

Role of port ecosystems within Hydrogen Valleys

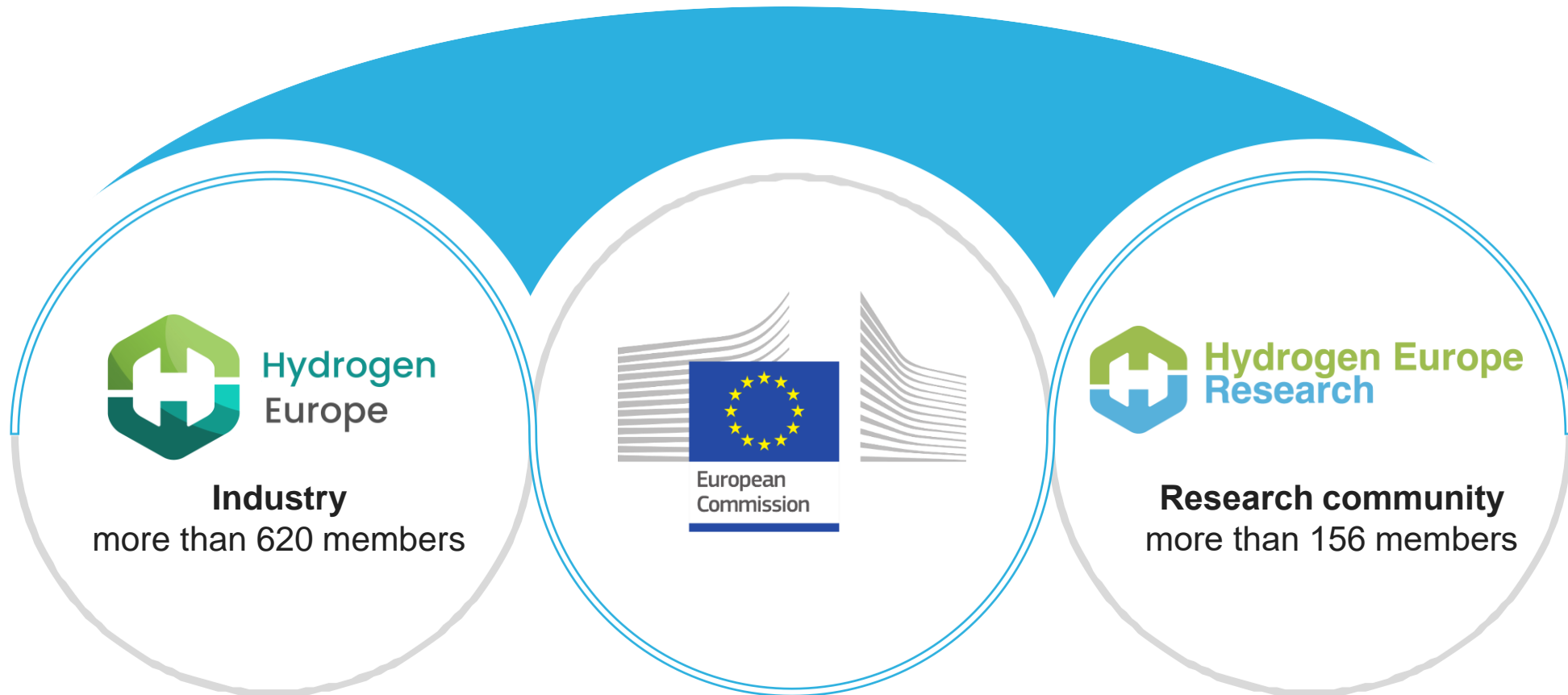
Lionel BOILLOT, CleanH2 JU

3 December 2025 – Valencia (ES)



Clean Hydrogen Joint Undertaking – Introduction

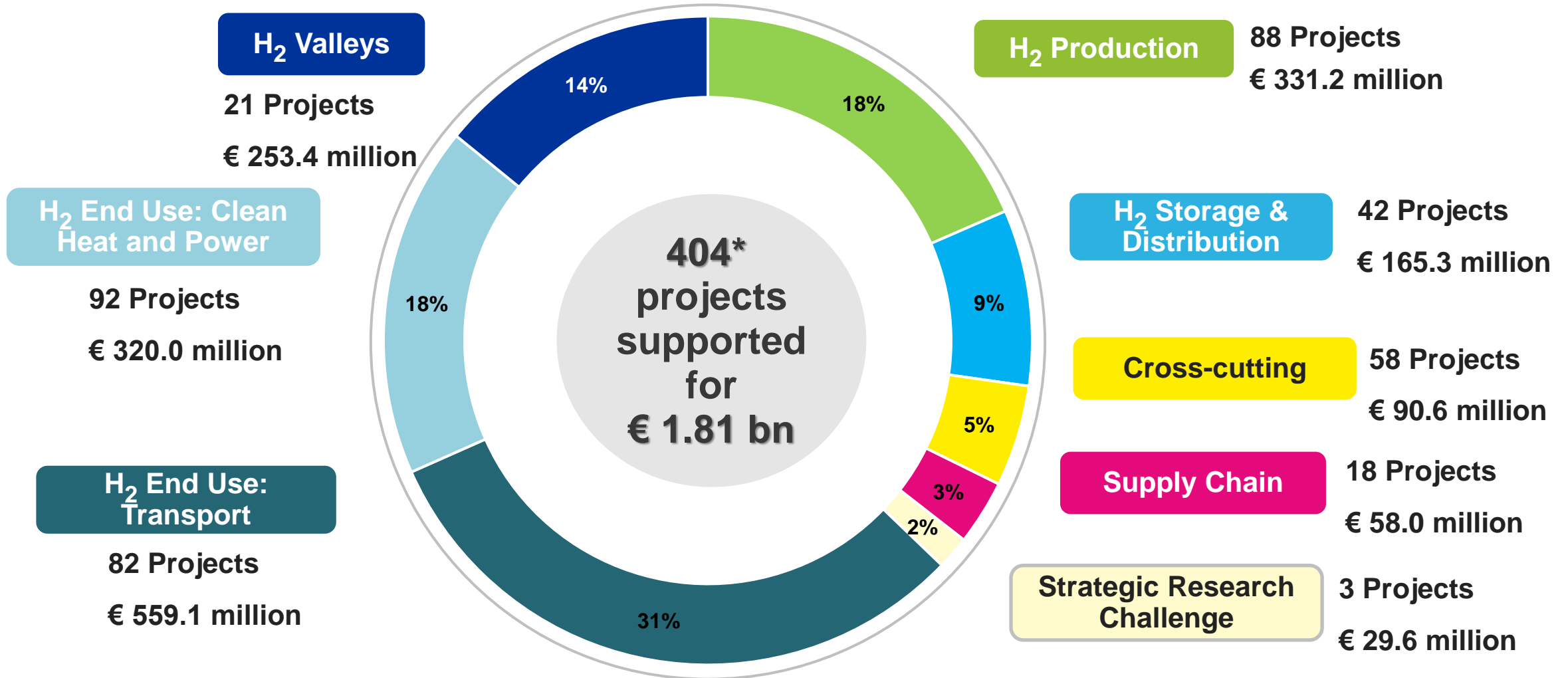
Institutionalised European Public-Private Partnership



1 billion EURO from Horizon Europe* to implement R&I activities and facilitate the transition to a greener EU society through the development of hydrogen technologies

