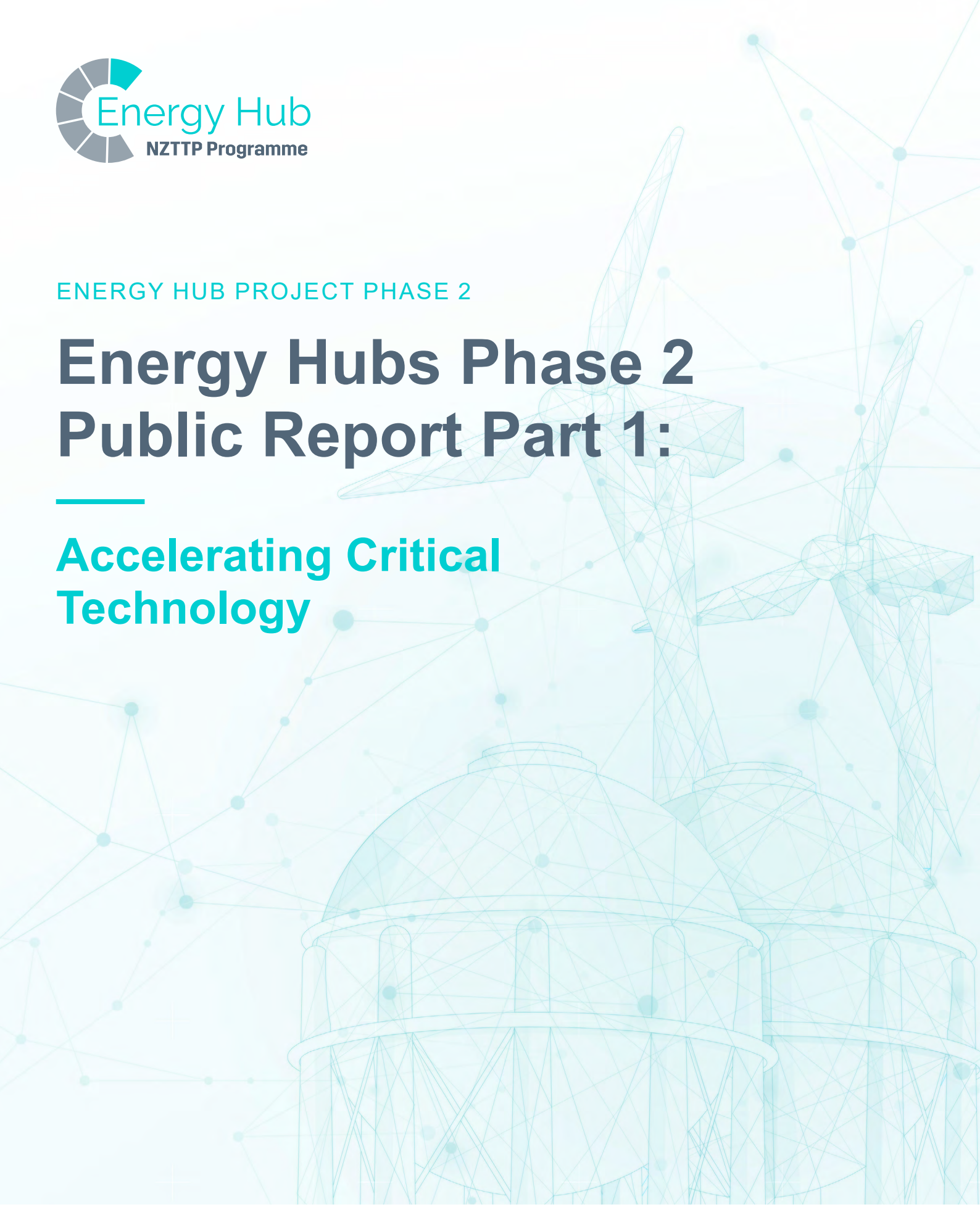
Energy Hub
NZTTP Programme

ENERGY HUB PROJECT PHASE 2

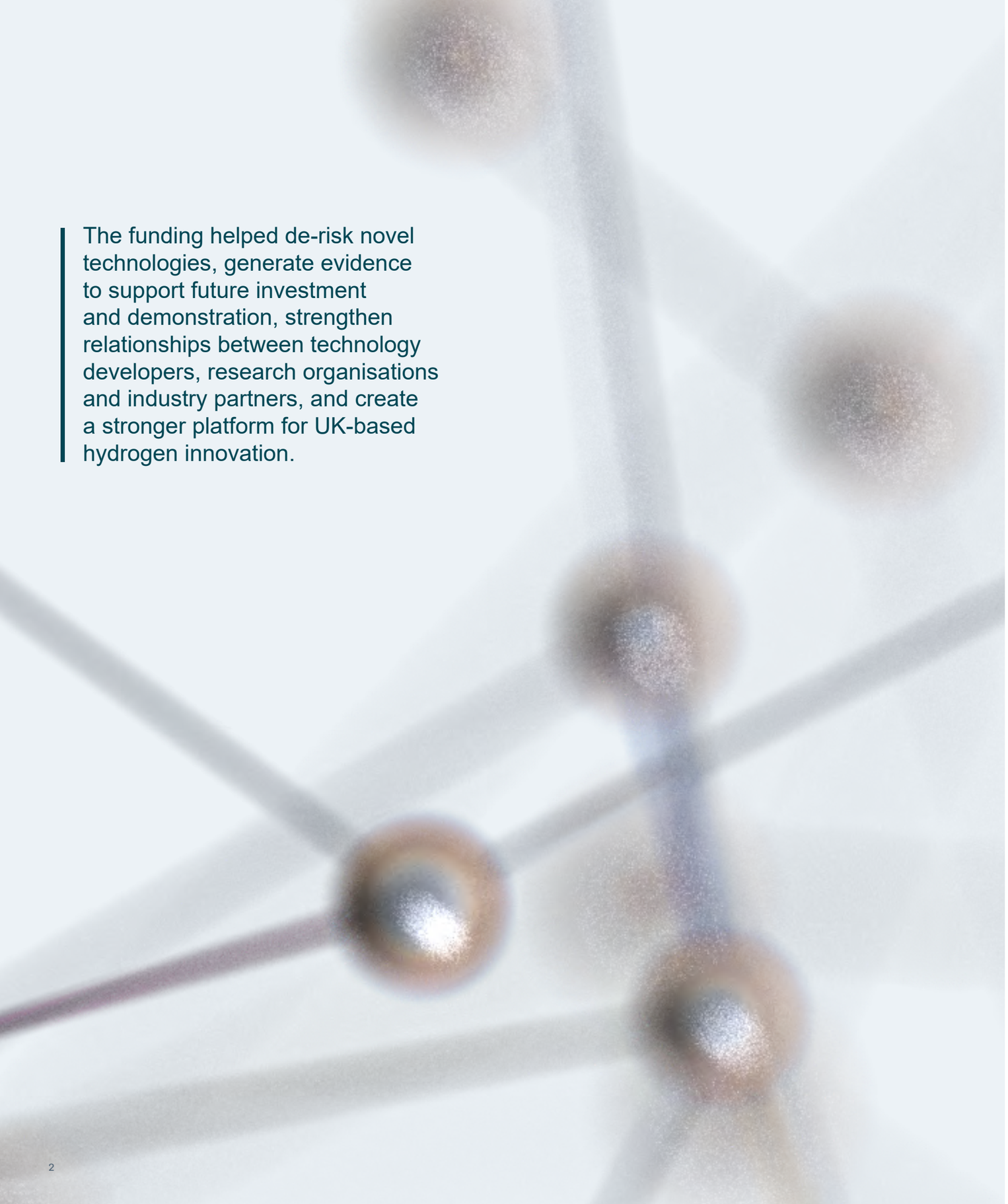
Energy Hubs Phase 2 Public Report Part 1:

Accelerating Critical Technology



Net Zero Technology Transition Programme

Net Zero Technology Centre
Technology Driving Transition



> The funding helped de-risk novel technologies, generate evidence to support future investment and demonstration, strengthen relationships between technology developers, research organisations and industry partners, and create a stronger platform for UK-based hydrogen innovation.

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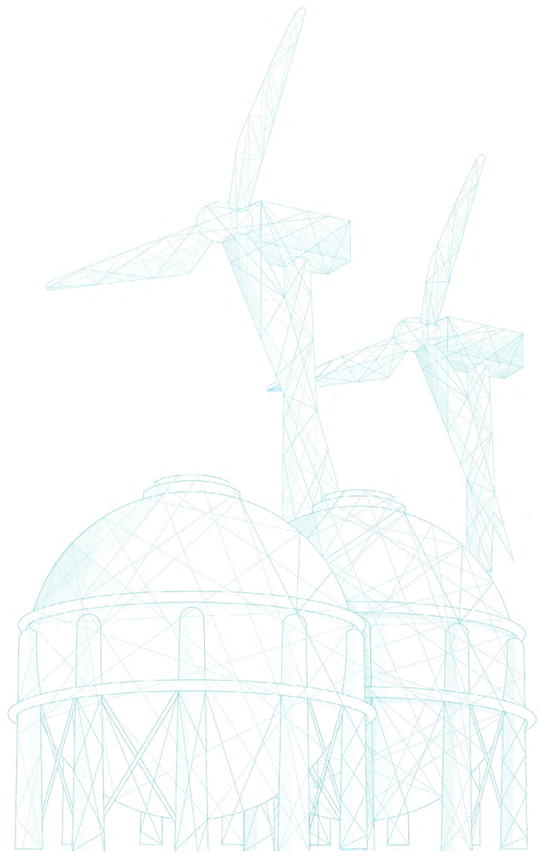
Executive Summary

Green hydrogen will play a central role in the UK's transition to a low-carbon energy system, but the cost, efficiency and scalability of electrolyser technologies remain significant barriers to deployment. Phase 2 of the Energy Hubs Project aimed to accelerate promising early-stage hydrogen production technologies that could help address these challenges, building on the findings of Phase 1 and supporting innovation that can strengthen the UK's future clean energy supply chain.

Through a competitive process, the project provided a total of £500,000 of direct financial support to three innovative electrolyser developers: Clyde Hydrogen Systems, AqSorption and Latent Drive. The funded work focused on improving electrolyser performance, including improvements in efficiency at a system level, reducing cost and balance-of-plant complexity and improving compatibility with intermittent renewable energy.

The project delivered measurable technical progress across all three selected technologies. Clyde Hydrogen Systems advanced its decoupled electrolysis technology through improved electrode performance, membrane evaluation, and state-of-charge sensing. AqSorption designed and pressure-tested a 100 bar membraneless electrolyser stack and demonstrated the potential for microturbines to recover energy from pressurised gas streams. Latent Drive progressed its SeaStack direct seawater electrolysis concept from early-stage design towards a lab-tested prototype, including advances in bipolar membranes, bipolar plates and split-stack architecture.

