CLEAN HYDROGEN MISSION

Examples of 8 Hydrogen Valleys from all over the world – a brochure by the Clean Hydrogen Mission

Hydrogen Valleys brochure

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1. Introduction

a) The Clean Hydrogen Mission and Hydrogen Valleys

CHM aims to drive down cost of clean hydrogen technologies

Mission Innovation is a global initiative to catalyse action and investment in research, development and demonstration to make clean energy affordable, attractive and accessible to all. Clean Hydrogen Mission (CHM) is on the 7 Missions of Mission innovation and was launched in June 2021. CHM's goal is to increase the cost-competitiveness of clean hydrogen by reducing end-to-end costs to $2 USD per kg by 2030. This is a crucial step to make hydrogen economic viable and support the decarbonisation of hard-to-abate sectors such heavy transport, industry and power & heat. CHM is managed by 5 co-leads (Australia, Chile, European Union, United Kingdom and the USA) and consists of 15 members: Austria, Canada, China, Finland, Germany, India, Italy, Japan, Republic of Korea, Morocco, Norway, Netherlands, Saudi Arabia, Spain, and the United Arab Emirates.

To achieve its goal, the CHM is following three main priorities: 1. Stimulate research, development and innovation to help reduce costs of hydrogen technologies, 2. Support the demonstration of hydrogen technologies via the implementation of integrated hydrogen value chains from production to end-uses, so-called "Hydrogen Valleys", 3. Facilitate the creation of an enabling environment which will accelerate the uptake of clean hydrogen and the roll-out of hydrogen solutions.

The Misson Innovation Hydrogen Valley Platform: a knowledge transfer tool for Hydrogen Valleys

CHM co-leads and members conduct workshops and produce deliverables in line with CHM's main priorities. A major result is the Hydrogen Valley Platform, a joint initiative of CHM and the Clean Hydrogen Joint Undertaking. It is a platform (https://h2v.eu/) for collaboration, best practice sharing and visibility to promote the clean energy transition through H2 projects. It features a world map of Hydrogen Valleys (98 Valleys as of 09/24), individual Hydrogen Valley profiles, a tool for data, analysis, visualization as well as a resources centre (with links to other platforms, reference reports).

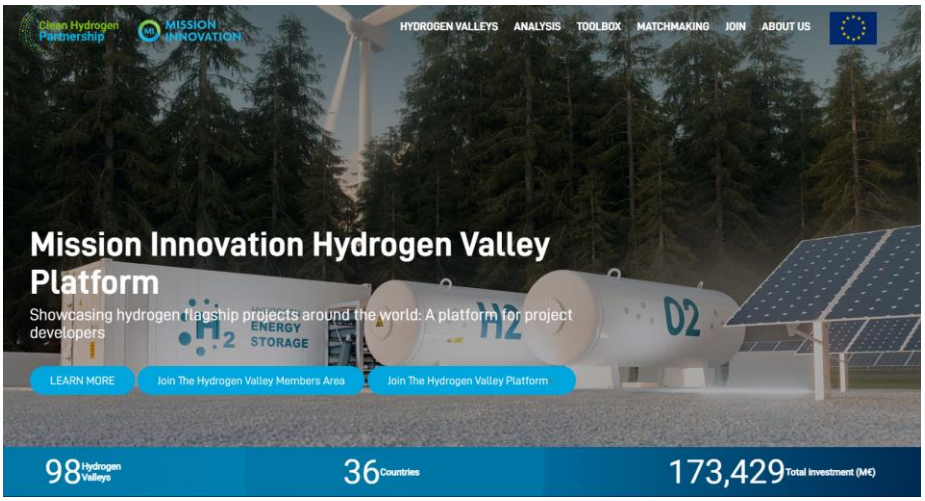


Figure 1 - Homepage of the Hydrogen Valleys Platform (September 2024)

b) The Hydrogen Valleys brochure

Showcasing best practice examples from different world regions

The Clean Hydrogen Joint Undertaking published in June 2024 an update report on Hydrogen Valleys and the Mission Innovation Hydrogen Valley Platform[1]. This report analyses data from Hydrogen Valleys globally over the last three years. The document discusses the development of the Hydrogen Valley concept and community. It also explores the more recent challenges faced by Hydrogen Valleys and the clean hydrogen sector as a whole and seeks to find solutions.