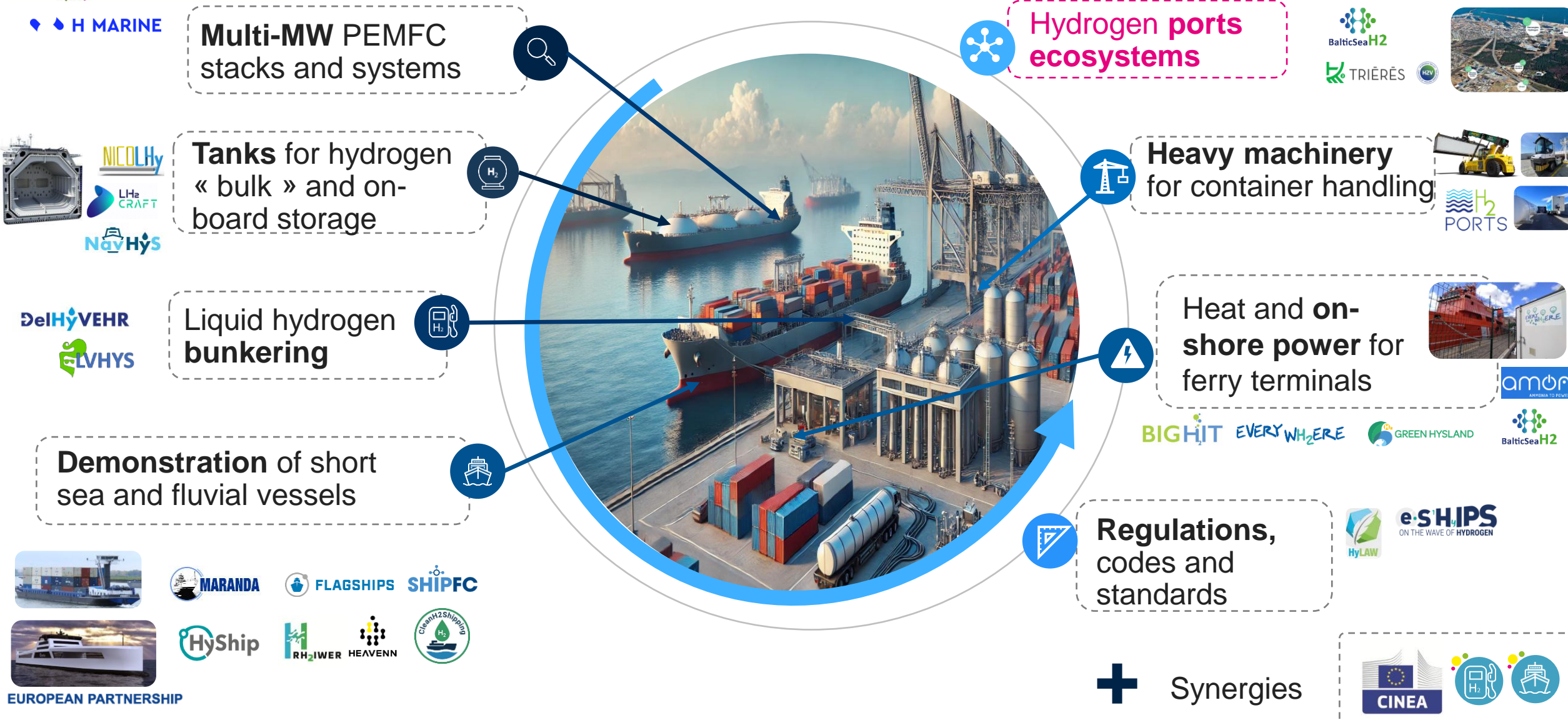
*** additional 200 million EURO for Hydrogen valleys (under RePowerEU)**

Clean Hydrogen JU Programme (cumulative over last 17 years)