The impact of the project extends beyond the technical work completed during the funding period. The funding helped de-risk novel technologies, generate evidence to support future investment and demonstration, strengthen relationships between technology developers, research organisations and industry partners, and create a stronger platform for UK-based hydrogen innovation. By moving these technologies closer to real-world testing, Energy Hubs Phase 2 has helped build a stronger UK pipeline of hydrogen innovation, with the potential to reduce production costs, improve flexibility and support future clean energy supply chains.



The Energy Hubs Project

The Energy Hubs Project is one of seven projects within the Net Zero Technology Transition Programme (NZTTP).

The Energy Hubs Project, led by Net Zero Technology Centre (NZTC) and partners, has delivered over 25 detailed studies examining how Scotland can convert its natural energy resources into clean fuels and hydrogen at scale.



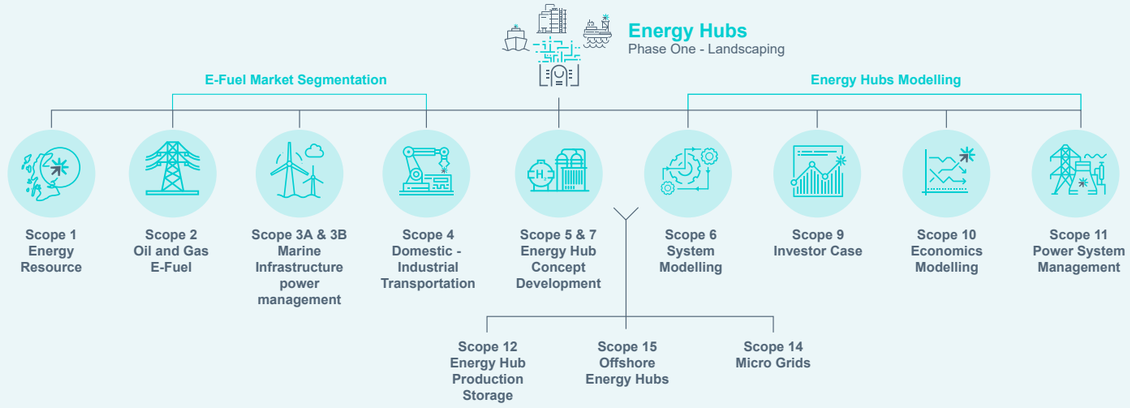


Figure 1 Energy Hubs Phase 1 Scopes of Work

Phase 1 of the Energy Hubs Project addressed key considerations around the creation of Energy Hubs across Scotland and concluded in 2023. The Phase 1 public report, available to download on the NZTC website, provides an overview of the main findings from this work.

> "Energy Hubs" are a site or area that combines various technologies driving efficiencies of scale and the sharing of site facilities. An Energy Hub is a geographic location (region, city, island, industrial cluster) that can potentially host the entire hydrogen value chain, from production, storage, and distribution to end-use.





Accelerating critical technology

- Scope 1 electrolyser projects

  Successfully advanced the TRL of 3 innovative electrolyser technologies



"Clean Fuels Transition Strategy" - Establishing a Scottish hydrogen industry

- Scope 17 SEES (power to liquids) Phase 1
- Scope 17 SEES (power to liquids) Phase 2
- Scope 18: Clean Fuels 2035 (Transition Strategy)



"Fill the backbone" - developing the large scale, long term concept

- Scope 2: Thermal integration
- Scope 3: Black start & storage
- Scope 5: Concept development
- Scope 6: Ports
- Scope 7a: Byproducts
- Scope 7b: Biofuels
- Scope 8: System modelling
- Scope 15: Non-technical

Figure 2 Energy Hubs Phase 2 Scopes of Work

Phase 2 of the Energy Hubs project built on the findings and recommendations of Phase 1 and focused on three main areas of work, with the outputs from that work summarised across three public reports.

Those reports are:

- Energy Hubs Phase 2 Public Report Part 1: Accelerating Critical Technology (This document)
- Energy Hubs Phase 2 Public Report Part 2: Clean Fuels Transition Strategy.
- Energy Hubs Phase 2 Public Report Part 3: Fill the Backbone

For further details or for more information on the 25+ studies delivered through the Energy Hubs Project, please contact NZTC.

This Report

This document summarises the technology acceleration activities funded through the Energy Hubs and the Hydrogen Offshore Production (HOP2) projects. It provides the background and context for the funding, outlines the technological progress achieved, and summarises the wider impacts and next steps for the technologies.



Accelerating Critical Technology

The development of low-TRL hydrogen production technologies is vital to the UK's future energy system.

Multiple independent findings from Energy Hubs Phase 1 concluded that electrolysers require further development, and that improving electrolyser performance will have a significant impact on reducing system costs (SLB, 2023) (Crondallenergy, 2023) (NZTC, 2024a) (NZTC, 2024b). Innovative electrolyser technologies must be incubated whilst established technologies are built-out in the 2030s.

Innovation in electrolyser technology is needed to optimise overall system efficiency. Robust technologies are needed to operate in challenging environments with minimal degradation, reduced maintenance requirements and improved equipment life. The technologies must be highly compatible with intermittent renewable energy sources and must enable flexible, reliable operation. Safety will also be essential. In addition to this, in many applications, minimising the balance of plant will also be of benefit, and reducing dependence on rare earth minerals will be of increasing importance as electrolytic hydrogen production scales up.

