Regional Energy and H2 landscape

August 2023

Steve Keating
Pembrokeshire County Council
https://milford-haven-energy-kingdom.virtual-engage.com/

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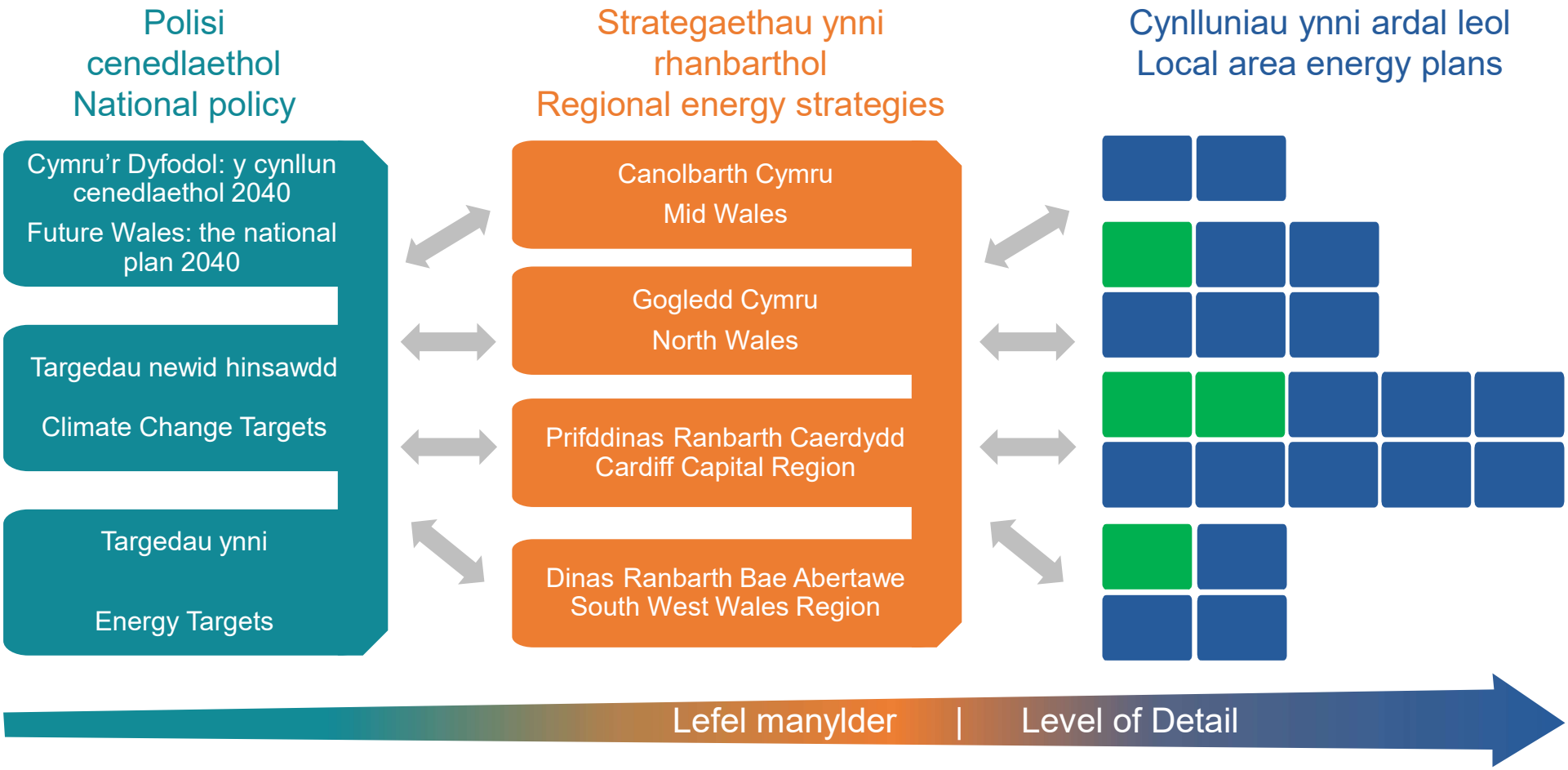
Cynllunio ar gyfer system ynni carbon isel sy'n fwy integredig
Planning for a more integrated low carbon energy system



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.

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Pembrokeshire Local Area Energy Plan (LAEP)

ARUP

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.

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

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

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)

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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 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.

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).

UK Research and Innovation

MILFORD HAVEN:ENERGY KINGDOM
READ MORE: www.pembrokeshire.gov.uk/mh2-energy-kingdom

Project partners

Port of Milford Haven

CATAPULT Offshore Renewable Energy

CATAPULT Energy Systems

riversimple

ARUP

WALES & WEST UTILITIES

Electrolyser and refueller providers

FUEL CELL SYSTEMS

GRIFFITHS civil engineering and construction

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

MILFORD HAVEN: ENERGY KINGDOM

Why here Milford Haven Waterway/South West Wales?

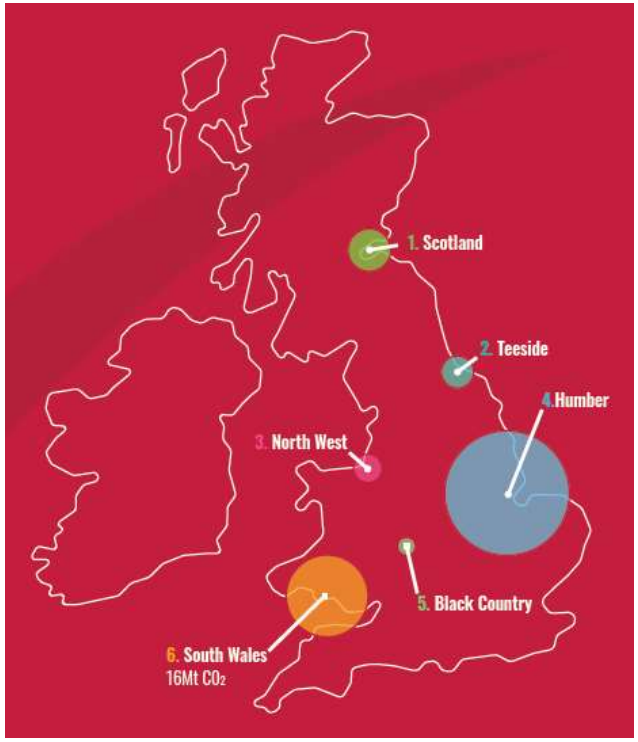
South Wales has the UK's 2nd largest Industrial Cluster. Milford Haven is the UK's largest Energy Port - Circa 20% of the UK's energy imports.

4,000 jobs (40% of total local employment around the Port)

- 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.


ABP Port Talbot vision



Wales, Some key facts

4.9GW / 30%

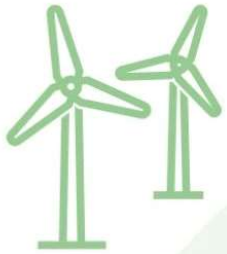
Floating Offshore Wind Celtic Sea deployment / UK proportion by 2040.