**Additional 30 grants/projects under preparation from call 2025 for more than 180 mill EURO*

H2 in shipping and ports: from systems to ecosystems



H MARINE

Multi-MW PEMFC stacks and systems

Hydrogen ports ecosystems

Heavy machinery for container handling

Heat and on-shore power for ferry terminals

Demonstration of short sea and fluvial vessels

Tanks for hydrogen « bulk » and on-board storage

Regulations, codes and standards

NICOLHy
LH2 CRAFT
NAVHYS

DELHYVEHR
ELVHYS

MARANDA
FLAGSHIPS
SHIPFC
HyShip
RH-IWER
HEAVENN
CleanH2Shipping

BIGHIT
NA
CONVEY
BalticSeaH2
TRIÈRES
H2V

H2 PORTS

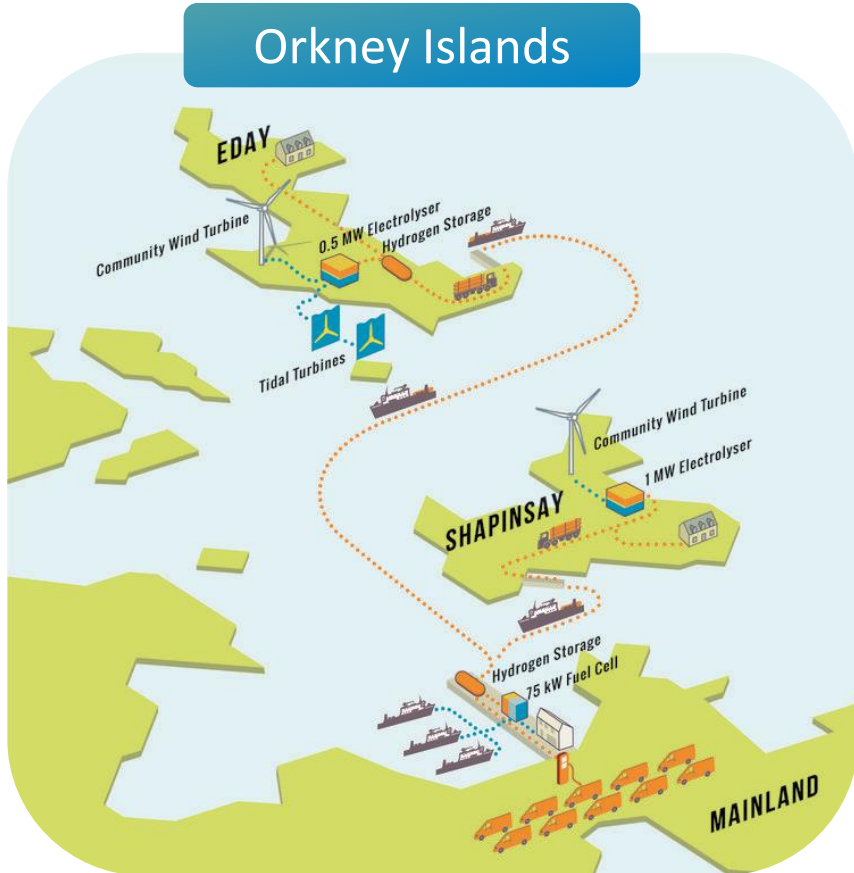
amoni
BIGHIT EVERYWHERE
GREEN HYSLAND
BalticSeaH2

e-SHIPS ON THE WAVE OF HYDROGEN
HyLAW
CINEA

BIG-HIT Project - “Hydrogen Territory” – the pioneer in 2015 and sited in port



Orkney Islands



Use of renewable energy curtailment

In 2016 renewable electricity generation produced **120% of the island's annual electricity demand**



Hydrogen from wind and wave

- Integration with wind and tidal turbines
- 2 PEM electrolysers (**1MW & 0.5MW capacity**) producing **~50T/year of H₂**.

Port ecosystem

- 75kW PEM for cold ironing (3 ferries) and CHP at harbours offices and marina
- CHP for 2 schools, a HRS for 10FCEVs



Hydrogen Ro-Ro ferries

- HyDIME - 40-60% H₂ in ICE
- HySeas III – H2020 - 600 kW PEM FC Power



JU tailored support for Hydrogen Valleys



Past and ongoing work

1 Support to pre-FID activities & CAPEX

JU Hydrogen Valleys projects

<https://europa.eu/WYcrhy>

488 beneficiaries
40 countries
1,300 M€ budget

 21 Hydrogen Valleys funded
+250 M€ JU funding
 +7 grants under preparation

2 Project Development Assistance - PDA From idea to project plan

2021-onwards (H2V Facility)



