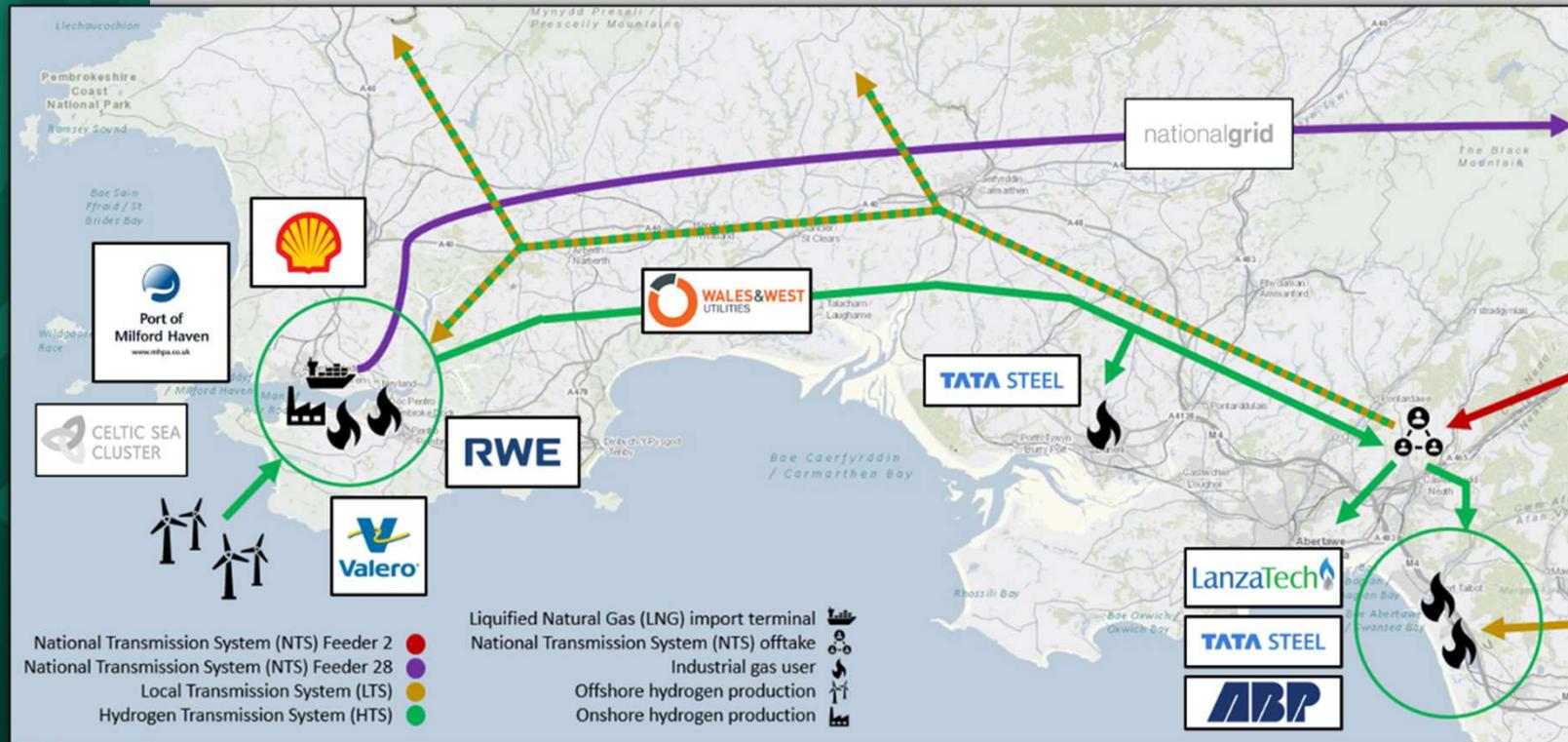
“Develop a world leading, truly sustainable industrial cluster, befitting the societal needs of 2030, 2040, 2050 and beyond”.

The SWIC Vision showcases ambitious plans to achieve:

- Net zero industries in South Wales by 2040, equating to **40% reduction of current Welsh CO<sub>2</sub> emissions**
- **Retention of 113,000 jobs** and a net positive increase in jobs overall
- **Unlocking £30bn investment opportunities** in the region
- **Growing the £6bn Gross Value Added** from South Wales industry.



# WWU Hydrogen LTS Feasibility – Phase 1 – ‘HyLine Cymru’



## Milford Haven now clearly identified as part of Project Union

### Why Project Union is vital:



**Urgency, pace and scale** is required to ensure energy security and independence, benefitting all UK consumers to realise the UK's decarbonisation challenge and deliver **legally binding** net zero 2050 commitments



Low carbon hydrogen is required for all net zero scenarios



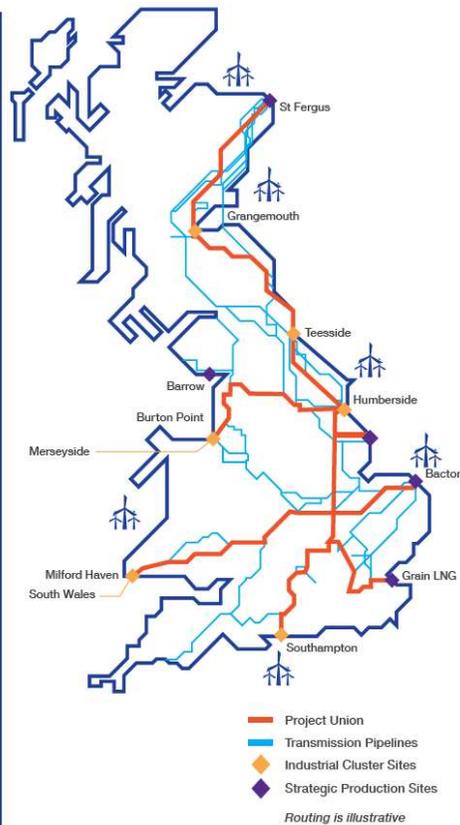
UK Hydrogen Strategy sets a target of **10GW** of hydrogen production – equivalent to six million homes