Building upon the report from the CH JU, the Clean Hydrogen Mission (CHM) wants to add a more global dimension to the report by highlighting examples of Hydrogen Valleys from around the world. This brochure showcases 8 Hydrogen Valleys, each representing a region of the world where HVs are implemented:

- the Port of Los Angeles Shore to Store demonstration project in the USA,
- Alberta Industrial Heartland (AIH) in Canada,
- the Volta project: Green Hydrogen and Green Ammonia plant (part of Antofagasta Hydrogen Valley) in Chile,
- the Central Queensland Hydrogen Hub (CQ-H_2) in Australia,
- The Fukushima Hydrogen Energy Research Field (FH2R) in Japan,
- NEOM Green Hydrogen Company (NGHC) in Saudi Arabia,
- the Basque Hydrogen Corridor (BH_2C) in Spain;
- and one of the first Hydrogen Valleys called BIG HIT in the United Kingdom.

[1] Clean Hydrogen Joint Undertaking, „Making it happen – Hydrogen Valleys – Progress in an evolving sector“, 2024, link (last accessed September 2024)

Foster the implementation and replication of Hydrogen Valleys

The brochure was produced by CHM with the support of its members and the lead developers of the Valleys who reviewed the descriptions. The Valleys featured in the document represent a diverse set of technical projects which are at different development stages: some of the projects are already completed or nearing completion such as the Valleys in USA, Japan and UK while other are still running or in an early development step like NEOM whose construction just started.

As for the Mission Innovation Hydrogen Valley platform, the main ambition of this booklet is exchanging knowledge and lessons learnt to facilitate the replication and implementation of new Hydrogen Valleys, supporting the building of a hydrogen economy on a global scale. The CHM goal is to have 100 Hydrogen Valleys fully operational worldwide by 2030. As of mid-2024, there are 98 Valleys featured in the Mission Innovation Hydrogen Valley Platform but most of them still need to achieve financial close (three quarters of the Valleys listed on the platform are pre-FID). The authors hope that this report will encourage project developers, governments and stakeholders in the hydrogen value chain to develop and implement new Hydrogen Valleys around the world, so that clean hydrogen becomes a tangible reality and decarbonisation targets are reached.

2. Hydrogen Valleys description

This chapter presents the 8 Hydrogen Valleys. For ease of reading, all Valleys are described using the same layout. To access the descriptions, click on the Valley you are interested in in the following list:

a. North America, USA – Port of Los Angeles – Shore to Store demonstration project
b. North America, Canada – Alberta Industrial Heartland (AIH)
c. Latin America, Chile – Volta project: Green Ammonia and Hydrogen Plant (part of Antofagasta Hydrogen Valley)
d. South Pacific, Australia - Central Queensland Hydrogen Hub (CQ-H2)
e. East Asia, Japan - Fukushima Hydrogen Energy Research Field (FH2R)
f. Middle East, Saudi Arabia – NEOM Green Hydrogen Company (NGHC)
g. Europe, Spain - Basque Hydrogen Corridor (BH2C)
h. Europe, United Kingdom – BIG HIT

a) North America, USA – Port of Los Angeles – Shore to Store demonstration project

Country	USA	 Source: Shell
Lead partner	Port of Los Angeles	
Project partners	- Equilon Enterprises LLC / Shell - Toyota Motor North America - Kenworth Truck Company - Port of Hueneme - Freight operators (United Parcel Service, Total Transportation Services, Southern Counties Express, Toyota Logistics Services) - Air Liquide - National Renewable Energy Laboratory - Coalition For A Safe Environment - South Coast Air Quality Management District	
H2 volume	2 hydrogen stations (HRS) with a capacity of 1.14 t/day each	
Total investment (funding)	$82.5 M for the whole project including non-H2 investments ($41.1 M grants from the California Air Resources Board)	
Status 2024	Completed (project ended in 2023)	
Objective of the HV		
Introduction of hydrogen fuel into the Southern California drayage truck market by demonstrating near-commercial heavy-duty H2 fuel cell electric trucks (FCEV) in operation at and between freight facilities throughout the region		
Value chain		
Feedstock & Production Renewable natural gas to hydrogen pathway	Transport, storage and distribution 2 HRS in California in the cities of Ontario and Wilmington	End-use 10 FCEV Ocean trucks completing drayage operations across four different fleets
Main achievements		
Demonstration: 22,000 in-service miles from the 10 FCEV trucks showing their viability for drayage operations and immediate benefit of reducing direct localized emissions and 2 HRS erected and fully operational		
Main lessons learnt / challenges to be addressed / next steps		
Progress made: project team perfected component and software performance of HRS, as well as fuelling protocols; Future R&I needs: collaboration and investments needed to develop high-voltage components for FCEV trucks; Project afterlife: trucks will be utilized in various ways to support future development and to broaden technology awareness and HRS will remain in operation to serve the committed fleet operators		
Main contact & useful links		
Contact: Jacob Goldberg, Environmental Specialist at Port of Los Angeles Jacob Goldberg et al., "The Port of Los Angeles Zero- and Near-Zero-Emission Freight Facilities "Shore to Store" Project", 2024, link		

