

## **HYBRID SBRI 2.0 Phase 2 Demonstrators**

**September 2024 – March 2025**

### **Welsh Government Smart Living Hydrogen Business Research & Innovation for Decarbonisation (HYBRID) SBRI Programme (2021 – 2025)**

#### **HYBRID**

The Welsh Government Smart Living Hydrogen Business Research & Innovation for Decarbonisation or HYBRID SBRI programme supports innovative and research solutions to deliver the [Wales Hydrogen Pathway](#) and [Net Zero Wales CB2 – 2021-2025](#). Investment in the scheme is designed to speed up the deployment of hydrogen as a key energy vector, and help Wales meet our national commitment to achieve net zero emissions by 2050. The second phase of HYBRID's second cycle (2.2 Demonstrator) started in September 2024, building on successful feasibility studies completed in Phase 1 (January – June 2023). Welsh Government has invested funds of £2.75m to date supporting hydrogen decarbonisation projects across Wales through the HYBRID SBRI.

#### **Smart Living**

HYBRID is delivered and managed by the Smart Living scheme. This Welsh Government Smart Living initiative has been in existence in 2015, helping to realise the [Wellbeing of Future Generations Act \(2015\)](#) and the goals and policies of our [Net Zero Wales Carbon Budget 2](#) and its successors through supporting innovative decarbonisation projects. These projects supply place-based and needs-led decarbonisation solutions for trialling in the real world, so that they can later be mainstreamed and rolled out at scale. Smart Living also promotes the development of a whole energy systems approach specific to Wales through a new SBRI Contracts for Innovation programme called the Whole System Research and Innovation for Decarbonisation 1.0 (WSRID 1.0) SBRI Contracts for Innovation Programme. As part of WSRID, Welsh Government is looking to award up to a potential £2 million across two separate phases between 2024-2026. and supports the development of Local Area Energy Plans, shaping a smart and flexible future energy system across Wales, and effective and **sustained local action** to tackle climate change. Smart Living projects are usually delivered in partnership with Welsh local government and other public sector bodies They also link into later-stage Welsh Government decarbonisation initiatives and other public and private investment in this important area.

#### **Small Business Research Initiative (SBRI) Contracts for Innovation**

Since 2021 Smart Living has run six consecutive Contracts for Innovation<sup>1</sup> or Small Business Research Initiative (SBRI) programmes for whole systems decarbonisation (WBRID), hydrogen-led decarbonisation (HYBRID), and now the whole systems WSRID SBRI (launched September 2024). These programmes are integrated to its approach to deliver its broader innovation mission. "Contracts for Innovation", also called SBRI, is the UK public sector's leading **pre-commercial procurement vehicle** which uses the procurement of research and development to support the creation of new products and solutions to address perceived

<sup>1</sup> [Contracts for Innovation \(May 2024\)](#)

unmet needs. SBRI Contracts for Innovation offers organisations and businesses in Wales<sup>2</sup> a unique opportunity to work directly with the public sector to develop new technologies and processes, helping to meet efficiency targets and improving public services. SBRI Contracts for Innovation is also not limited to small businesses and is in fact open to any organisation, regardless of size or previous experience of working in a specific sector.

Smart Living's SBRI programmes encourage:

- Working collaboratively with people and communities to take a more joined up approach to prevent and resolve problems, while reducing demands on already pressurised services and transforming current business models.
- Aiding in boosting the economy by engaging with innovative companies to turn their bright ideas into commercially viable products. This is likely to both create and safeguard jobs.
- Leveraging substantial new research and development into Wales.
- Supporting Welsh Government strategy by driving innovation and technology to resolve identified sectoral focused challenges across Wales.

## **HYBRID 2.2 Demonstrator Projects**

***September 2024 – March 2025***

### **1. Hydrogen Port Re-Fuelling Project (HyPR)**

**Solution Provider:** Milford Haven Port Authority (MHPA, Pembrokeshire)

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**Delivery Partners / Sub-contractors:** Offshore Renewable Energy Catapult Development Services; Apollo Engineering; ERM and Haush Ltd.