2x / #5

Fifth largest electricity exporter in Europe, 2018, generating double the energy it consumed.

>100,000 / 7%

Industry and power generation employment in Wales, 7% of our workforce.

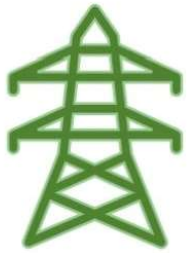


>100GW (UK currently has 14 GW)

Offshore Wind required to reach Net Zero 2050.

36%

Welsh Renewable generation in 2020, up from 12% in 2016



2050

Electricity Grids critically important to enable Net Zero transition.

30%

UK gas delivery capacity through Milford Haven, UK's largest energy port.

Electricity

CLWSTWR DIWYDIANNOL DE CYMRU
SOUTH WALES INDUSTRIAL CLUSTER

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The South Wales Industrial Cluster (SWIC) collaboration

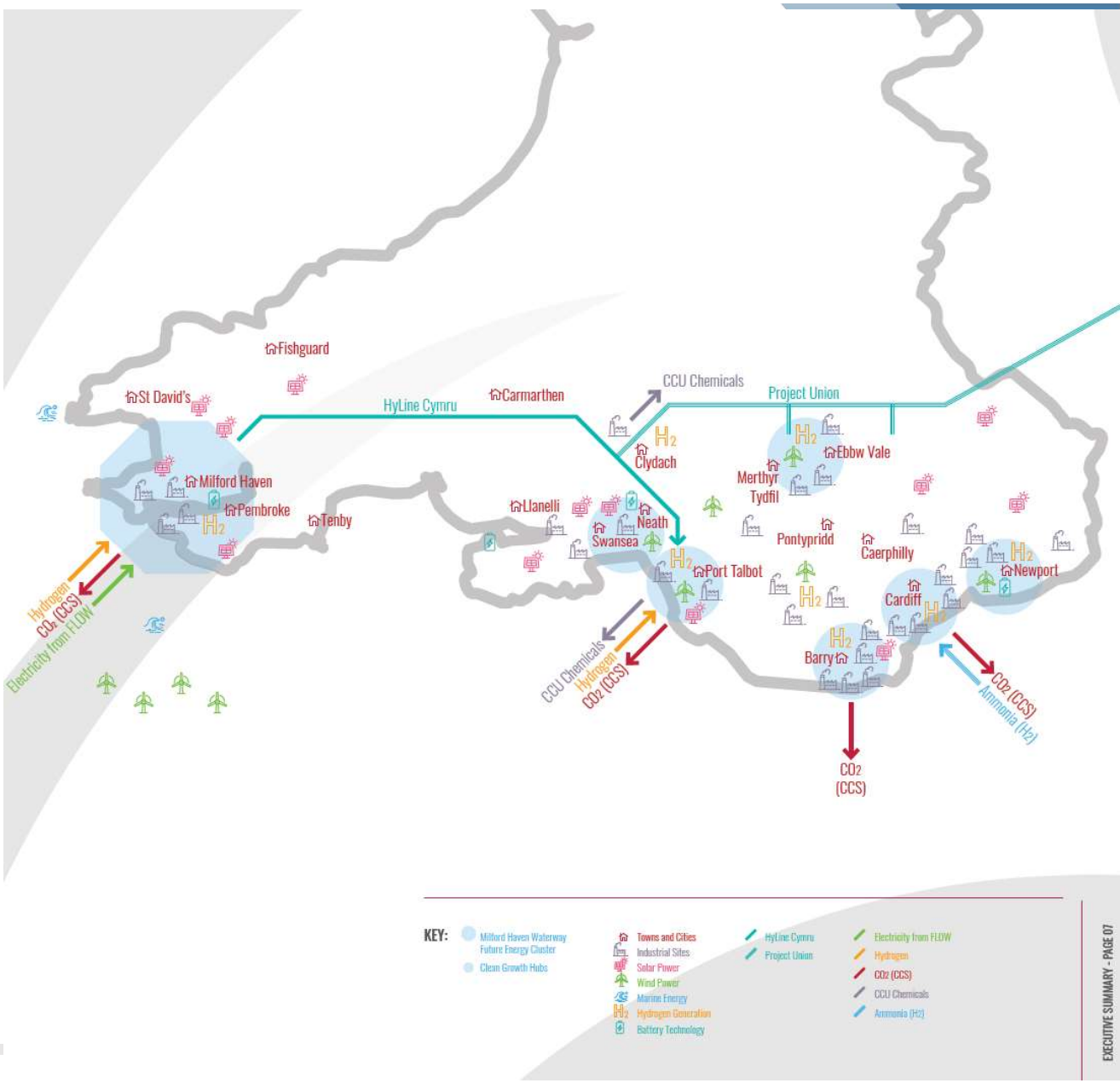
South Wales is home to a significant industrial base, including the UK's largest integrated steelworks, one of the UK's seven oil refineries and one of only four nickel refineries in Europe.

The SWIC Vision

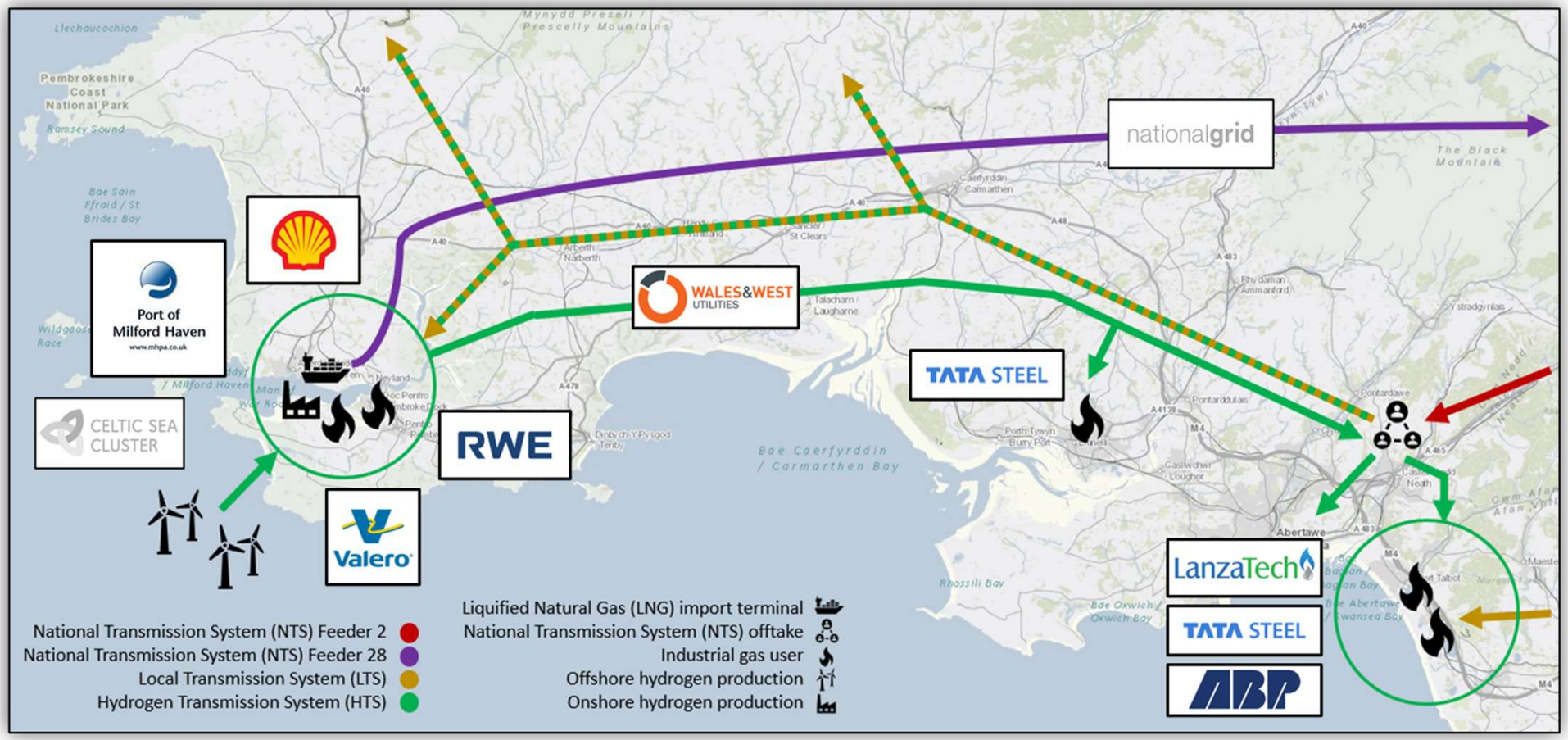
"Develop a world leading, truly sustainable industrial cluster, befitting the societal needs of 2030, 2040, 2050 and beyond".