The technological challenges are multiple and complex and will require novel solutions. The breakthroughs we invest in today will unlock step change improvements in performance in the future.

In recognition of these challenges and the findings from Phase 1, Phase 2 of the Energy Hubs Project provided £500,000 of direct financial support to accelerate innovative electrolyser technologies. The technologies were selected via a competitive process. Electrolyser developers submitted applications, which were assessed by a panel against four main criteria:

- Technology – Impact and innovation
- Technology – Feasibility / Pilotability
- Long term benefits to Scottish economy and supply chain
- Organisation, Team and Ownership

These applications were reviewed by a panel comprised of NZTC and Energy Hubs Partners. Three technologies were selected for funding:

- Clyde Hydrogen Systems' decoupled electrolysis technology;
- AqSorption's high pressure membraneless electrolyser with oxygen expander;
- Latent Drive's "SeaStack" direct seawater electrolyser

The Projects

Clyde Hydrogen Systems – Improving the Efficiency of the CHS Decoupled Electrolyser (Clyde Hydrogen Systems, 2026)

The Technology – Decoupled electrolysis
Clyde Hydrogen Systems (CHS) is a spinout from the University of Glasgow's School of Chemistry, one of the world's leading electrochemistry research groups.

Clyde Hydrogen Systems has developed a new type of electrolysis that allows hydrogen and oxygen to be made in separate places and at different times and rates.

The technology works by splitting hydrogen production into two linked stages, using a re-useable liquid mediator that temporarily stores electrical energy in chemical form. First, electricity charges the mediator in an electrochemical cell while oxygen is released. The charged liquid then passes to a separate catalytic reactor, where it releases hydrogen and returns to its discharged state, ready for recharging.

This decoupled electrolysis has the potential to:

- improve safety by preventing hydrogen and oxygen from mixing;
- provide greater flexibility when operating with intermittent renewable energy;
- enable high-pressure hydrogen production without mechanical compression;
- simplify system design and support scale-up; and
- reduce operating costs through more reliable operation.

Overall, the technology aims to enable safer, more flexible and lower-cost green hydrogen production.

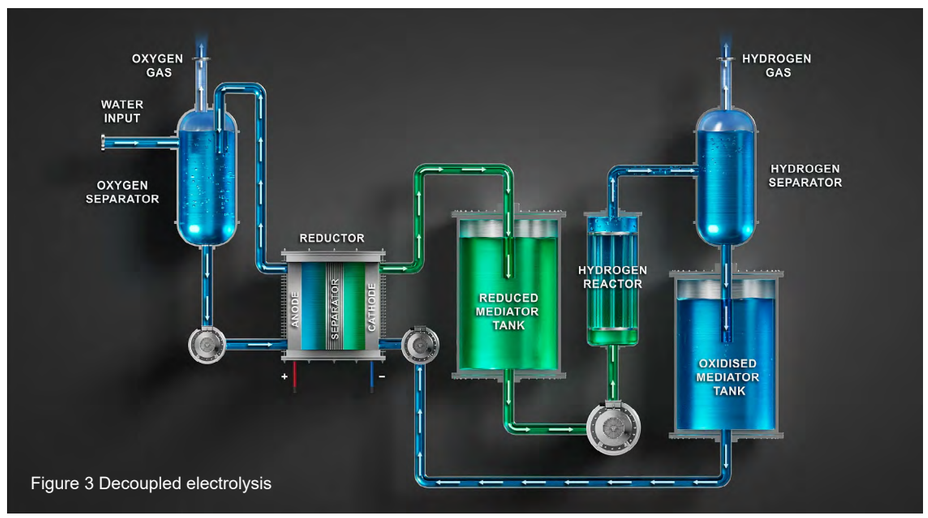


Figure 3 Decoupled electrolysis

The Work Funded by Energy Hubs

Energy Hubs funding supported three areas of work:

- the evaluation and scale-up of electrodes and cell hardware (Work Package 1);
- the assessment of alternative membrane materials (Work Package 2); and
- the development of a practical method for monitoring the mediator's state of charge (Work Package 3).

WP1 – Electrodes and cell hardware
The CHS system includes an electrochemical "charging" and a catalytic "discharging" step. During charging, the mediator is reduced in the cathodic side of a flow cell while oxygen is produced at the anode. It is then discharged in a catalytic fixed-bed reactor to produce hydrogen rapidly, without being constrained by the slower oxygen evolution reaction.

Work Package 1 (WP1) focused on optimising the two electrochemical processes involved in mediator charging, beginning with electrode comparisons to identify the best materials, catalysts and surface structures.

Linear sweep voltammetry was used to assess the performance of several anode catalyst coatings and electrode morphologies against a benchmark control. This screening exercise identified the five best-performing anodes for follow-on testing. Different cathode morphologies were also assessed to identify the strongest-performing design.

The five best performing anodes were tested to see how well they withstood extended exposure to the mediator solution, which is acidic and corrosive. The cathodes were not included in this study as the stability of their base substrates was already known to CHS. Two options remained particularly stable over 245 days and were taken forward for more demanding stress testing. Following more than 100 hours of testing under harsher operating conditions, the more stable anode was selected for scale-up.