b) North America, Canada – Alberta Industrial Heartland (AIH)

<table>
<tr><td>Country</td><td>Canada</td><td rowspan="3"> 
Source: St. Albert Gazette</td></tr>
<tr><td>Lead partner</td><td>Alberta's Industrial Heartland Association</td></tr>
<tr><td>Project partners</td><td>- The Transition Accelerator
- Emissions Reduction Alberta
- Government of Alberta
- Several counties and cities in Alberta
- Edmonton region hydrogen hub</td></tr>
<tr><td>H2 volume</td><td colspan="2">In 2023, 940 t/day of hydrogen is produced in AIH</td></tr>
<tr><td>Total investment (funding)</td><td colspan="2">Cannot be estimated as not all projects have been confirmed (support from the Canadian federal government, Alberta's provincial government and municipal government)</td></tr>
<tr><td>Status 2024</td><td colspan="2">Pre-FID - projects not yet implemented</td></tr>
<tr><td colspan="3">Objective of the HV</td></tr>
<tr><td colspan="3">Make AIH, a 582 square kilometre industrial energy cluster, home to over 40 CAPEX-intensive companies producing fuels, fertilizers, power, petrochemicals a key hydrogen production cluster in the Province of Alberta and Canada</td></tr>
<tr><td colspan="3">Value chain</td></tr>
<tr><td>Feedstock & Production

SMR-based hydrogen production including CO2 sequestration and transformation into derivatives (ammonia, LOHC)</td><td>Transport, storage and distribution
2 railroads connect AIH with main markets in North America and with Port of Prince Rupert for export to Asian markets</td><td>End-use

Potential regional hydrogen market (H2 as industrial feedstock, H2 as fuel for heavy-duty transport and as fuel for heat and power in the Edmonton region)</td></tr>
<tr><td colspan="3">Main achievements</td></tr>
<tr><td colspan="3">AIH designated as Designated Industrial Zone: it aims to make industry operating in AIH more competitive by addressing application backlogs, increasing efficiency and transparency, and supporting economic development ; Supportive community: Launch of "Life in the Heartland" in 2009, a collaborative communications initiative working to increase resident awareness of industrial projects and development in Alberta's Industrial Heartland region ; New partnerships and projects: MoU between Pembina Pipeline and Marubeni to develop a low-carbon hydrogen and ammonia facility to supply the Japanese market. Dow selected Linde as its industrial gas partner for the supply of clean hydrogen and nitrogen for its ethylene cracker& derivatives site</td></tr>
<tr><td colspan="3">Main lessons learnt / challenges to be addressed / next steps</td></tr>
<tr><td colspan="3">Next steps/ challenges to be addressed: implementing projects and ensuring that partners' commitments are translated into concrete projects</td></tr>
<tr><td colspan="3">Main contact & useful links</td></tr>
<tr><td colspan="3">Website of Alberta's Industrial Heartland association, link
David B. Layzell et al., "Building a transition pathway to a vibrant hydrogen economy in the Alberta Industrial Heartland" 2020, link</td></tr>
</table>

c) Latin America, Chile – Volta project: Green Ammonia and Hydrogen Plant (part of Antofagasta Hydrogen Valley)

Country	Chile	 Source: Mejillones Ammonia Energy
Lead partner	Mejillones Ammonia Energy (MAE)	
Project partners	-	
H2 volume	110, 000 t/year of H2 (620,000 t/y of green ammonia at full capacity)	
Total investment	US$ 2.5 billion	
Status 2024	Pre-FID - Submission of an Environmental Impact Study to the environmental evaluation service in February 2024	