The SWIC Vision showcases ambitious plans to achieve:

- Net zero industries in South Wales by 2040, equating to **40% reduction of current Welsh CO_2 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’



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Milford Haven now clearly identified as part of Project Union

Why Project Union is vital:

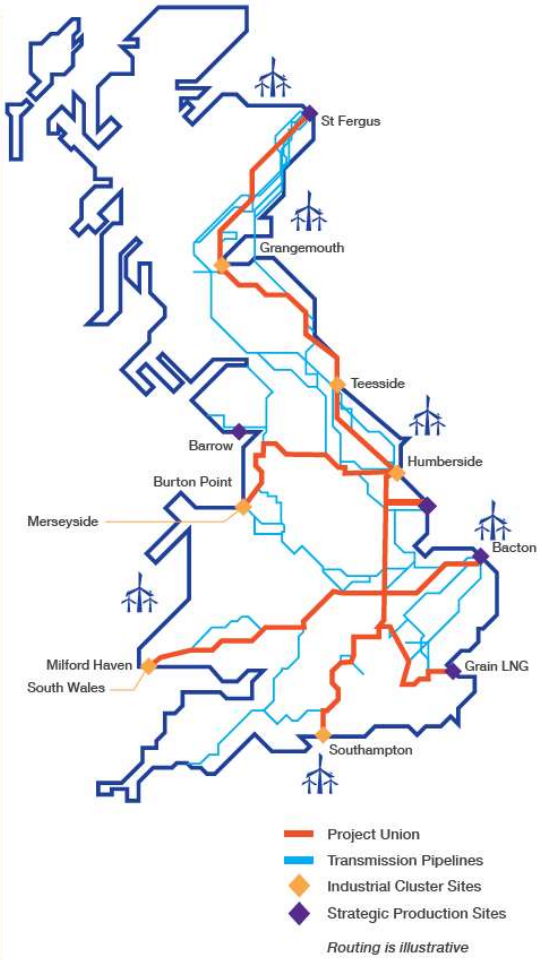
Urgency, pace and scale is required to ensure energy security and independence, **benefitting all UK consumers** to realise the UK's decarbonisation challenge and deliver **legally binding** net zero 2050 commitments

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.

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Vision: – Pembrokeshire/SW Wales is home to a vibrant clean energy cluster, the bedrock for the UK's hydrogen economy

FLOATING OFFSHORE WIND (FLOW)

- The Crown Estate's (TCE's) ambition is to unlock up to 4GW of new floating offshore wind capacity by 2035.
- TCE state regional potential to utilise a further 20GW of floating offshore wind capacity by 2045.
- Studies show more is potentially attainable 49.9GW (low) to 120GW (high).
- **3,000 jobs and £682m in supply chain opportunities for Wales and Cornwall by 2030.**
- The Celtic Sea is home to the **first ever floating offshore CfD award** (Hexicon's 32MW Twinhub project to be built 2025-27)

Project Name	Capacity	Developer	Expected Completion
TwinHub	32MW	Hexicon	2025 (contracted)
Erebus	96MW	Blue Gem Wind (a joint venture between Total and Simply Blue Energy)	2026/2027
Valorous	300MW	Blue Gem Wind	2029
Llyr 1	100MW	Floventis (a joint venture between SBM Offshore and Cierco)	Unknown
Llyr 2	100MW	Floventis	Unknown
Whitecross	100MW	Offshore Wind Ltd. (a joint venture between Cobra and Flotation Energy)	Unknown
Pembrokeshire Demonstration Zone	180MW	Wave Hub	Unknown
Llywelyn	300MW	Falck Renewables & BlueFloat Energy	Unknown
Petroc	300MW	Falck Renewables & BlueFloat Energy	Unknown
Gwynt Glas	300MW – 1,000 MW	EDF Renewables UK & DP Energy	Unknown
Celtic Deep 1	98MW	AWC Technology Ltd.	Unknown
Celtic Deep 2	300MW	AWC Technology Ltd.	Unknown

Table 1 Floating wind projects in planning in the Celtic Sea.