The best-performing anode and cathode designs were then manufactured in larger formats and tested in a commercial cell with more than six times the active area of the laboratory-scale system. These trials assessed whether electrode performance could be maintained at a larger scale and examined the effects of operating conditions, including liquid flow rate and component spacing.

WP2 – Membrane evaluation
The membrane in the electrochemical cells is a major contributor to performance and cost. The existing membrane, Nafion 117, is made from PFAS material and was used as the benchmark against which alternatives were assessed. In order to support lower cost, more efficient and more environmentally friendly use of chemicals, WP2 examined the performance of alternative materials.

A total of 21 different membranes were screened through compatibility testing, electrochemical testing and crossover rejection tests. Membranes that could not support the required current, or that allowed unacceptable mediator crossover, were progressively removed from the test programme. Short-duration operational testing and osmotic drag measurements were then used to narrow the field further.

Three membranes were taken forward for testing in the larger electrochemical cells used during the scaled-up electrode trials. Testing identified one of these membranes as the most promising alternative to Nafion 117. Further testing is needed to establish its long-term durability.

WP3 – State of Charge (SoC) sensing
The properties of the liquid mediator change according to its state of charge. The mediator is colourless when uncharged but turns deep blue-black during electrochemical reduction. CHS considers the mediator fully charged once it has undergone a reduction equivalent to two additional electrons per mediator molecule.

Accurate monitoring of the state-of-charge (SoC) of this mediator is of critical importance to efficient operation of the CHS system. Work Package 3 aimed to develop a reliable and cost-effective method for measuring the mediator's state of charge in real time. The method also needed to be suitable for integration with data capture and control systems.

Optical methods were explored first, based on the mediator's colour change during charging, but these were not sufficiently reliable for practical use. Open-circuit voltage monitoring produced the strongest results, with the measured voltage changing consistently as the mediator charged and levelling off once full charge was reached. Comparison with the existing titration method showed good agreement across the overall charging profile. CHS also collaborated with the National Physical Laboratory to support this work.

Outcomes and Next steps

The data generated through this work has strengthened the case for more flexible and efficient hydrogen generation using decoupled electrolysis, the fundamental technology underpinning the CHS technology. This has also facilitated the move of this technology from academic research towards industrial scale.

Since the Energy Hubs-funded work concluded, Clyde Hydrogen has continued to progress its decoupled electrolysis technology towards commercial demonstration. In January 2026, the company announced that its first fully integrated prototype had successfully produced hydrogen, providing further validation of the system. Clyde Hydrogen is now focused on scaling the technology towards a commercial demonstrator, securing investment and delivery partners, and developing a market-ready product.



AqSorption - A study into the Techniques of Kinetic Energy Recovery for Improving Overall Electrolysis Efficiency (AqSorption Ltd, 2025)

The Technology – high pressure electrolyser with energy recovery system
The overall efficiency of an electrolysis system depends on more than the electrolyser alone. Loads from balance-of-plant equipment can increase electricity consumption and operating costs, making it important to reduce these loads or recover energy that would otherwise be lost.

AqSorption's membraneless electrolyser separates hydrogen and oxygen using porous electrodes and controlled liquid flow rather than an ion-exchange membrane or diaphragm. The system produces both hydrogen and oxygen at high pressure, owing to the operating pressure profile of the system. Directly producing hydrogen at high pressure reduces the downstream compression requirements. As the oxygen is typically not required at pressure, the energy contained in this gas stream is normally lost during depressurisation. Recovering and converting this energy into usable electrical power could improve overall system efficiency. However, energy recovery from high-pressure oxygen is technically challenging because of the gas's high reactivity and the associated pressure, temperature and moisture conditions. Addressing these challenges formed a key part of AqSorption's work under the project.

The technology has the potential to:

- avoid the need for mechanical hydrogen compression by producing hydrogen directly at high pressure;
- reduce balance-of-plant requirements, system complexity and footprint;
- lower operating costs by reducing compression-related energy demand;
- avoid the scarce catalyst materials commonly used in proton exchange membrane electrolysers, including platinum and iridium; and
- improve overall system efficiency by recovering energy from pressurised gas streams.

The Work Funded by Energy Hubs

Energy Hubs funding supported two related areas of work:

- the design, manufacture and pressure testing of a high-pressure membraneless electrolyser stack; and
- the evaluation of technologies for recovering kinetic energy from pressurised gas streams

High-pressure electrolyser stack prototype
AqSorption worked with the Manufacturing Technology Centre (MTC) to design and build a high-pressure electrolyser stack. Detailed part drawings and parts lists were developed for both a 100 Bar and 500 Bar electrolyser stack.

The project initially intended to deliver a working prototype operating at 500 bar. Following cost and feasibility assessments, the scope was revised to an operating pressure of 100 bar. The stack was designed and analysed against a target pressure of 150 bar to provide an additional safety margin.

Once built, the prototype stack underwent a series of water-based pressure tests to validate integrity. The stack was repeatedly pressurised to 100 bar and held under pressure for periods ranging from one hour to nine days. Across these tests, no leaks were observed and the recorded pressure drops were very small (typically less than 0.25 bar). These variations were attributed to gauge limits and thermal effects rather than genuine leakage. Integrating all components into a complete stack allowed them to be tested as a complete protype, moving the technology from TRL 3 to TRL 5.

Energy recycling technology
The second major strand of work examined how to recover kinetic energy from pressurised gas streams, particularly oxygen, which is often vented as a low value by product in electrolyser systems. The initial idea was to repurpose an existing commercial gas booster (normally used to compress gas using a pneumatic drive) so that it would run in reverse and convert high pressure oxygen into a lower pressure air supply and potentially an energy store.