Low carbon hydrogen can enable decarbonisation of industry and provide optionality for transport and domestic heating



Investment in **hydrogen transmission** infrastructure is required to link supply and demand, **de-risk** investment decisions, and secure inward investment to realise a hydrogen economy and reduce the impact on the consumer

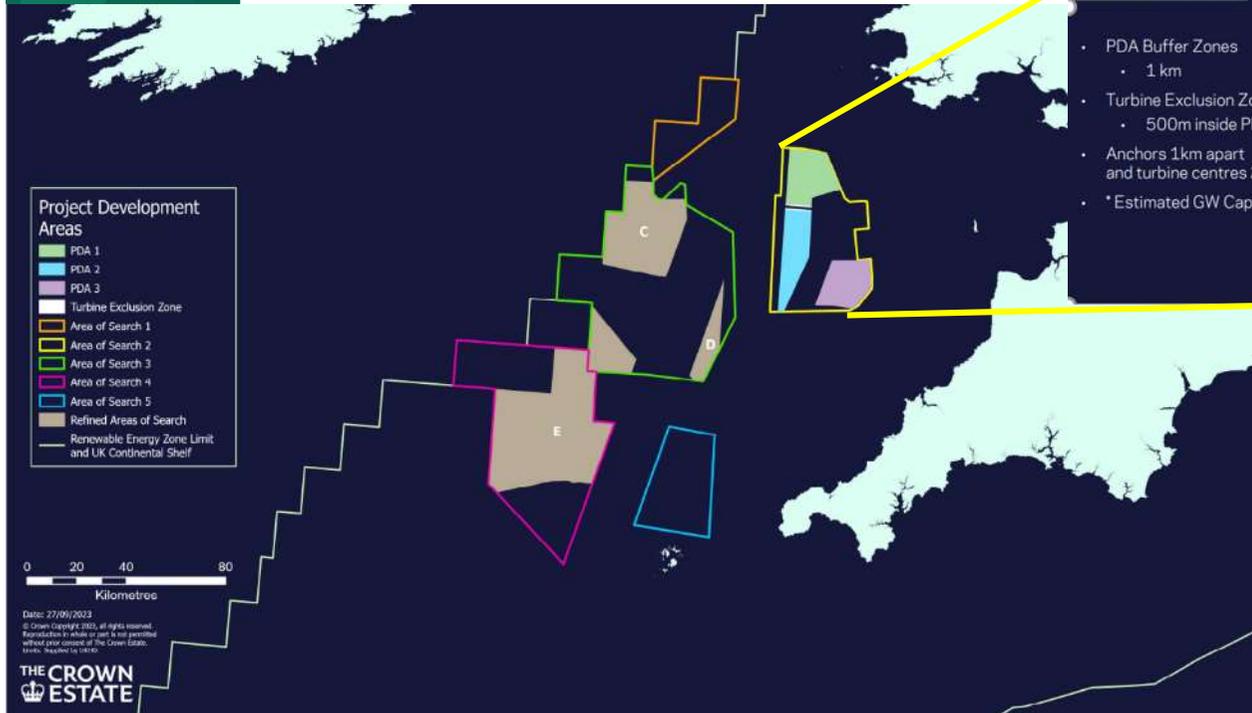


Project Union will connect hydrogen production, storage and demand to enable net zero and empower a UK hydrogen economy. Repurposing existing transmission pipelines will create a low-cost hydrogen 'backbone' for the UK by the early 2030s and connect to the proposed European Hydrogen Backbone. It will deliver a programme of 'no-regrets' investments with supporting evidence to inform energy policy that will enable the Government to make progress in realising its hydrogen ambitions.

## FLOW IN WALES - THE OPPORTUNITY

For perspective UK baseload power consumption 32 GW, peak is 47 GW

- 4.5GW of new FLOW capacity by 2035 (3 x 1.5 GW zones)
- 20GW of FLOW capacity by 2045.



The Bristol Channel and Severn Estuary is home to the second largest tidal range in the world after the Bay of Fundy in Canada

### TIDAL STREAM

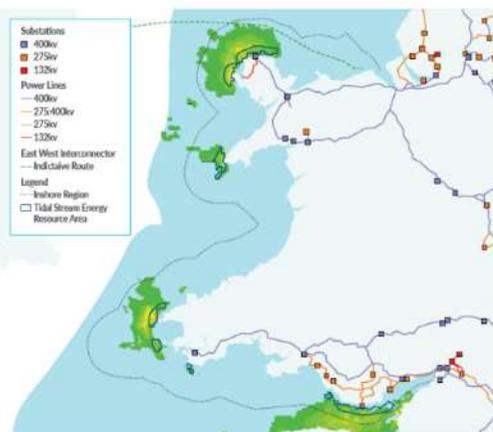


Figure 11 Total stream resource area around Wales. Source: Sector locational guidance: tidal stream energy (January 2022) (Welsh Government).

Ramsay Sound - Cambrian Offshore - capacity of up to 1 MW connected to South Wales grid.

Larger area West of Ramsey Island - modelling shows 1.3TWh annual potential.