Objective of the HV

Distribute green ammonia to Chilean industries and to other world regions. The project has two stages of construction and operation, each producing around 300,000 t/year of green ammonia. The project should lead to the creation of 2,200 jobs (1,700 during construction and 500 direct and indirect jobs once operational). At full capacity, will contribute to the reduction of more than 1 M t/year of CO_2 emissions

Value chain

Feedstock & Production	Transport, storage and distribution	End-use
H2 production via electrolysis powered by 600 MW solar park and power grid at night	Area for ammonia storage connected to close-by port infrastructure and truck loading station	Transformation of hydrogen into ammonia to be distributed to local companies and other world regions. Green ammonia can be incorporated as a marine fuel, as fertilizers or as chemicals

Main achievements

Study stage finalised: completion of 3-years of pre-feasibility and feasibility studies;
Community relationships: development of a community relationship strategy in line with the interests and concerns of the Mejillones community. One of actions is to share knowledge about green hydrogen and green ammonia through educational workshops

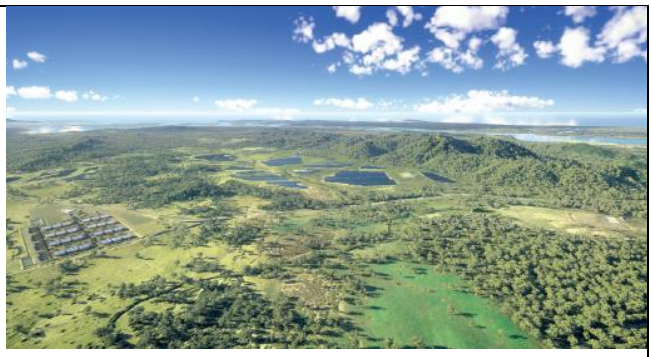
Main lessons learnt / challenges to be addressed / next steps

Circularity and recycling as key challenges: use of wastewater will be investigated, and plan is to recycle all major components like solar modules at the end of their useful life; Next steps: the construction of the first stage of the plant to start in 2025 to become operational by end 2027/ early 2028. Offtake agreements and potential strategic partnerships are currently being discussed

Main contact & useful links

Presentation of the Volta project on the website of MAE, link
Executive Summary Environmental Impact Assessment Volta Project - Hydrogen and Ammonia Plant Green: link

d) South Pacific, Australia - Central Queensland Hydrogen Hub ($CQ\text{-}H_2$)

Country	Australia	 Source: Stanwell
Lead partner	Stanwell Corporation	
Project partners	- Iwatani Corporation - Marubeni Corporation - Keppel Infrastructure	
H2 volume	Phased development: Initial phase 200t/day by 2029, scaling up to 800 t/day by early 2030's	
Total investment (funding)	$161m total investment to date (AUD$65m funding received from Australian Federal and State Governments for the Feasibility Study, the Front End Engineering Design (FEED) study and to support the development of the hydrogen project in the form of a Hub Implementation Grant)	
Status 2024	Pre-FID – FEED study in progress since May 2023	

Objective of the HV

$CQ\text{-}H_2$ will be one of the largest renewable hydrogen project in Australia with the view of exporting renewable hydrogen via carriers to Asia, including Japan and Singapore, and supplying large local industrial customers in Queensland. At its peak, the project is expected to create thousands of new jobs, and to deliver AUD$ 14.5 b in hydrogen exports and AUD$ 8.94 b to Central Queensland's Gross Regional Product over its 30-year life

Value chain

Feedstock & Production	Transport, storage and distribution	End-use
2 GW H2 production facility (800 t/day) powered by 7-9 GW wind/solar plants	Pipeline to transport hydrogen to ammonia production facility and liquefaction facility close to port and local industrial companies	Ammonia for domestic and export markets. Liquid hydrogen export to the Japanese market

Main achievements

Studies completed: detailed feasibility study completed in June 2022 and FEED study awarded to engineering company in September 2023; April 2024); Valley shortlisted for funding: Project shortlisted for $2 billion Hydrogen Headstart funding program (December 2023)

Main lessons learnt / challenges to be addressed / next steps

Creating long-term benefits for the region as main ambition: project partners are committed to have continued stakeholder and community engagement activities and support the growth of the renewable hydrogen industry in Queensland; Next steps: FID to be taken in mid-2025 once FEED results are available

Main contact & useful links

Project presentation on the Australian HyResource platform, link
Project presentation on the website of Stanwell Corporation, link

e) East Asia, Japan - Fukushima Hydrogen Energy Research Field (FH2R)