Figure 4 High-pressure electrolyser stack, commissioned to MTC, assembled at the AqSorption workshop.

Testing found that this solution was unsuccessful. Even after making several physical modifications, the team were unable to achieve useful operation in the reverse direction, and so alternative technologies for energy recovery were explored. The work provided valuable insights into the limitations of adapting commercial gas boosters for energy recovery. It also identified how future computational fluid dynamics analysis could support the design of appropriately sized pneumatic cylinders and surface areas for a bespoke system.

AqSorption reviewed a wide range of alternative turbine and booster technologies – from cryogenic helium expanders to turboexpanders and microturbines aimed at combustion applications to see whether any could be adapted for high pressure hydrogen and oxygen service. Most options were discounted because of their cost, lead times, scale or suitability for use with hydrogen or oxygen. This evaluation identified microturbines as the most promising option for the required scale and application.

The microturbines were tested by two independent teams across a range of controlled pressure reductions. Results showed a positive relationship between inlet pressure and electrical output, demonstrating the feasibility of energy recovery, although integration with an operating electrolyser was beyond the scope of this phase of work.

Outcomes and Next steps

The project successfully designed, built and pressure tested a 100 bar membraneless electrolyser stack, advancing the technology from an experimental concept towards a prototype demonstrated in a relevant environment. The associated engineering documentation also provides a basis for the future development of higher-pressure variants.

The energy recovery work demonstrated that microturbines can generate electrical power from controlled reductions in gas pressure, with output increasing as inlet pressure rises. Although the attempt to repurpose a commercial gas booster was unsuccessful, it provided valuable insight into the limitations of this approach and helped identify microturbines as the most promising route for future energy recovery. New technical documentation has been created from the testing done, which will help with future development.

The collaboration also strengthened AqSorption's relationships with key partners and generated clear recommendations for further integration, control, and demonstration work, laying the groundwork for future reductions in electrolyser operating costs.

Further research and work is needed to address the challenges that emerged during testing. Future work should focus on integrating microturbines with an operating electrolyser to quantify the energy recovery achievable under real-world conditions. Additional development is required to make the recovered DC power usable, including power conversion and storage solutions, alongside improvements to turbine control and pressure regulation systems. Further testing with oxygen and other process gases at representative operating pressures is needed to validate performance and safety. In parallel, AqSorption intends to complete operational testing of the 100 bar stack and use the findings to support development of the original 500 bar stack concept and demonstrate the commercial benefits of high-pressure electrolysis and energy recovery.

Since the project concluded, AqSorption has continued to advance several areas of its technology portfolio. This includes adapting and developing a deployable hydrogen supply solution for specialist applications. The company is also undertaking research into applications for the nuclear sector, while its parent company AqGas continues to develop low-temperature DECOM ammonia-to-hydrogen technology.

Latent Drive – Developing the SeaStack Technology (Latent Drive, 2025)

Latent Drive is a UK company developing green hydrogen technologies, including platinum-group-metal-free “Catrode” electrodes and the SeaStack direct seawater-to-hydrogen electrolyser. Its aim is to make large-scale green hydrogen production abundant and affordable.

LATENT DRIVE

Latent Drive received support from two NZTC-led funding streams: Energy Hubs Phase 2 and the Hydrogen Offshore Production Project (HOP2). HOP2 is an initiative designed to review the practicality and viability of large-scale offshore green hydrogen production and is funded by the Scottish Government’s Just Transition Fund. The SeaStack technology is particularly well suited to offshore applications, and so advancing this technology was of benefit to the overall aims of the HOP2 project.

These two funding streams supported distinct scopes, although both aimed to support Latent Drive in advancing the SeaStack technology.

Energy Hubs focused on advancing the SeaStack cell architecture, while HOP2 supported the development of key materials and components needed for larger-scale offshore deployment, particularly bipolar membranes and bipolar plates.

Together, the funding helped progress SeaStack from TRL 2 to TRL 4 by moving the concept from early-stage design towards a lab-tested prototype. The work also helped de-risk the technology, strengthen the evidence base for future demonstration, and support Latent Drive in securing follow-on opportunities.



Figure 5
Latent Drive SeaStack

The Technology – Direct seawater electrolysis
SeaStack is designed to produce green hydrogen directly from seawater. This is particularly relevant for coastal and offshore applications, where renewable energy resources are abundant but freshwater is scarce.

By using seawater directly, SeaStack has the potential to reduce the need for separate desalination infrastructure, lowering balance-of-plant complexity, cost and footprint. This could be especially valuable for space-constrained offshore or port-based hydrogen production sites.

The technology is also capable of operating with variable renewable energy input, making it well suited to intermittent power from offshore wind and other renewable sources.

- Direct use of seawater could reduce desalination requirements and associated balance-of-plant complexity.
- Reduced infrastructure needs may lower cost, footprint and environmental impact.
- Compatibility with fluctuating renewable power could support near-shore and offshore hydrogen production.

SeaStack works by splitting water from a seawater feed through a proprietary two stage process. It uses a composite bipolar membrane formed by integrating an anion exchange membrane (AEM) with a proton exchange membrane (PEM). This approach means that the seawater is never exposed to the full cell voltage, helping to reduce unwanted chlorine formation.