Anglesey - [Magallanes Renovables](#) - deploying 5.62 MW [Morlais](#) Project - power to grid in 2025.

### TIDAL RANGE

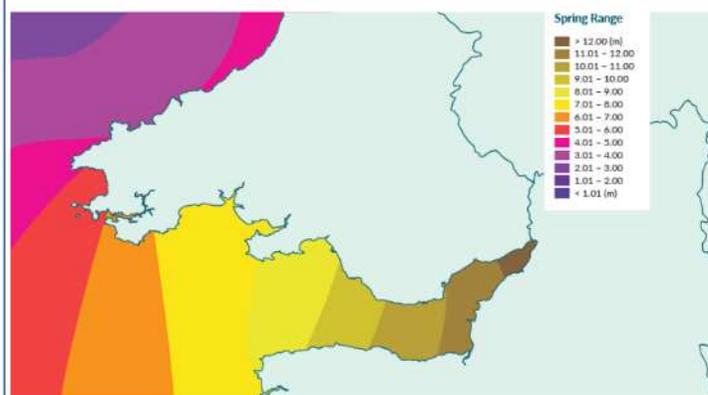


Figure 12 Spring tidal range off the coast of South Wales. Source: renewables-atlas.info (July 2021).

Proposed but yet to be built (Swansea likely first mover):

- 320 MW Swansea Bay Tidal Lagoon (SBTL)
- 1.4 GW Newport Tidal Lagoon
- 3 GW Cardiff Tidal Lagoon
- 12 GW Severn Barrage (up to 10% UK power)

Tidal impoundments can continue to **generate predictable power for around 120 years** and this has not been reflected in most economic assessments which look at 20/30 year terms.

### WAVE

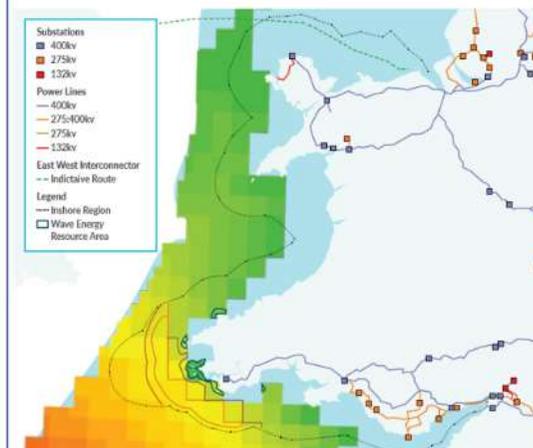


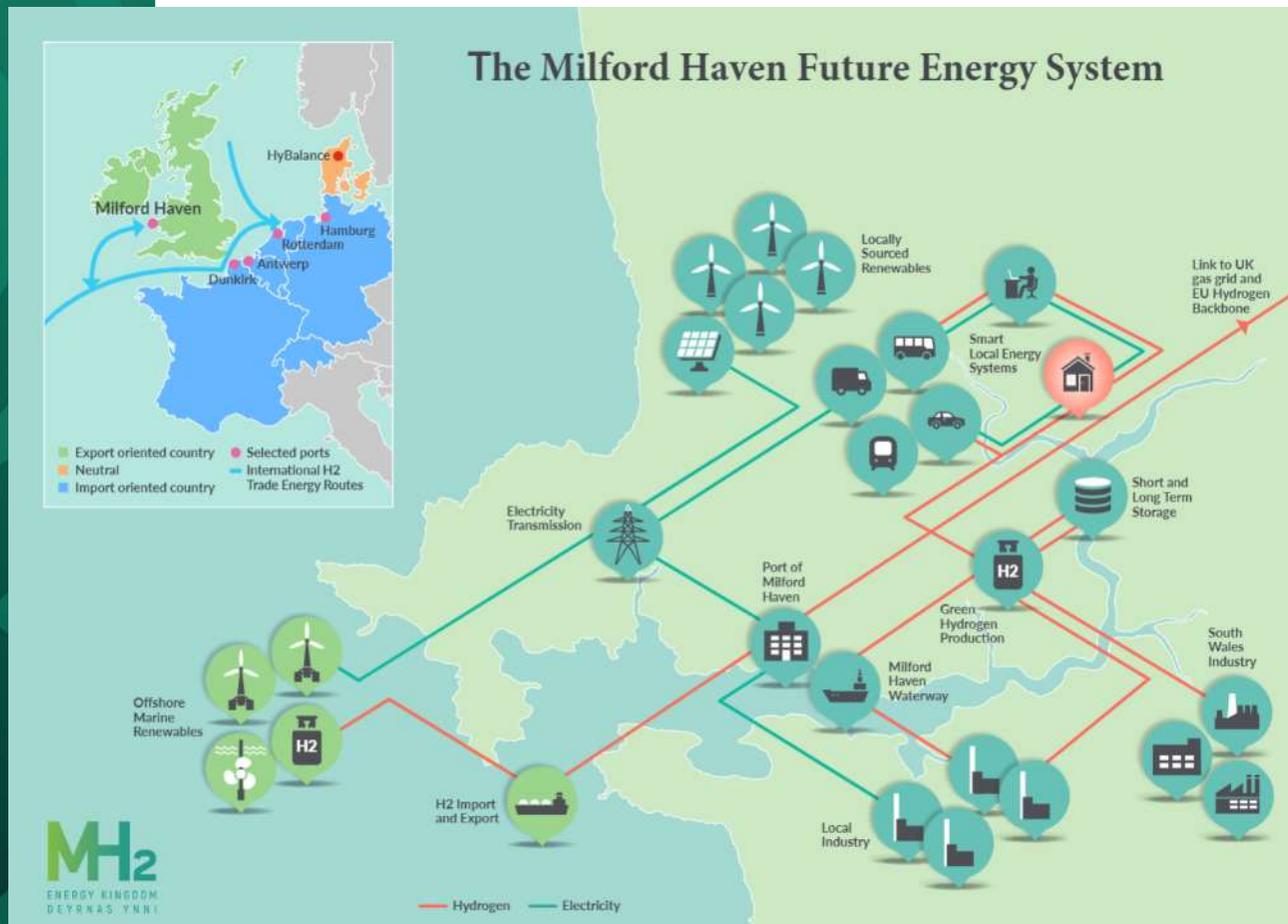
Figure 13 Annual mean wave power. Source: BERR Atlas of UK Renewable Energy Resource (April 2010) & RPS.