<https://europa.eu/McW9JP>

 25 Regions supported
 40 Project developers

3 Leverage national and regional funding

Synergies with Managing Authorities



<https://europa.eu/lhkcmdP>

 10 Memorandum of Cooperation with Managing Authorities

Hydrogen Valleys Value Chain Coverage

Projects plans (excl. PDA support)

1

H₂ VALUE CHAIN COVERAGE

H₂ production

+600MW
+60,000
Tons H₂ per year



Electrolysis



2,5 - 30 MW Electrolyzers



H₂ Storage and distribution



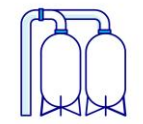
100 km



50 HRS



50 tube trailers



x1000t H₂ storage above and underground



H₂ end uses



Industry – 70%

- Ammonia production
- Refineries
- Steel making
- Other chemical industry

Energy 10%

- 100 MW fuel cell
- Gas/H₂ turbines
- H₂ blending gas grid
- Heat only

Transport 20%

- +150 buses
- ~200 trucks
- ~7 garbage trucks
- ~4 vessels
- +150 cars/vans
- Others

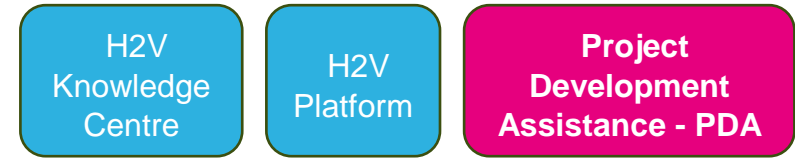


Accelerating deployment

Support for Hydrogen Valleys on their way to FID via a dedicated Hydrogen Valleys Facility, including **Project Development Assistance**

2

Hydrogen Valleys Facility



PDA = Expert support in:

- ✓ Commercial - ✓ Technical
- ✓ Regulatory - ✓ Governance

Two support types:

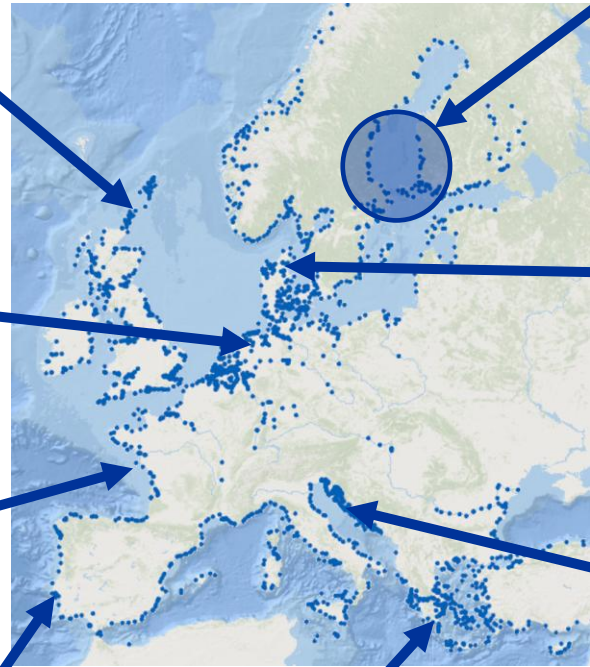
- ◆ PDA **light** (6 weeks - idea to concept)
- ◆ PDA **plus** (12 weeks - concept to feasibility)

Next PDA call: Q1 2026

<https://pda.h2v.eu/en>



Excludes Hydrogen Valleys included in the [Hydrogen Valleys Platform](#)
Excludes 7 Valleys Call 2025, currently being prepared



BIG-HIT (2015, 5M€)



- H2 production and end-uses in port of Orkney (UK)

HEAVENN (2019, 20M€)



- H2 pipeline in Groningen port (NL)
- A H2 fluvial barge

AdvancedH2Valley (2023, 9M€)