The Work Funded by Energy Hubs

The Energy Hubs scope centred on progressing the SeaStack cell design and generating laboratory evidence to support technology maturation. This included developing a seawater-configured test bed, testing single-cell SeaStack operation, assessing membrane and electrode assembly options, and advancing early component and stack designs. Laboratory trials were conducted using both international standard seawater and locally sourced seawater from Weymouth Harbour, with a strong emphasis on managing challenges such as calcium and magnesium carbonate scaling, chlorine evolution reactions, and gas bubble accumulation within porous transport layers leading to increased resistance.

Work Package 1
Seawater feed chamber
The original objective was to design and implement a seawater feed chamber compatible with an existing AEM stack. However, testing showed that this arrangement created resistance losses across the gap between membranes, limiting efficiency. In response, Latent Drive moved towards a zero-gap design in which the membranes are pressed together, creating a bipolar membrane arrangement that retained the two-stage water-splitting concept while improving performance.

Further development was then funded under the HOP2 project, as detailed later.

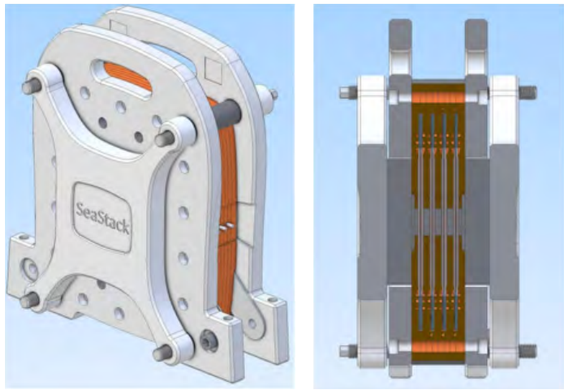


Figure 6 Full Stack

Work Package 2
Seawater-configured test bed
Latent Drive developed a dedicated laboratory-scale test loop for seawater electrolysis, integrating pumps, reservoirs, power supplies, salinity controls and pressure controls. This test bed provided the platform for subsequent work packages and enabled controlled testing using both synthetic seawater and seawater sourced from Weymouth Harbour.

Work Package 3
Sourcing and Testing Proton Exchange Membranes (PEM) Membrane Electrode Assemblies (MEAs) for Cathode
The team tested commercial proton exchange membrane electrode assemblies under acidic operating conditions, using platinum-group-metal catalysts as a benchmark. These commercial options provided useful reference data but were costly, supporting the case for developing lower-cost in-house alternatives.

Work Package 4
In-house single-cell SeaStack testing
Single-cell rigs were built and tested with seawater to validate the two-stage seawater-splitting concept. Trials using both synthetic seawater and real seawater demonstrated laboratory-scale operation and highlighted areas for further optimisation, including membrane thickness, catalyst coatings, gas bubble management and resistance within porous transport layers.

Work Package 5
Membrane electrode assembly development
Latent Drive developed and tested in-house membrane electrode assemblies, including Catrodes and PEM components. These in-house assemblies outperformed commercial benchmarks and offered a significant cost advantage, reducing the cost per unit by around £200 compared with commercial alternatives.

Work Package 6
Component and stack development
The Energy Hubs work also supported early development of larger cell and stack components, including bipolar plate designs and split-stack concepts. This work helped identify routes to improve gas separation, pressure control and manufacturability as the technology progresses towards larger-scale demonstration.

Overall, the Energy Hubs programme showed that SeaStack can work as a direct seawater electrolysis system at laboratory scale. It validated the core concept, improved the cell design significantly, and advanced SeaStack from an early-stage idea to a more credible lab-tested technology.

The Work Funded by HOP2

The HOP2 scope built on the Energy Hubs work by focusing on the components needed to make SeaStack more durable, scalable and suitable for offshore deployment. The work concentrated on two main areas:

- Bipolar membrane development, including PEM-AEM integration, catalyst selection, catalyst optimisation and in-house bipolar membrane manufacture.
- Bipolar plate development, including assessment of manufacturing routes for offshore-tolerant and scalable components.

For the bipolar membranes, Latent Drive refined how the membrane layers were joined and improved performance by adding a tin oxide catalyst at the interface. Laboratory testing identified effective catalyst loadings and showed that the in-house membranes outperformed commercial examples. The work also demonstrated that these membranes could be produced internally in a practical and cost-effective way, strengthening the pathway for future scale-up.

For the bipolar plates, the team moved away from earlier metal designs that had shown corrosion, leakage and sealing challenges under seawater conditions. Instead, they developed moulded composite plates, including PPS-based materials, which offered improved sealing, durability and reduced unwanted electrical losses. These designs are more suitable for larger-scale manufacture than the earlier etched metal versions.