Higher resource areas further offshore pose survivability challenges.

Bombora's 1.5 MW mWave device testing at the Marine Energy Test Area (META) in 2023 - largest WEC trial to date globally.

Pembrokeshire Demonstration Zone (PDZ) will be a 180 MW grid connected test area in open sea off Pembrokeshire for the purpose of testing and validating.

# A visual overview of The Milford Haven Future Smart Local Energy System



An investible, renewable electricity and green hydrogen-based energy system that allows for the integration of heat, power and transport.

# Milford Haven Waterway Future Energy Cluster

## Milford Haven Waterway Future Energy Cluster

### Delivering an accelerated transition to a Net Zero future

The Milford Haven Waterway aims to support the UK by achieving...

20% of UK Government low carbon hydrogen production target by 2030

At least 10% of UK Government floating offshore wind target by 2035

The Milford Haven Waterway is a critical national energy asset, **attracting billions of pounds in investment** for over sixty years and supplying **20% of the UK's annual energy demand**.

The Waterway has a pivotal role to play in delivering the UK's net zero ambitions, offering a whole energy cycle solution that will unlock accelerated transition, while stimulating economic growth. This is an opportunity that will repurpose existing assets, skills, rail connectivity,

transmission and pipelines to deliver a future focused on hydrogen (blue and green), floating offshore wind (FLOW), marine renewables, sustainable alternative fuels, CO<sub>2</sub> shipping, and energy storage.

The benefits are clear. Continued investment and support will create and stabilise thousands of jobs and supply chain opportunities, levelling up the coastal communities across South Wales. It will strengthen UK energy resilience while establishing new export opportunities. And, it will stimulate inward investment providing clear line of sight on returns for investors, ensuring the Milford Haven Waterway remains a major energy innovation hub capable of competing globally.

**Government support is needed:**

- + Expand South Wales' grid capacity by 10GW by 2030
- + Implement a fast-tracked consenting regime
- + Back a South Wales Green Freeport bid
- + Introduce mechanisms to de-risk the Celtic Sea FLOW opportunity
- + Back a South Wales Floating Offshore Wind (FLOW) infrastructure bid
- + Support the Milford Haven Waterway SuperPlace ambition, including both blue and green hydrogen
- + Support prioritisation of South Wales in National Grid's Project Union
- + Support a BEIS Cluster Sequencing Track 2 bid
- + Incentivise the production and use of low carbon fuels
- + Back a Skills Accelerator programme
- + Back a Supply Chain Accelerator programme

Proud to be part of the South Wales Industrial Cluster: maintaining 100,000 UK manufacturing jobs and contributing £8bn to the economy.

The Milford Haven Waterway Future Energy Cluster brings together private and public sector operations to deliver UK and Welsh Governments' energy ambitions.



**Blue Gem Wind**  
The pioneer of floating wind in the Celtic Sea.



**ERM**  
Developers of the 300 MW ERM Dolphin offshore hydrogen project generating green hydrogen from floating offshore wind, piped directly back to Milford Haven. ERM will be trialling the system offshore in Summer of 2023 with the commercial start-up of the field planned for 2028.



**Prosperity Energy**  
Connecting renewable energy projects with investment to create opportunity.



**CAMBRIAN OFFSHORE**  
Delivering the Ramsay Sound regeneration of a tidal energy deployment site, including a grid connected, subsea tidal turbine, sub-station and associated infrastructure.



**MARINE ENERGY WALES**  
Marine Energy Wales brings together technology developers, the supply chain, academia and the public sector to establish Wales as a global leader in sustainable marine energy generation, making a significant contribution to a low carbon economy.



**Port of Milford Haven**  
The UK's largest energy port.



**DP ENERGY**  
Renewable energy developer DP Energy has a 30 year track record with a global portfolio spanning wind, solar and ocean energy, operating in the UK, Ireland, Australia and North America.



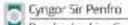
**CATAPULT**  
The UK's leading technology innovation and research centre for offshore renewable energy.



**SWiFC**  
Developing a world leading truly sustainable cluster befitting the societal needs for 2030, 2040, 2050 and beyond.



**DRAGON LNG**  
Dragon LNG, an LNG import terminal, is a critical national infrastructure site with the capacity to supply 10% of the UK's power demand.



**Cyngor Sir Penfro**  
Pembrokeshire County Council will use all levers at our disposal to maximise Pembrokeshire's Economy and ensure the aims of the Haven Waterway Future Energy Cluster are met. This is essential to continue Pembrokeshire's key place in delivering 30% of the UK's energy, making Pembrokeshire the UK Capital of Green Energy and the bedrock for the UK's hydrogen economy.