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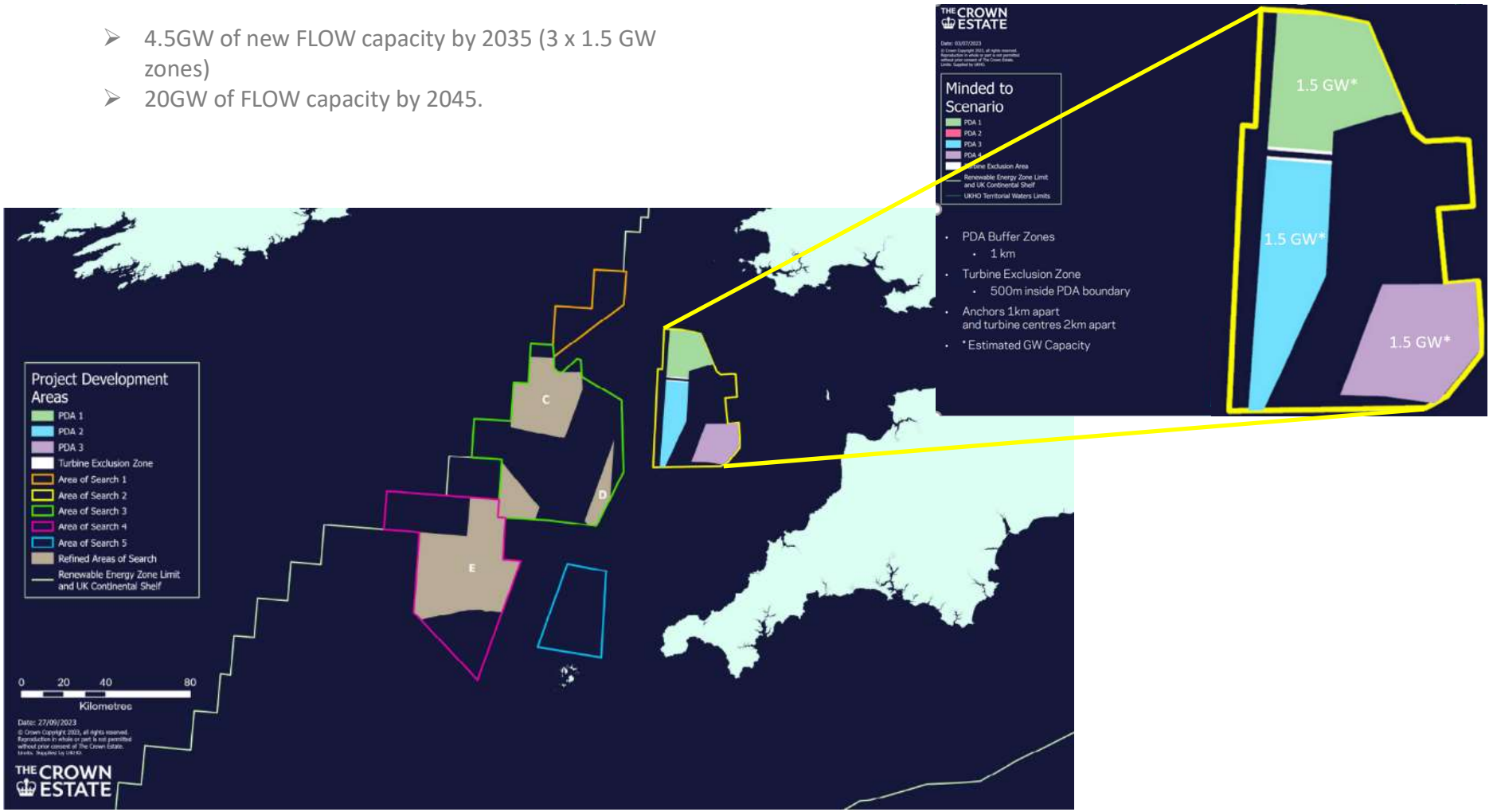
FLOW IN WALES - THE OPPORTUNITY

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.



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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

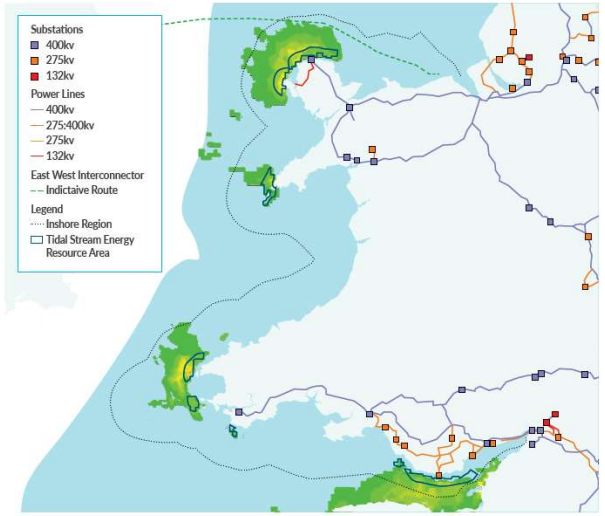

Figure 11 Tidal stream resource area around Wales. Source: Sector locational guidance: tidal stream energy (January 2022) (Welsh Government).

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

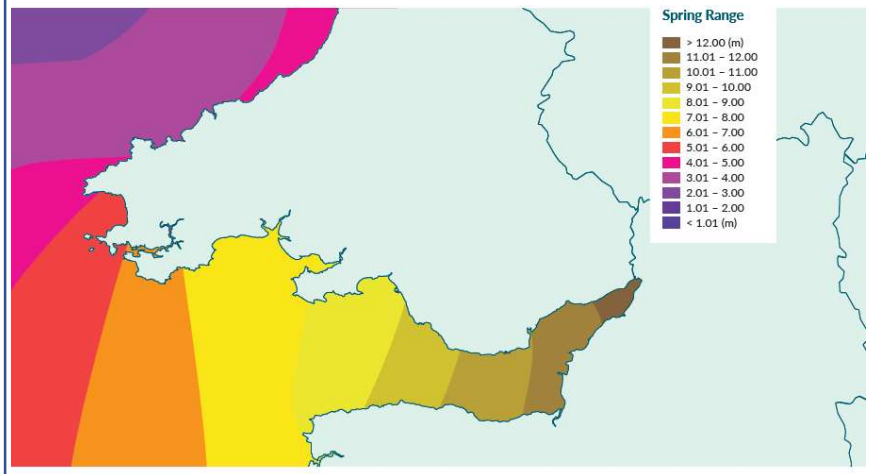

Figure 12 Spring tidal range off the coast of South Wales. Source: renewables-atlas.info (July 2021).

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

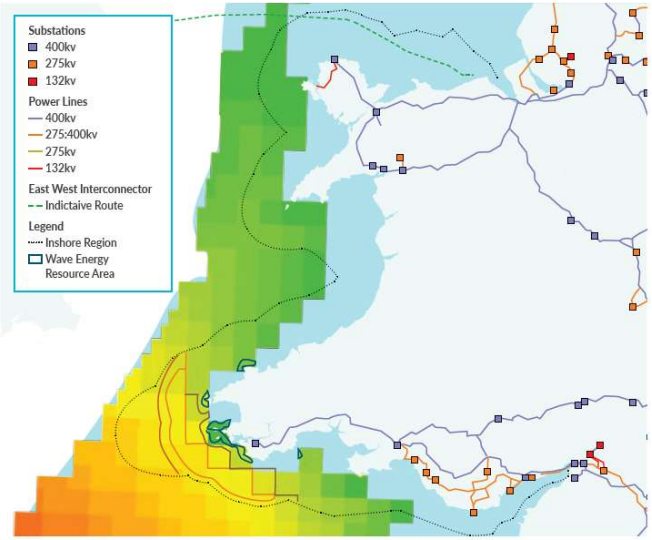

Figure 13 Annual mean wave power. Source: BERR Atlas of UK Renewable Energy Resource (April 2010) & RPS.

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 p
testing and validating.

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Swansea Port Development Project (formerly Blue Eden)

A £4bn project, estimated to be worth £114m a year to the Swansea economy, creating up to 2,500 full-time jobs.