*Aerial photo of Milford Haven.*

#### **Project Overview**

Milford Haven is critical to the resilience and security of UK energy and has a pivotal role to play in delivering the UK's net zero ambitions.

The UK's single largest cluster of energy-related businesses, Milford Haven handles or processes around 20% of the UK's energy needs, supporting the employment of 5,000 highly skilled workers in Wales, with many hundreds more throughout the wider supply

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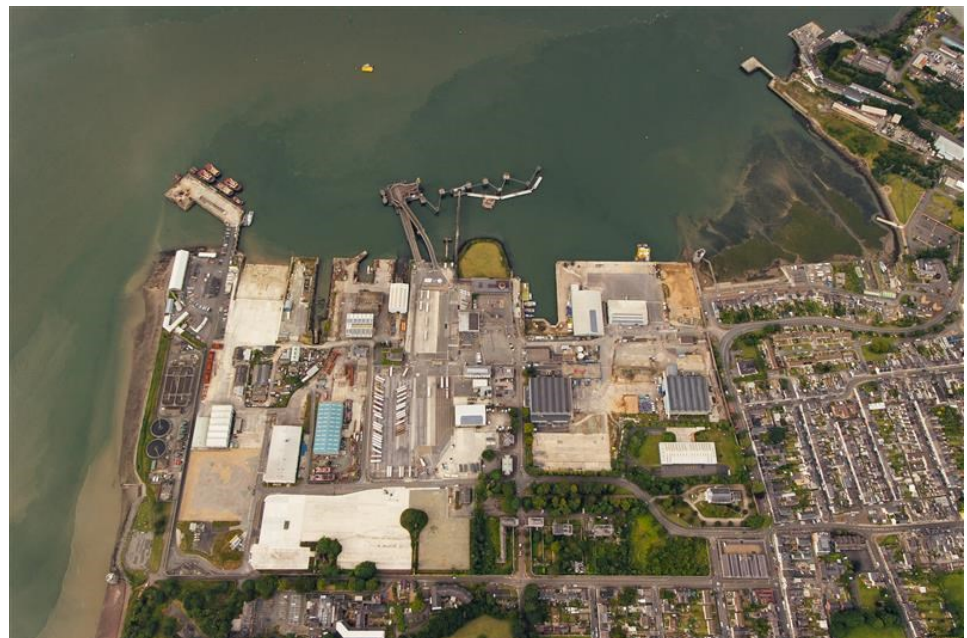
<sup>2</sup> Wales SBRI Centre of Excellence <https://sbriwales.co.uk/>

chain. These facilities play a vital role in supporting the net zero transition and we are at the forefront of exciting developments around low-carbon hydrogen and renewable energy.

With access to fuels such as hydrogen, existing energy facilities can be supported to decarbonise and by utilising existing skills, rail connectivity, transmission and pipeline assets, the Milford Haven Energy Cluster can deliver an economy focused not only on hydrogen, but also on FLOW, marine renewables, sustainable alternative fuels, CO2 shipping, and energy storage. To do so new supply chains will be required to produce and deliver these fuels to the port. Consideration must now be given to how they will bunker the fuels, and which energy sources will be required to create the hydrogen required. These can be supplied from both local renewables and electrolytic production on forthcoming Celtic Sea offshore wind arrays (FLOW).

The previous HYBRID Phase 1 Feasibility HyPR study collated information on the variety of vessels that could use the Haven as part of the construction phase of offshore wind assets in the Celtic Sea. Analysis was carried out to understand the potential fuel demand that could be created by these vessels. The study also identified the types of fuels and infrastructure that could meet this demand.

The focus of the Phase 2 Demonstrator is to bring together two advancing hydrogen projects to co-develop a trial, with the aim of fast-tracking innovations they develop to the mainstream and commercialisation. The Port of Milford Haven is leading the project and will seek to host the refuelling asset as well as facilitate end use of the hydrogen supplied. Project partners include



*Aerial photo of Pembroke Port.*

Haush, a renewable and hydrogen development company positioning to establish a green hydrogen generation facility in Pembroke Port and also the possibilities for owning and operating a permanent hydrogen refuelling facility within the Port.