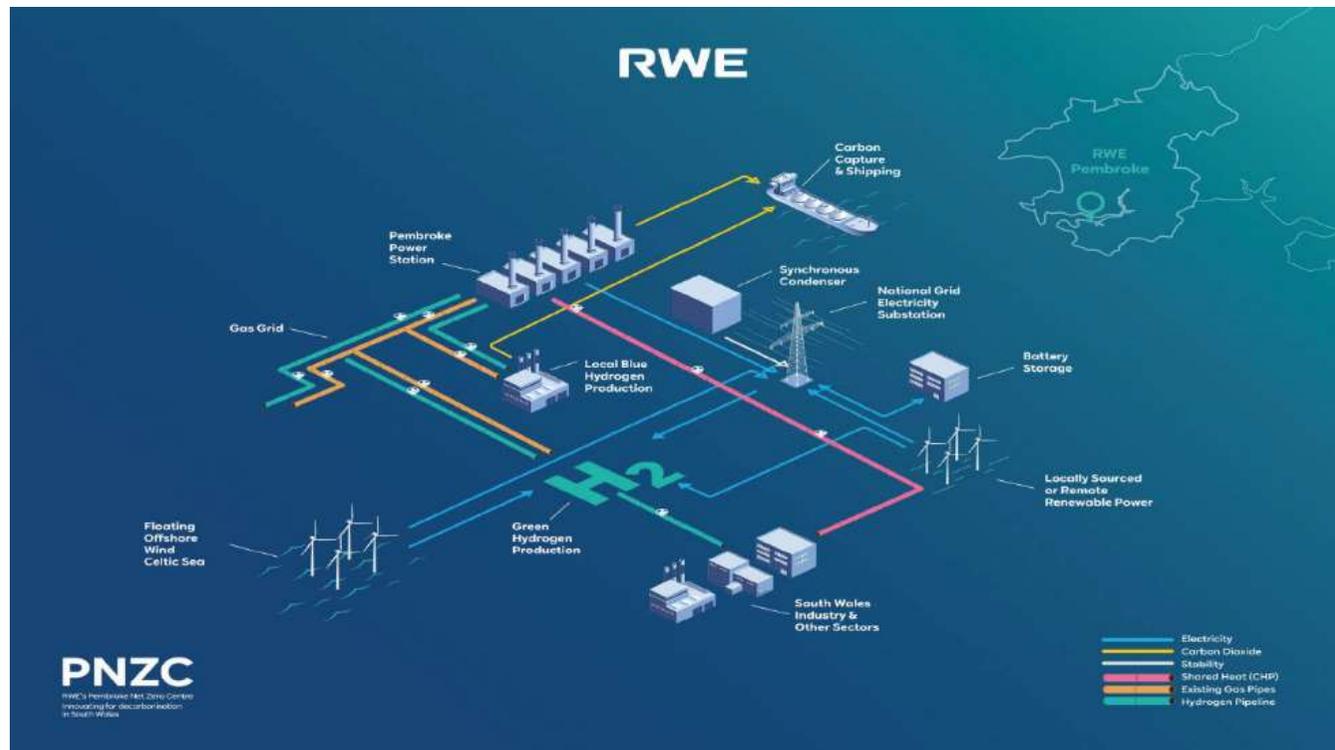


**RWE**  
RWE is the largest power producer in Wales and the country's number one renewable energy generator, with over 3GW of capacity. RWE's flagship Pembroke Power Station hosts the Pembroke Net Zero Centre, looking at future decarbonisation opportunities including hydrogen and floating wind in the Celtic Sea.



**Valero**  
Valero owns and operates Pembroke Refinery in south-west Wales, which is one of Europe's largest and most complex refineries, supporting over 1,000 jobs in Pembrokeshire. A major supplier of retail, commercial and aviation fuels, supported by our investments in supply infrastructure across the UK, Valero is also one of the world's largest producers of renewable liquid fuels.