- Expanding the Fabian Way park and ride site to create a green energy transport hub to potentially include a hydrogen manufacturing station for hydrogen-powered transport, an abundance of electric vehicle charging points, and restaurants and flexible working areas for visitors to enjoy.
- Expanding on approved solar farm plans at the former Tir John landfill site to create one of the UK's largest solar energy generating facilities.
- A new manufacturing facility on the former Morrissey Site in SA1 to make high-tech batteries that would store the renewable energy generated by the project and for worldwide distribution.
- A tidal lagoon
- A floating solar facility
- A hyper-scale data centre powered by renewable energy
- An oceanic and climate change research centre
- Energy-efficient eco-homes anchored in the water
- A new district heating system using renewable energy.

CURTAILMENT – i.e. the grid can't currently transmit renewable electricity to where it is needed

- In 2022 the UK generated c.30% of its energy from renewables, of which wind power at c.23% total generation was by far the biggest contributor
- When we're generating more wind power than we can transmit, the National Grid pays the windfarms to turn off ('curtailment'), and pays a (typically gas powered) alternative generator, closer to the demand, to turn on
- In 2022 the UK spent £215m on turning windfarms off, and then another £717m turning on gas power plants to replace the lost wind power

Potential solutions:

- ➢ Build more electricity cables to take the power to demand centres
- ➢ Add energy storage at cable bottlenecks – e.g. lithium batteries, pumped hydro, green hydrogen
- ➢ Probably a mix of these but electrolysed green hydrogen can be used in the whole energy system with interconnectivity of transport, heat, gas and power and could take advantage of the existing national gas grid for storage.
- ➢ Regional industry has high hydrogen demand (e.g. Valero) or high hydrogen potential demand (e.g. SWIC) or hydrogen production, distribution and storage potential (RWE / Puma / National Grid / WWU).
- ➢ Hydrogen to service transport – convenience, rapidity of refuelling and range
- ➢ Hydrogen for heat – e.g. via the gas distribution grid

Source: The UK is wasting a lot of wind power | Archy de Berker

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FLOATING OFFSHORE WIND AND GREEN HYDROGEN PRODUCTION

Huge renewable electricity potential. Electricity grid and ports infrastructure upgrades needed. Industrial processes, Heat & Transport emissions hardest to action.

There is potential for green hydrogen to service industry (Haven Waterway/SWIC), regional transport, heat and power generation.

Increasing volumes of floating offshore wind is well suited to production of green hydrogen – produce H2 when curtailed or low UK power demand.

Co-location of hydrogen with offshore wind will enable an increase in usable energy from individual projects as well as providing long-term storage and an alternative fuel source for increased UK electrification.

ORE Catapult estimates that the cost of supplying **blue hydrogen** is tied to gas prices, which is likely to remain around **£145/MWh (£5.70/kg)**

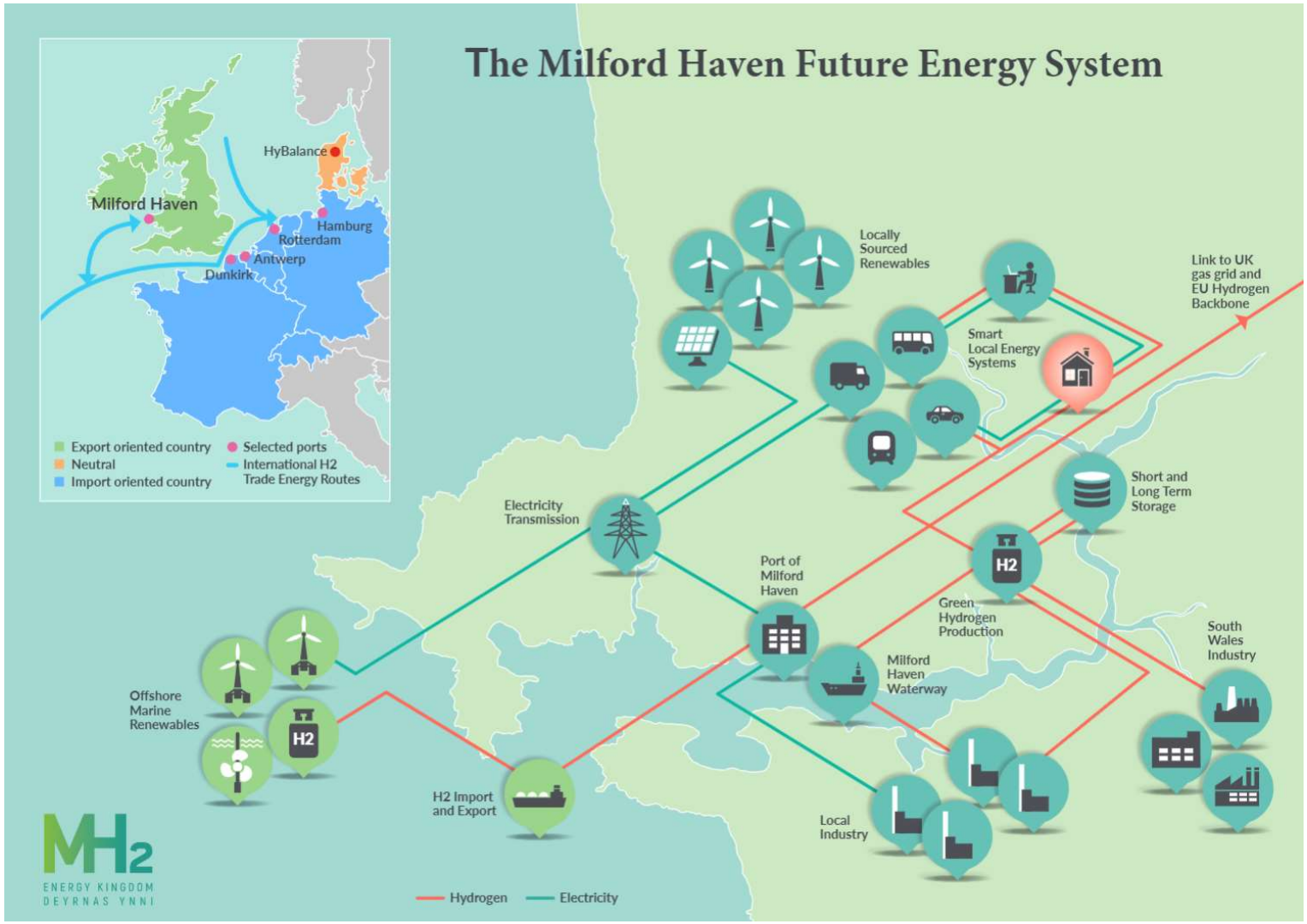
OREC forecast the cost of producing **green hydrogen** from UK floating offshore wind to reduce from around £145/MWh for early commercial projects around 2025-2027 to around **£75/MWh by 2030** to **£50/MWh by 2040** reducing to **£40/MWh (£1.60/kg) by 2050** (cost parity with the cheapest global cost for green hydrogen). *(Perspective: A Toyota Mirai can drive 60 miles on 1 kg of hydrogen at a cost of £1.60 by 2050 – before duty etc).*

There is huge potential to **export UK green hydrogen** to Europe and beyond. This opportunity was valued at **£48bn per year** in ORE Catapult's Solving the Integration Challenge (StIC) study with **hydrogen forming 25% of Europe's energy needs by 2050**.