<table>
<tr><td>Country</td><td colspan="2">Japan</td><td rowspan="3"> 
Source: FH2R</td></tr>
<tr><td>Lead partner</td><td colspan="2">- Toshiba Energy Systems and Solutions (lead EPC partner and project manager)</td></tr>
<tr><td>Project partners</td><td colspan="2">- Tohoku Electric Power Co. (responsible for power grid control system)
- Iwatani Corporation (in charge of H2 storage and handling and forecasting system)
- Asahi Kasei (electrolysis system)
- Japanese and Fukushima governments</td></tr>
<tr><td>H2 volume</td><td colspan="3">180kg / hour</td></tr>
<tr><td>Total invest.</td><td colspan="3">approx. US$200 M funded by NEDO, Japan's research and development agency</td></tr>
<tr><td>Status 2024</td><td colspan="3">H2 production facility operational since 2020, the project lasted from 2016 to 2025</td></tr>
<tr><td colspan="4">Objective of the HV</td></tr>
<tr><td colspan="4">FH2R aims to maximize the utilization of renewable energy sources and achieve low-cost green hydrogen production technology by building a hydrogen production, storage and distribution plant in Namie, Fukushima region</td></tr>
<tr><td colspan="4">Value chain</td></tr>
<tr><td>Feedstock & Production
20 MW solar plant which powers a 10MW alkaline electrolysis</td><td>Transport, storage and distribution
12 tube trailers (240 kg per trailer) and 15 hydrogen storage bundles (24kg per unit)</td><td colspan="2">End-use

-Hydrogen refueling stations
-Stationary fuel cells (public and commercial buildings, rest areas, hotel)
-Demonstration sites (industrial heat, refueling technology test centre, ammonia production)</td></tr>
<tr><td colspan="4">Main achievements</td></tr>
<tr><td colspan="4">Hydrogen management system as main result: development of system which controls the operation of the electrolyser based on hydrogen demand forecasts and status from the power grid. H_2 production is preferentially activated when electricity production is greater than grid consumption and demand for hydrogen is high; Ensuring reliability of 10MW alkaline water electrolysis: performance of alkaline electrolysis was verified through tests under various conditions. Asahi Kasei plans to scale up the system by arranging multiple 10MW electrolysis units in a row; FH2R as a regional hydrogen hub: hydrogen is supplied to a variety of end uses: 7 hydrogen refuelling stations (5 in Fukushima prefecture), hydrogen refuelling research facilities for heavy vehicles and hydrogen boilers in tyre manufacturing plants. It is also used in fuel cells installed in public buildings, private offices and rest areas in Fukushima prefecture</td></tr>
<tr><td colspan="4">Main lessons learnt / challenges to be addressed / next steps</td></tr>
<tr><td colspan="4">The importance of testing in a real environment: Scaling up electrolysis and developing advanced operational technologies are important challenges. This requires carrying out tests that simulate actual operation and collect data from a variety of experiments. With a view to implementing this technology in society, technological development will be undertaken in collaboration with hydrogen consumers as partners</td></tr>
<tr><td colspan="4">Main contact & useful links</td></tr>
<tr><td colspan="4">Presentation of FH2R on Japanese websites, link 1, link 2, link 3
Presentation of refueling technology research center on NEDO website, link</td></tr>
</table>

f) Middle East, Saudi Arabia – NEOM Green Hydrogen Company

Country	Saudi Arabia	 Source: NGHC
Lead partner	NEOM Green Hydrogen Company (NGHC) an equal joint venture between ACWA Power, Air Products and NEOM	
Project partners	- Air Products (EPC and exclusive 30 year off-taker)	
H2 volume	Up to 600 tonnes/day generated from 4GW of renewable energy from dedicated wind and solar farms once operational at the end of 2026. The carbon free hydrogen will be transported in the form of green ammonia (1.2 million tonnes annually) for hard-to-abate sectors including heavy industry and transportation	
Total invest.	USD$ 8.4 B with USD$ 6.1 B non-recourse financing	
Status 2024	Post-FID – construction continues across all sites, including the green hydrogen production facility, wind and solar farms, and transmission grid network	

Objective of the HV

Once operational at the end of 2026, NGHC's plant located at Oxagon in NEOM will produce up to 600 tonnes of green hydrogen per day, saving the planet 5 million tonnes of CO_2 per year. NGHC's green hydrogen will be transported in the form of green ammonia via the dedicated jetty by the exclusive 30 year off-taker Air Products for the global decarbonisation of hard-to-abate sectors. The project aligns with Saudi Arabia's aspirations to become a leading producer/exporter of hydrogen globally