ERM Dolphyn Hydrogen is also a renewable and hydrogen development company with a specific focus on producing hydrogen from Floating Offshore Wind at scale, with the Celtic Sea identified as a major opportunity for the company. Dolphyn have recently tested hydrogen generation using seawater on a barge in the Haven at their META test site next to Pembroke Port.

Apollo is supporting HyPR with engineering expertise to undertake renewable energy feasibility to support hydrogen generation. Offshore Renewable Energy Catapult are providing strategic oversight, project management and stakeholder expertise for the project. Together through HyPR they are building on previous significant work and physical trials undertaken to date, to design a permanent refuelling solution for the Port of Milford Haven.



## 2. Caerogen: Optimising Efficient use of Alternative Water Sources for Electrolysis

**Solution Provider:** University of South Wales

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**Delivery Partners / Sub-contractors:** Caerphilly County Borough Council and Challoch Energy.



*'Caerogen' Project site entrance.*

### Project Overview

The 'Caerogen: Optimising Efficient use of Alternative Water Sources for Electrolysis' project is trialling the use of waste heat from an electrolyser to drive a water purification process, utilising technology from project supporter Alfa Laval. The project makes use of the Caerphilly County Borough Council (CCBC) reed bed water treatment facility at Coed Top Hill as a case study. Previous work at the site (HYBRID SBRI2.0 Phase 1 - Feasibility) analysed the flow and quality of water through the reed bed treatment facility, indicating the potential of the site as a source of water, but showing further purification would be required for most electrolysis systems. This Phase 2 project will demonstrate the ability of Alfa Laval's Multi-Effect Plate (MEP) technology to purify the water to the required standard for electrolysis using waste heat generated from the electrolyser itself.

Water usage for large electrolysis projects can be significant and securing sufficient water supply from potable water can add to the cost and complexity of project development. Use of non-potable water supplies, especially from waste water sources, reduces the environmental impact of electrolysis projects and increases viability, especially where projects are likely to cluster. The Coed Top site presents an ideal case study for the technology, but the innovation from this project has broader applicability for electrolysis projects, including water desalination for offshore electrolysis. The project seeks to support renewable hydrogen development in Wales, particularly in supporting objectives 7, 9 and 10 of the Wales Hydrogen Pathway.

Caerogen also has the potential to increase cost-effectiveness and reduce the environmental impact of hydrogen production. It represents a significant innovation over the current use of potable water for electrolysis. The outcomes from this project will demonstrate the ability to utilise waste heat to generate purified water from different waste streams, increasing economic performance and reducing the use of valuable potable water.

Caerogen focusses on hydrogen development by the Caerphilly County Borough Council (CCBC) local authority area. CCBC has already invested millions into energy efficiency measures, leading to upgrades to street lighting and solar panel installation at schools, and are also investing in wind turbines, electric vehicle charging points, hydroelectric and solar farms. CCBC has a commitment to become net carbon neutral by 2030, aligning with Cardiff Capital Region (CCR) and Welsh Government targets.



*Coed Top reed bed water treatment facility.*

Delivering this will require a new and transformative approach that incorporates the energy needs of the whole area and emerging technology approaches. To date it has developed an energy prospectus which identifies key projects for solar, wind, anaerobic digestion and EV transport that could contribute to this transformation however without adding hydrogen to the energy mix it will not be possible to meet this strategic need. CCBC has identified the Coed Top Hill site's potential for hydrogen development, and this Phase 2 project aids that development by enabling the efficient use of water on the site, as well as providing an exemplar for future developments.

The project is being led by the University of South Wales with support from key stakeholders and subcontractors Caerphilly County Borough Council and Challoch Energy. As well as these, key support for the project comes from.

- Wales and West Utilities
- Protium Green Solutions
- Alfa Laval