Project Name	Capacity	Developer	Expected Completion
Project Dylan	300MW 1GW	ERM and Source Engie	Commercial windfarm by 2028 Expansion by 2030
Pembroke Net Zero Centre	100-250MW	RWE	2028

Table 2 Welsh offshore renewable projects with hydrogen production.

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.

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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_2 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

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.

Cambrian Offshore
Delivering the Ramsey Sound regeneration of a tidal energy deployment site, including a grid connected, subsea tidal turbine, sub-station and associated infrastructure.

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.

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

ERM
Developers of the 300 MW ERM Dolphyn 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.

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.

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

Cyngor Sir Penfro
Pembrokeshire County Council
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.

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

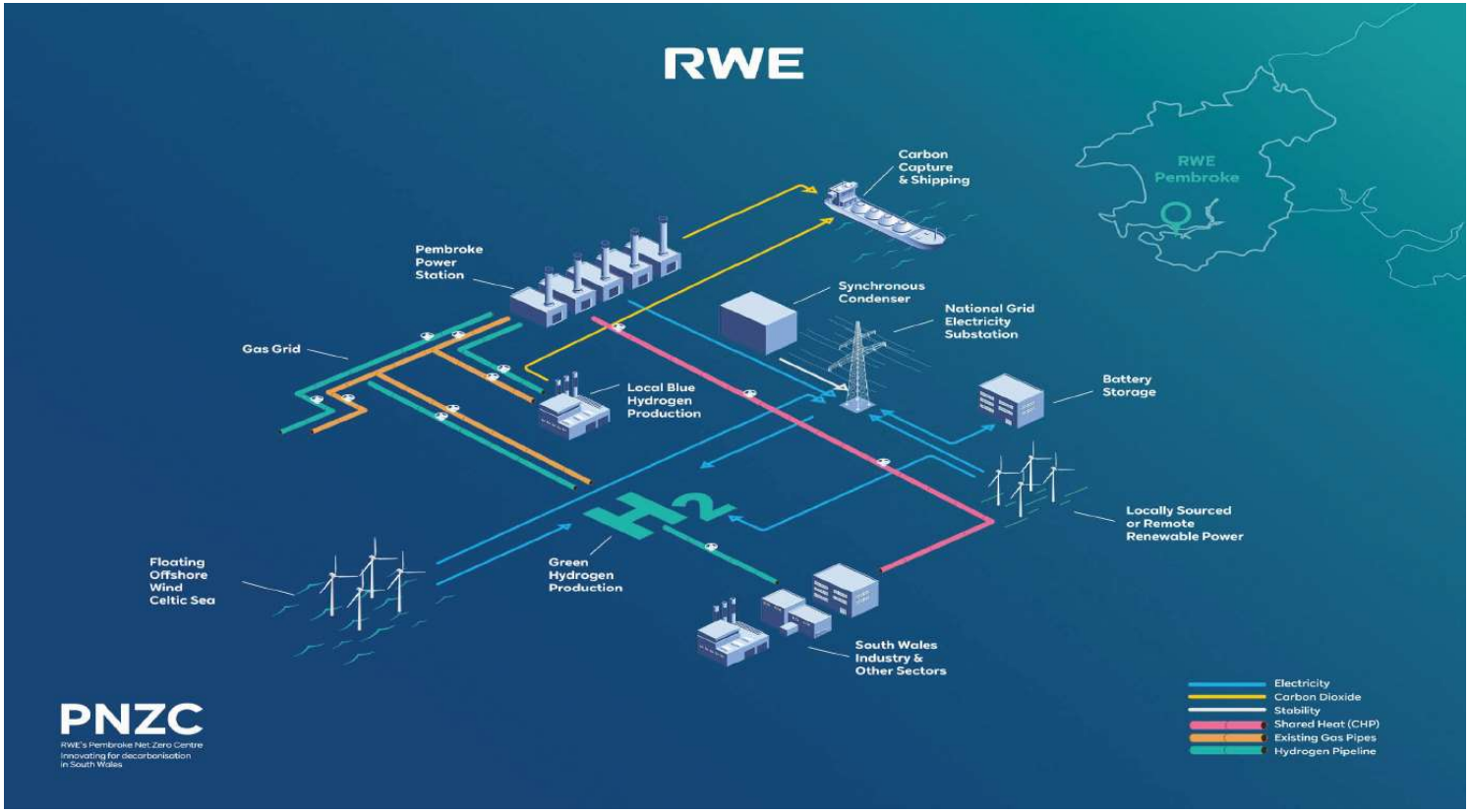
Port of Milford Haven
The UK's largest energy port.

SWIC
South Wales Industrial Cluster Plan
A Plan for Clean Growth
Developing a world leading truly sustainable cluster befitting the societal needs for 2030, 2040, 2050 and beyond.

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



“RWE has a hydrogen business and we are looking to deliver 2GW of hydrogen projects by 2030, including a green hydrogen project in Pembrokeshire. Key to this is the economic viability of projects producing hydrogen for use across a wide variety of sectors such as transport, power and industry. RWE welcomes the work of MH:EK in helping to make the storage, use and distribution of hydrogen cost effective.” Jeremy Smith, RWE.

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 H2 electrolysis (by 2026) and up to 1GW (by 2030). (UK target for 10 GW by 2030)
- H2 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

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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.

Project summary

15 MW
Hydrogen electrolyser

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

15 MW
Ground mounted solar arrays

4 TONNES
Hydrogen storage

100%
Clean, carbon-free hydrogen

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

Successful bid into UK Gov Net Zero Hydrogen Fund

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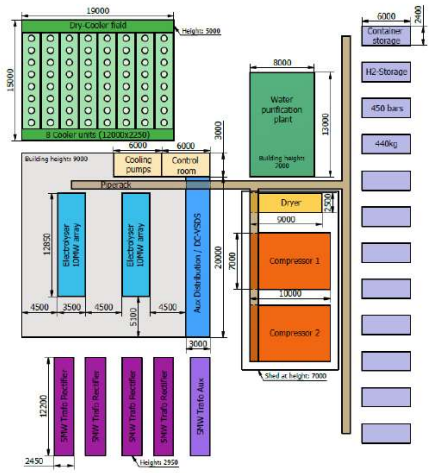
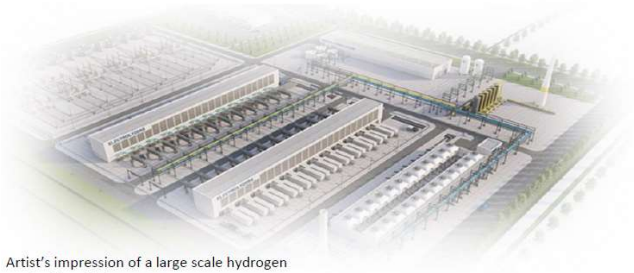
Puma/Trafigura – Milford Haven 20 MW Green H2 Project