Value chain

Feedstock & Production	Transport, storage and distribution	End-use
4 GW of renewable energy via dedicated wind and solar farms powering the 2.2 GW electrolyser package for green hydrogen production	Dedicated jetty at the NGHC site for transportation of green hydrogen in the form of green ammonia	Green ammonia export for global, hard-to-abate sectors such as heavy industry and transportation

Main achievements

Financial close: NGHC achieved full financial close in May 2023 at a total investment value of USD 8.4 B including USD 6.1 B in non-recourse financing from 23 local, regional and international banks and financial institutions; EPC agreement and off-take agreement: NGHC concluded with Air Products an EPC agreements and 30 years off-take agreement for the produced green ammonia

Main lessons learnt / challenges to be addressed / next steps

NGHC's plant is advancing at pace: All major subcontracts for the project have been awarded and construction is progressing on the ground, with ongoing delivery of major equipment since 2023 including wind turbines, hydrogen storage vessels, solar panels, the cold box and electrolysers. NGHC's plant will be operational at the end of 2026; NGHC launches recruitment: NGHC has announced a significant recruitment drive for its construction and operations phases. This initiative aims to build a strong, talented team across various functions, NGHC is also collaborating with Saudi educational and research institutions to provide training and on-site experience for the Saudi youth

Main contact & useful links

Contact: Komal Bajaj, Marketing and Communications Director NGHC, Komal.bajaj@nghc.com
Website of NEOM Green Hydrogen Company, link

g) Europe, Spain - Basque Hydrogen Corridor (BH_2C)

Country	Spain	 Source: BH_2C
Lead partner	Companies Petronor and Repsol as main initiators	
Project partners	77 member organisations: - 12 government institutions - 13 knowledge centres and business associations - 52 companies	
H2 volume	21,000 tons/year expected to cut 230,000 tons of CO_2 per year	
Total investment (funding)	1.1 B€ by 2030 including 580 M€ invested in renewable energy sources which should lead to more than 2,000 direct jobs creation	
Status 2024	52 deployment and R&D projects running	

Objective of the HV

The objective of the BH_2C is to create a hydrogen ecosystem in the Basque Country, based on 52 projects and supported by a public-private collaboration strategy, that will help advance the decarbonisation of the energy, mobility and industrial sectors. The new value chain will support the economic recovery of the region

Value chain (only deployment projects are considered, not early-stage R&D projects)

Feedstock & Production	Transport, storage and distribution	End-use
7 renewable hydrogen production projects and 2 projects to produce synthetic fuels	3 projects focussing on hydrogen transport and 1 on hydrogen storage	3 projects dedicated to industrial applications and 16 to mobility and transport (2 cars, 10 buses,10 trucks, 2 trains and 2 inland waterway vessels)

Main achievements

Portfolio of projects: Petronor's 2.5 MW electrolyzer in operation; Nortegas built the first Spanish hydrogen pipeline; Sarralle's new generation of reheating furnaces for H2 combustion; CAF and Irizar's H2 buses; Talgo and CAF's H2 trains; Nortegas' demonstrator of 20% H2 mixture in the natural gas network; Abanto Campius' first technology park in Europe with continuous H2 supply, etc. EU H2 Valley award: BH_2C was among the three winning Valleys receiving a Valley award in 2022 from the Clean Hydrogen Partnership. Public Funding: 2 IPCEIs awarded to Petronor and SENER, Innovation Funds, Spanish PERTEs (national funding), other regional funds. Knowledge exchange, partnerships and conferences: regular meetings of different working groups (mobility, industry, production) to share latest developments, visits of country/industry representatives from various countries (Chile, India, Brazil, Turkey), and participations in conferences to showcase BH_2C