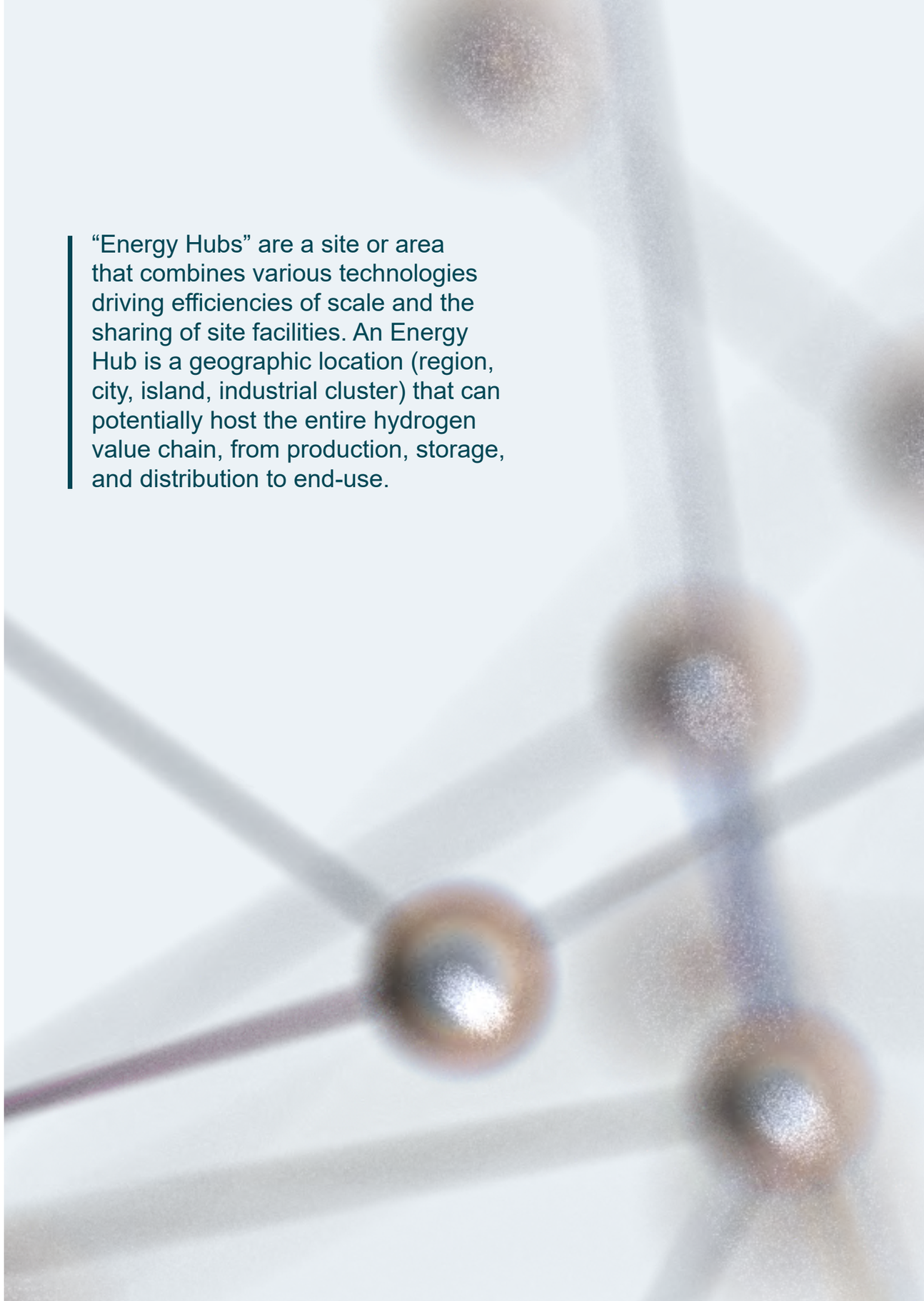
Outcomes and Next steps

The combined Energy Hubs and HOP2 funding enabled Latent Drive to de-risk the SeaStack concept and move it from TRL 2 to TRL 4. The work demonstrated that seawater can be used directly as an electrolyte without desalination, validated the two-stage zero-gap bipolar membrane architecture, advanced in-house MEA and BPM fabrication, and improved the design of key stack components.

The funding also delivered wider strategic benefits. It strengthened Latent Drive's technical capability, supported knowledge-sharing with Scottish and wider UK industrial partners, and helped position SeaStack as a credible technology pathway for future coastal and offshore hydrogen production. The progress achieved through NZTC support also helped Latent Drive secure follow-on Innovate UK Launchpad: Marine and Maritime funding for HydroPort, which provides a route to first real-world deployment at port facilities.

Since the Energy Hubs- and HOP2-funded work concluded, Latent Drive has continued to develop and demonstrate SeaStack. The company secured £630,000 in Innovate UK funding for the HydroPort trial at Portland Port and was selected for the Hydrogen Innovation Initiative 2025/26 Demonstration Programme. It also reported successfully producing green hydrogen from seawater, concentrated brine and treated wastewater under real portside conditions, advancing SeaStack to TRL 5. In addition, Latent Drive has reported securing more than £1 million in funding, filing its first UK patent and extending the application internationally, growing its team, and receiving an AFID Green Hydrogen Award at IRENA Innovation Week.

> "Energy Hubs" are a site or area that combines various technologies driving efficiencies of scale and the sharing of site facilities. An Energy Hub is a geographic location (region, city, island, industrial cluster) that can potentially host the entire hydrogen value chain, from production, storage, and distribution to end-use.



Abbreviations

Abbreviation	Definition
AEM	Anion exchange membrane
BPM	Bipolar membrane
CHS	Clyde Hydrogen Systems
DC	Direct current
HOP2	Hydrogen Offshore Production Project
MEA	Membrane electrode assembly
MTC	Manufacturing Technology Centre
NZTC	Net Zero Technology Centre
NZTTP	Net Zero Technology Transition Programme
PEM	Proton exchange membrane
PFAS	Per- and polyfluoroalkyl substances
PGM	Platinum-group metal
PPS	Polyphenylene sulphide
TRL	Technology readiness level
WP	Work package

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