## Industry 'early mover' example



Operational  
target date  
2027

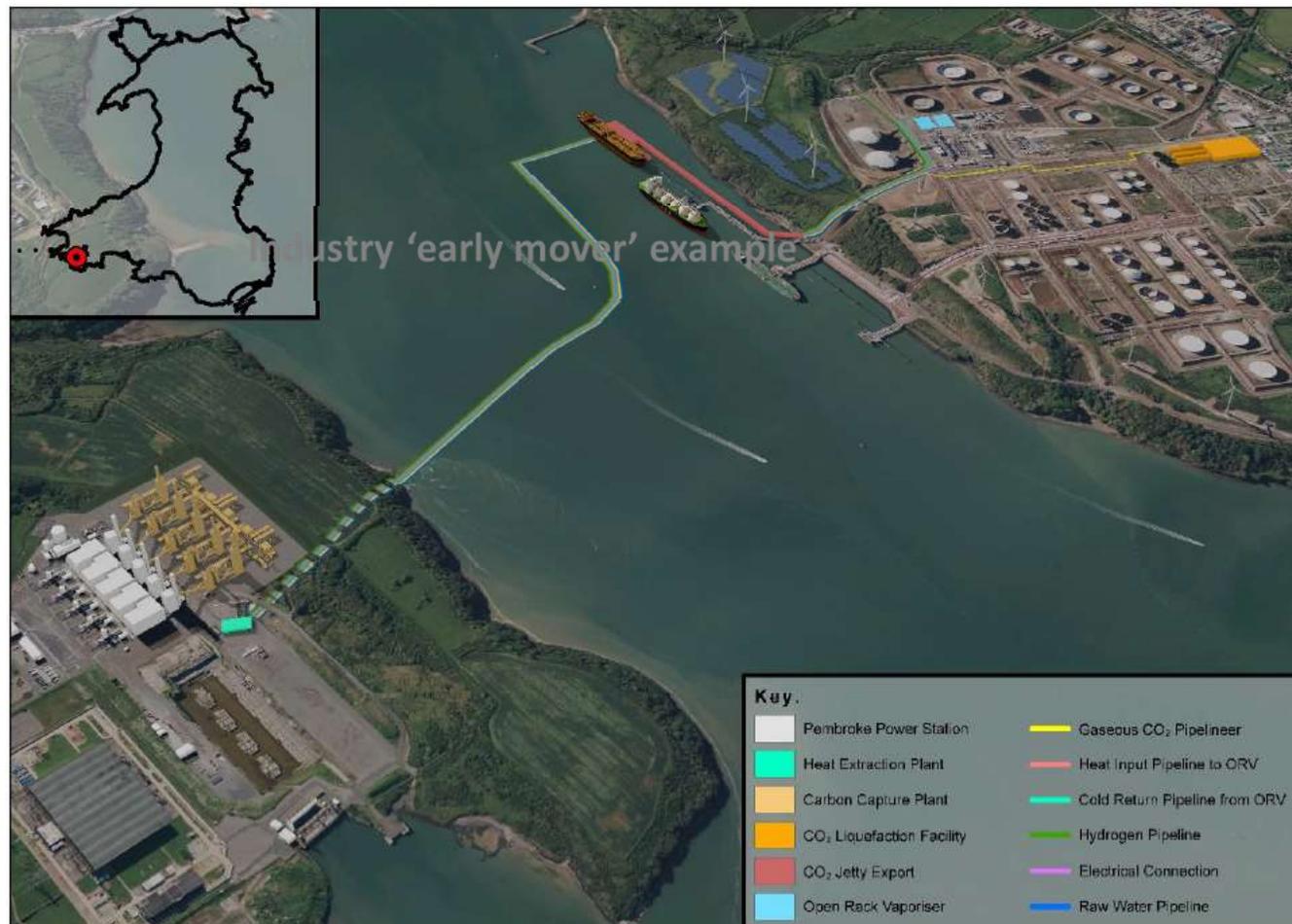
### RWE Pembroke Net Zero Centre

£3bn investment in Pembroke:

- Green hydrogen production, including the development of an electrolyser on the Pembroke site, the development of floating offshore wind (FLOW) in the Celtic Sea. 110 MW green H<sub>2</sub> electrolysis (by 2026) and up to 1GW (by 2030). (UK target for 10 GW by 2030)
- H<sub>2</sub> for fleet, transport, industry, grid.
- Decarbonisation of Pembroke Power Station, including carbon capture.
- The feasibility of hydrogen as a power generation fuel
- RWE £15bn investment in UK

## RWE / Dragon LNG – MUST Project Feasibility

A Multi-Utility Service Transit (MUST) infrastructure project connecting industry across the Milford Haven Waterway aiming for the full elimination of CO<sub>2</sub> emissions from Dragon LNG's regasification process by utilising the residual process heat from the generators at RWE's Pembroke Power Station.



## Statkraft - Trecwn



Trecwn Green Energy Hub is being developed by Statkraft, Europe's largest generator of renewable energy, and is the company's first green hydrogen project to be announced in the UK

A 15MW green hydrogen electrolysis plant to generate three tonnes of green hydrogen a day. (Enough to run a single bus for over 40,000 miles, or the equivalent of making 350 journeys from Fishguard to Cardiff)

Green hydrogen could be used to power trains running on railway lines west of Swansea and could also power lorries and buses, with the site able to produce enough green hydrogen to run around 170 buses every day, when operational.

If the planning application is successful, construction would take around 15 months, so the site could be generating green hydrogen by 2026.

Operational  
target date  
2026

Successful  
bid into UK  
Gov Net Zero  
Hydrogen  
Fund

### Project summary

**H 15 MW**  
Hydrogen  
electrolyser

**14.4 MW**  
Three wind turbines  
up to of 150m  
(to blade tip)

**15 MW**  
Ground mounted  
solar arrays

**H 4 TONNES**  
Hydrogen  
storage

**H 100%**  
Clean, carbon-free  
hydrogen

**£ £73k**  
Per year based on  
installed MW for a  
Community Fund\*

## Puma/Trafigura – Milford Haven 20 MW Green H2 Project

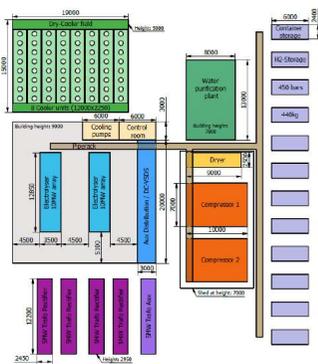


## Milford Haven H2 Project

MILFORD H2 PROJECT

### Planned H2 production facility at Milford Haven

Draft Layout Milford 20MW H2 Plant



Artist's impression of a large scale hydrogen production plant

#### Phase 1

- Location: Milford Haven, Wales, UK



- Electrolysis Capacity: 20 MW (import only)
- Daily h2 production: c. 4 tons
- Electricity source: new and operating wind farms in the UK
- Targeted CO2 savings: 15,000+ tons CO2e annually
- 15+ new green jobs created in Phase 1 alone; design life of >20 years
- Expected Timelines:
  - Q4 2022 - Submission of planning application
  - Q2/3 2023 – Financial Investment Decision (FID)
  - Q4 2025 – Commissioning Date



Operational target date 2025

*“The green hydrogen produced at Milford Haven will be used to displace natural gas and other fossil fuels in industrial and chemical processes and contribute to the decarbonisation of the local industry. The interest that we’ve already received from local industry means we are already reviewing the opportunity to scale up the facility.”* – Julien Rolland, CEO of H2 Energy Europe

## Green light for transformational Celtic Freeport bid



The Celtic Freeport private-public bid consortium has reacted to today's announcement it has been shortlisted by the UK and Welsh Governments for freeport status.