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

Successful bid into UK Gov Net Zero Hydrogen Fund

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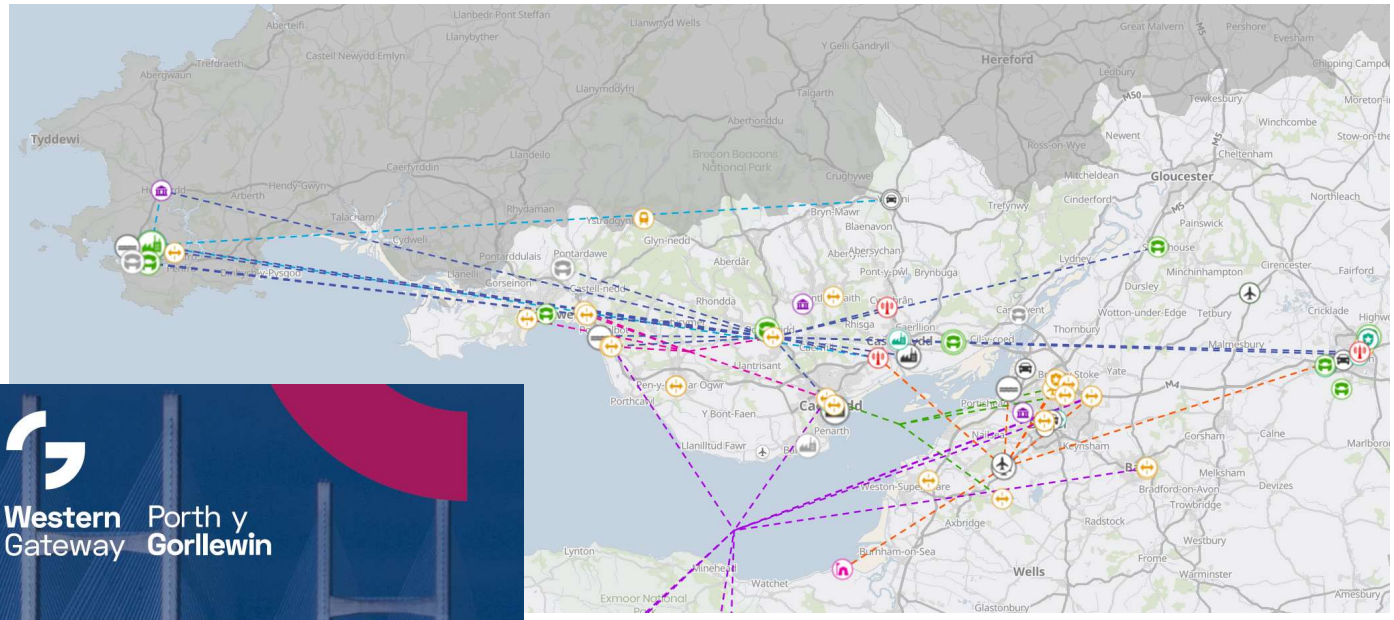
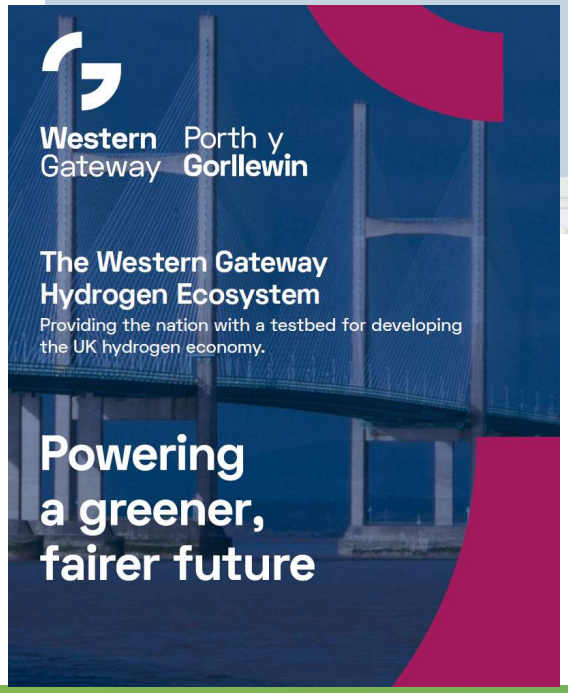
Western Gateway Hydrogen Network brochure and mapping





[hydrogen brochure and mapping tool.]

"South Wales and Western England are already leading the way in developing Hydrogen as a clean fuel to help the world decarbonise to reach Net Zero. Through the Western Gateway Partnership, this new Hydrogen Ecosystem is helping to bring together the best of what these areas have to offer across the wide range of potential uses and helping to supercharge this work to meet the challenges we face."

- **Milford Haven Energy Kingdom (MH:EK):** is a consortium of partners including the Port of Milford Haven, Pembrokeshire County Council, Catapult Energy Systems, Wales & West Utilities, Riversimple, Arup, and others within the South Wales Industrial Cluster (SWIC). MH:EK has developed plans to use hydrogen as part of a decarbonised smart local energy system alongside ambitious plans to harness offshore wind and tidal energy. The port of Milford Haven is one of UK's largest energy ports and is central to realising this initiative. It is home to the import and generation of 25% of the UK's energy and benefits from a natural harbour, vast offshore wind potential and the grid transmission infrastructure and as such, the area is well positioned to become a significant UK and European hub for hydrogen. The Milford Haven: Energy Kingdom project is paving the way to a renewables and hydrogen future for the Haven waterway and the Western Gateway.