Main lessons learnt / challenges to be addressed / next steps

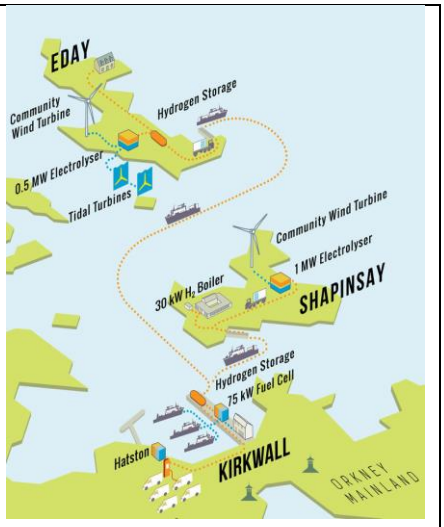
Next steps: construction of further electrolyser capacity (130 MW) to produce renewable hydrogen, hydrogen derivatives and hydrogen-based goods such as synthetic fuels (8,000 l/day) and green steel to be exported. In 2023, a MoU was signed between the ports of Bilbao and Amsterdam to work on a joint hydrogen corridor

Main contact & useful links

Website of Basque Hydrogen Corridor, link
Presentation of BH2C at European Hydrogen Energy conference 2024, link

h) Europe, United Kingdom – BIG HIT

Country	United Kingdom
Lead partner	Aragon Hydrogen Foundation
Project partners	- Research centres: Technical University of Denmark, European Marine Energy Centre - Technology providers: Calvera (compressed H2 storage and transport), Giacomini (systems for buildings), ITM power (electrolyser manufacturer), Symbio FCell (fuel cell technology) - Local Scottish members: Community Energy Scotland, Orkney Islands Council, Shapinsay Development Trust, Scottish hydrogen and fuel cell association - International members: Aragon Hydrogen Foundation, Ministry for Transport & Infrastructure of Malta
Total invest. (funding)	€13 M (€ 5M EU funding - BIG HIT was selected as the first hydrogen project to receive funding from the European Commission 'Hydrogen Territories' call)
Status 2024	EU project completed in 2022 after 6 years



Source: BIG HIT

Objective of the HV

BIG HIT aims to create a hydrogen territory in the Orkney Islands of Scotland by implementing an integrated model of H_2 production, storage, transportation and use for heat, power and mobility

Value chain

Feedstock & Production	Transport, storage and distribution	End-use
1 MW PEM electrolyser installed with the aim to produce hydrogen using curtailed wind. 0.5 MW PEM electrolyser on the island of Eday using tidal energy	5 hydrogen trailers to transport hydrogen by ferry across the islands and a station to refuel FC vehicles	H_2 used for transport (5 FC vehicles), power & heat provided to harbour buildings. Hydrogen boiler installed at Shapinsay school

Main achievements

Demonstration: BIG HIT project has helped deepen understanding of hydrogen logistics and supported the development of operational and safety procedures for moving hydrogen-filled tube trailers on roads and ferries; EU H2 Valley award: BIG HIT was among the three winning valleys which received a valley award in 2022 from the Clean Hydrogen Partnership; Hydrogen territory platform: initiated within BIG HIT, this platform launched in 2020 centralizes knowledge acquired from different Hydrogen Valleys and aims to ensure the replicability of HV in new territories

Main lessons learnt / challenges to be addressed / next steps

Corrosion as main challenge: tested technologies were subject to harsh coastal environment, and it will be essential to develop new designs to protect equipment and reduce maintenance costs; Learning about assets operation: significant learning was gained on the deployment, maintenance and operation of assets due to many operational challenges faced. Learnings such as electrolyser stack design, system integration and material selection support wider technology development; Project afterlife: Projects since BIG HIT have studied the feasibility of hydrogen use to decarbonise the aviation and maritime sectors. New R&D project focus is on hydrogen-based e-fuels

Main contact & useful links

Presentation of the project on the project webpage, link
Final BIG HIT operational rereport, link
HTP 4 webinar on commissioning and operation of Hydrogen Valley and Island projects, link

3. Acknowledgement and conclusion

The Clean Hydrogen Mission would like to thank its members and the lead developers of the Hydrogen Valleys who have contributed to the production of this brochure by providing and validating information. We hope that this document, which highlights innovative hydrogen projects, will inspire project developers and stakeholders in the hydrogen value chain to launch their own projects. Please do not hesitate to contact us (secretariat@mission-innovation.net) if you would like to be put in touch with one of the projects presented here.

Readers who are interested in the subject of Hydrogen Valleys are invited to read the latest report by the Clean Hydrogen Joint Undertaking, based on almost 100 Valleys around the world. The report (link) published in June 2024 discusses the development of the Hydrogen Valley concept, explores challenges faced by these projects and provides recommendations to remove current barriers.

Mission Innovation – Catalysing Clean Energy Solutions For All