£160m port infrastructure funding scheme, with a particular emphasis on the “substantial pipeline of potential projects in the Celtic Sea”



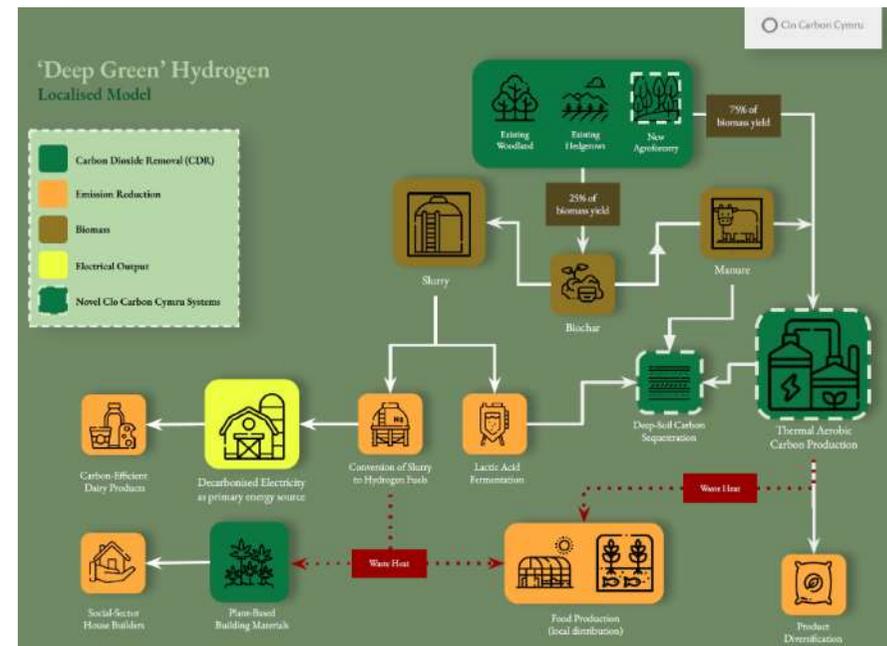
Support 16,000 new green jobs

Generate £5.5bn of new investment

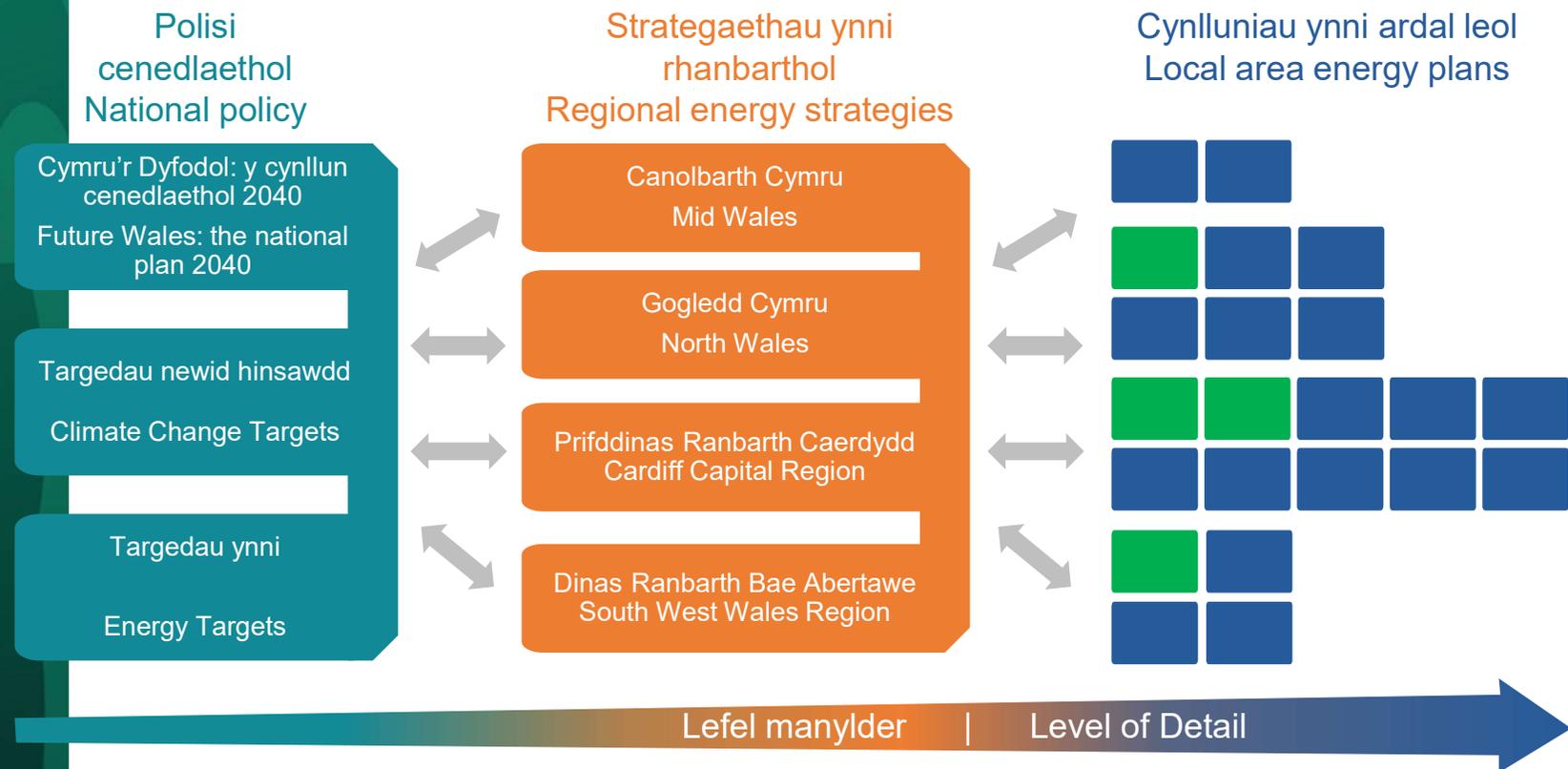
Accelerate the roll-out of floating offshore wind