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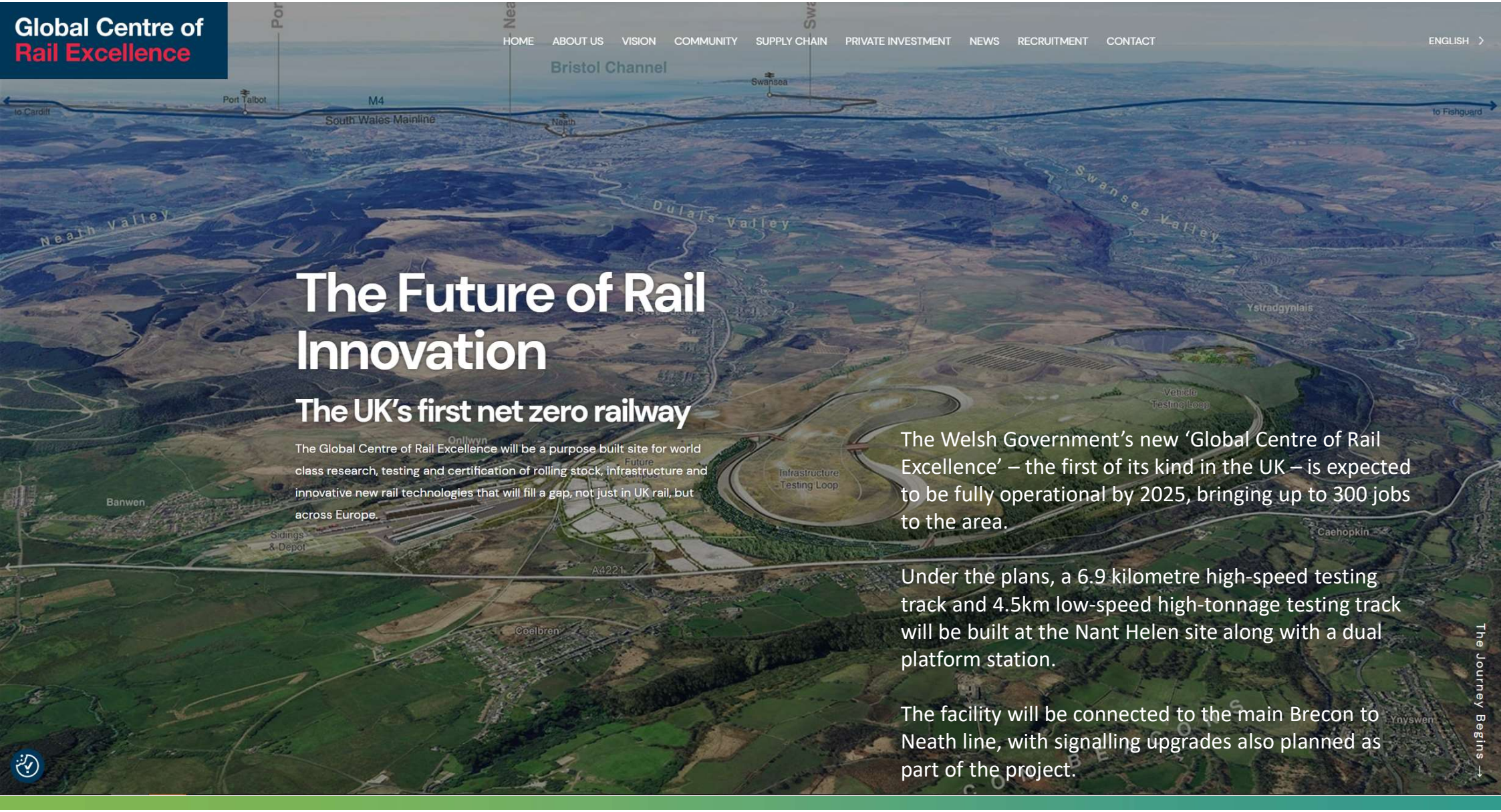
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Bristol Channel
Port Talbot
M4
South Wales Mainline
Neath
Swansea
to Cardiff
to Fishguard
Neath Valley
Dulais Valley
Swansea Valley
Ystradgynlais
Vehicle
Testing Loop
Onllwyn
Future
Infrastructure
Testing Loop
Banwen
Sidings
& Depot
A4221
Caehopkin
Coelbren
Ynyswen
The Future of Rail Innovation
The UK's first net zero railway
The Global Centre of Rail Excellence will be a purpose built site for world class research, testing and certification of rolling stock, infrastructure and innovative new rail technologies that will fill a gap, not just in UK rail, but across Europe.
The Welsh Government's new 'Global Centre of Rail Excellence' – the first of its kind in the UK – is expected to be fully operational by 2025, bringing up to 300 jobs to the area.
Under the plans, a 6.9 kilometre high-speed testing track and 4.5km low-speed high-tonnage testing track will be built at the Nant Helen site along with a dual platform station.
The facility will be connected to the main Brecon to Neath line, with signalling upgrades also planned as part of the project.
The Journey Begins →

Swansea Bay City Deal programme

Includes a number of projects that are aligned with the regional energy agenda:

- Pembroke Dock Marine project – MEECE, PDZ, META, Port Development
- Homes as Power Stations
- Supporting Innovation and Low Carbon Growth project.

‘Portfolio Carbon Reduction Assessment‘ report (February 2023)
provided by the SBCD Portfolio Office, identified a range of contributions:

- Estimated 80,000 sq m of BREEAM excellent floor space
- 5,000 jobs across renewable and energy sectors
- Estimated 6,000 skills and talent opportunities for the energy and decarbonisation sectors
- A regional centre of excellence in the renewable energy sector
- Growing the supply chains in the installation, marketing and operations of blue and green technologies.

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Green light for transformational Celtic Freeport bid

PORTHLADD RHYDD CELTAIDD

CELTIC FREEPORT

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.

Support 16,000 new green jobs

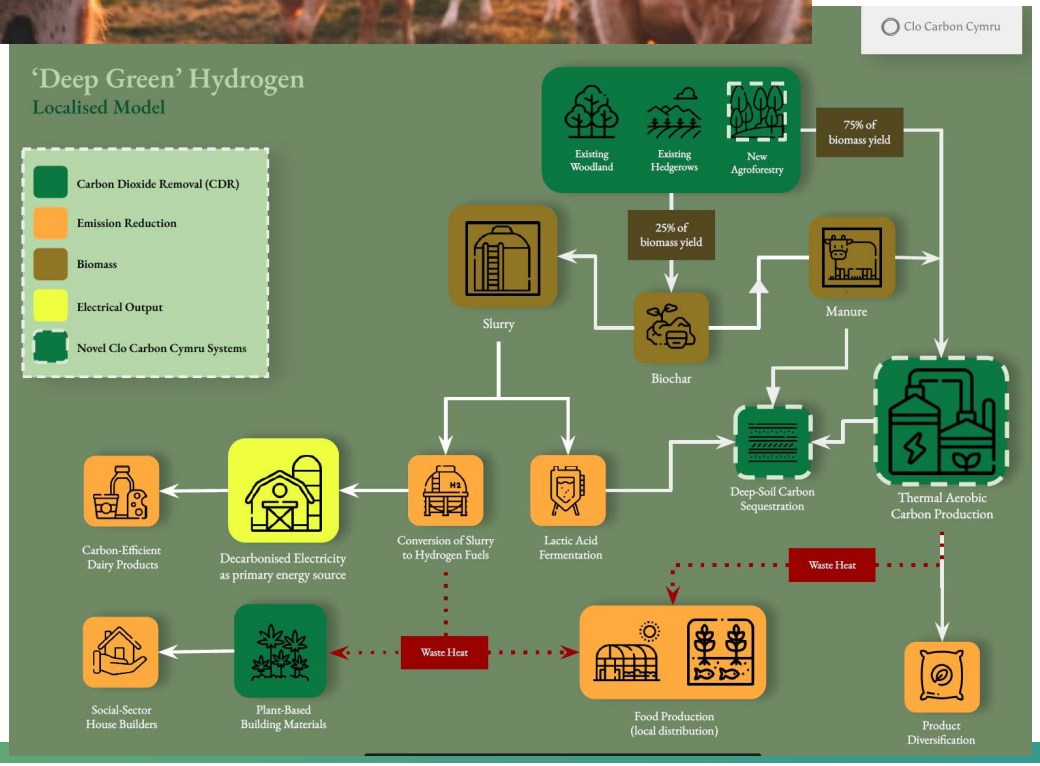
Generate £5.5bn of new investment

Accelerate the roll-out of floating offshore wind

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

‘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 2,500m3 and 7,500m3 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 H2 is fuelling the transportation of food (protein and calories) into communities to establish carbon-neutral food supply chains.



Pembrokeshire Climate Change Adaptation Strategy 2022

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

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