- Ro-Ro tractors in port of Nantes (FR)
- Fluvial barge

H2tALENT (2023, 9M€)



- H2 production and storage in the port of Sines (PT)

BalticSea H2 (2022, 25M€)



- Studies and pilots on:
 - Infrastructure for H₂/NH₃ bunkering
 - NH₃ and synthetic fuels for maritime
 - Retrofit of port vessels fleet
 - Passenger ferries

CONVEY (2023, 9M€)



- H2 production and end-uses in port of Hirtshals (DK)
- Aquaculture, food industry and logistics
- Synergy with REGEAR (CEF)

NAHV (2022, 25M€)



- H2 hubs in marinas (application case in marina of Cres island, HR)
- Ship and ferry

TRIERES (2022, 8M€)



- H2 bunkering system in Port of Piraeus (GR) for a ferry
- Replication in Port of Larnaca (GR)

New projects are in preparation stage

Clean port operations

- **Port container terminal operation**

Large trucks fleets and container machinery (reach stackers, yard tractors, RTG cranes, etc.)

- **Port ships and boats fleet**

Tug boats, pilots boats

- **Bunkering / On-Shore Power**

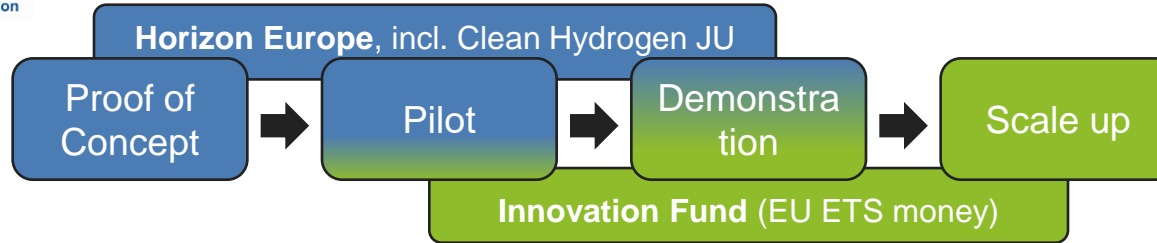
H2 bunkering terminals and stationary fuel cells for ships at berth



Ports as H2 coastal hubs

- Creating / **Serving H₂ demand** locally for energy intensive **industry** (steel, chemicals, refineries, etc.)
- Integration of **renewable electricity from offshore** wind
- International **trading routes for H₂**
- **Transport node / ecosystem** with trains, trucks and inland navigation





Ports – H2020

PIONEERS Antwerp

PIONEERS will work on the implementation of green port innovation demonstrations on clean energy production and supply, the deployment of electric, hydrogen and methanol vehicles, sustainable port design, modal shift and flows optimisation, and digital transformation through AI- and 5Gbased digital platforms.

HAVEN VAN ANTWERPEN-BRUGGE
pioneers-ports.eu
€ 24 999 997 #101037564

Start date: 1 October 2021
End date: 30 September 2026

MAGPIE Rotterdam

Green Deal port projects with the following demonstrated elements: On-site BioLNG production; Shore power peak shaving; Port digital twin (GHG tooling and energy matching); Ammonia bunkering; Offshore charging buoy; Autonomous e-barge; Green energy container for inland shipping; Hybrid shunting locomotive; Green connected trucking; Spreading of road traffic.

HAVENBEDRIJF ROTTERDAM NV
magpie-ports.eu
€ 24 964 564 #10103659

Start date: 1 October 2021
End date: 30 September 2026

Studies and infrastructures in ports

CEF – AFIF 2

- [PONTIS](#) – CORES – CICERONE – studies
- ENHANCE – LH2 and NH3
- GreenH2Atlantic – 100MW H2
- H2Sines.Rotterdam – 400MW H2

H2bank

- RjukanH2 - Norway – 19MW
- Gen2-LH2 - Norway – 82MW
- HammerfestH2 - Norway – 7,5MW

Thank you

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For further information
<https://www.clean-hydrogen.europa.eu/>