## 'Deep Green Hydrogen' in agriculture

- Is it really feasible to generate hydrogen fuel from dairy slurry? Via this [Deep Green Hydrogen](#) report produced in partnership with the Hydrogen Innovation Initiative (HII) and Pembrokeshire Council, ORE Catapult is helping to spread awareness around green hydrogen and delves into the benefits of hydrogen in agriculture as it:
- Tests the hypothesis, which suggests that relatively small-scale dairy farms (producing between 2,500m<sup>3</sup> and 7,500m<sup>3</sup> of slurry annually) can develop viable hydrogen-based generation systems.
- Explores the opportunity and viability of establishing a rural network of hydrogen fuel supply chains that support the ambition of car manufacturers, and hydrogen supply companies to locate hydrogen fuel 'filling stations' across Wales.
- Looks at how the production & use of hydrogen on dairy farms can make complete economic sense where H<sub>2</sub> is fuelling the transportation of food (protein and calories) into communities to establish carbon-neutral food supply chains.



# Planning for a more integrated low carbon energy system





## SW Wales Regional Energy Plan

***“Harnessing the region’s low carbon energy potential across its on and offshore locations, to deliver a prosperous and equitable net zero carbon economy which enhances the well-being of future generations and the region’s ecosystems, at a pace which delivers against regional and national emissions reduction targets by 2035 and 2050.”***

The priorities for achieving this vision are:

1. Energy efficiency
2. Electricity generation
3. Smart and flexible systems
4. Decarbonise heat
5. Decarbonise transport
6. Regional coordination

All of the local authorities in the Swansea Bay region are aligned to this vision and committed to action plans to become net zero local authorities by 2030. The LA’s will be carrying out efficiency projects to decarbonise buildings, street lighting, and transport. The authorities will be investigating and implementing renewable energy schemes. The LA’s will all be supporting innovation and green economic transition.

# Pembrokeshire Local Area Energy Plan (LAEP)

ARUP

Well-being Plan “Steer the implementation of the LAEP to ensure application of the principles of building a sustainable, fair and green economy, with high value green jobs, skills and training opportunities, to enable a just transition from a fossil fuel based energy system to a renewable based energy system, and acknowledging the need to fully engage communities in the transition.”

**“Develop a net zero energy system for Pembrokeshire by 2050, as the UK home of green energy”**

*This challenge can't be completed by the Council alone and it is not even possible without fundamental reforms. There are fundamental changes that are need in policy, funding, resourcing, skills & training, and infrastructure.*

Pembrokeshire County Council

## Pembrokeshire's Local Area Energy Plan

May 2022

*What is obvious is that the reality of decarbonising Pembrokeshire by 2050 is a monumental challenge. We need to achieve an energy efficiency and green energy revolution that will affect everyone in Pembrokeshire and beyond, and achieve this transition in a just way.*

*Pembrokeshire Council are responsible for LAEP strategic direction. The Public Service Board will provide steer of the project.*



**Retrofit whole buildings**  
Promoting a high investment package of measures 40,000 homes

**Pilot electrolyser and hydrogen villages**  
Demonstrate use of hydrogen through pilot projects

**Develop local onshore renewables**  
940MW of solar and wind capacity by 2050

**Decarbonise industry**  
Support industrial decarbonisation to retain economic benefits while achieving net zero targets

**Decarbonise transport**  
Develop EV charging infrastructure; support decarbonisation of heavy transport

**Reinforce electricity distribution network**  
Enabling new generation assets to come online

**Deploy heat pumps**  
Heat pumps prioritised in off gas properties (currently more than 25,000)

# Pembrokeshire Climate Change Adaptation Strategy 2022

## PEMBROKESHIRE CLIMATE ADAPTATION STRATEGY (DRAFT v1)

20<sup>th</sup> June 2022



Pembrokeshire Public Services Board  
Bwrdd Gwasanaethau Cyhoeddus Sir Benfro



UK Government  
Llywodraeth y DU

This project is funded by the UK Government  
through the UK Community Renewal Fund

PSB's responsibility to implement the Strategy by 2027, with progress being scrutinised via a "Red, Amber, Green" (RAG) system and reported to the Pembrokeshire County Council Policy and Pre-decision Committee.

UK and Wales Climate Change Risk Assessments suggests that by mid-century (2040-2060)

- warmer and wetter winters
- hotter and drier summers
- high variability of extreme weather
- increased exposure to weather-related hazards
- increased frequency and intensity of wildfire
- increases in average and extreme temperatures, in winter and summer
- changes to rainfall patterns
- flooding and water scarcity
- increased coastal flooding and erosion
- sea temperature rise and ocean acidification

**39 climate adaptation priorities** split into four key areas:

- Infrastructural
- Natural Environment & Agriculture
- Communities
- Business & Industry

Climate Risk and Communities  
Protocol