

From demonstration to strategy: H2Ports helps shape Europe's hydrogen ports ecosystem



Europe's ports are central to the clean energy transition, serving as gateways for trade, industry and future hydrogen imports, making them natural hubs for Europe's emerging hydrogen economy. Reflecting this role, the European Commission's new EU Ports Strategy recognises hydrogen as a key component of cleaner, more competitive and resilient ports.

Long before the Strategy was adopted, the H2Ports project demonstrated that hydrogen could safely and reliably power demanding port operations under real working conditions. Today, the project's legacy extends well beyond Valencia, reducing uncertainty for ports considering hydrogen investments and supporting the transition from isolated demonstrations to integrated hydrogen ecosystems.

Proving hydrogen in Europe's ports

When H2Ports was launched, hydrogen had never been demonstrated in heavy-duty port handling equipment operating in an active European container terminal. The project set out to reduce the technical and operational risks associated with hydrogen deployment through three complementary demonstrations: a mobile hydrogen refuelling station, the world's first hydrogen fuel-cell-powered reach stacker, and the world's first retrofitted four-wheel-drive hydrogen yard tractor.

Operating under everyday conditions at the Port of Valencia, the project validated equipment performance, hydrogen refuelling procedures, safety protocols and specialised training for port workers,

demonstrating that hydrogen can provide a practical zero-emission solution for intensive port operations.

Building a European hydrogen ports ecosystem

"H2Ports demonstrated that hydrogen can move beyond feasibility studies and operate successfully in real port environments. The experience gained has helped build confidence in hydrogen technologies and contributed to a growing European ecosystem that is accelerating the decarbonisation of ports."

Mirela Atanasiu, Head of Unit Operations and Communication, Clean Hydrogen Partnership.

Experience gained through H2Ports has contributed to a growing portfolio of Clean Hydrogen Partnership initiatives supporting hydrogen deployment across Europe's maritime sector. Hydrogen Valleys with significant port activities¹ are now integrating hydrogen production, distribution and use within port regions.

At the same time, additional Partnership projects are advancing hydrogen-powered vessels, bunkering, storage, fuel cells and regulatory frameworks, helping ports evolve into integrated clean energy hubs. Together, they show how early demonstrations can stimulate wider investment and deployment across an entire sector.

Supporting Europe's hydrogen economy

The EU Ports Strategy recognises ports as strategic gateways for hydrogen imports, storage and distribution. Building on pioneering demonstrations such as H2Ports, the Clean Hydrogen Partnership now supports Hydrogen Valleys, maritime transport projects and a broad portfolio of initiatives spanning hydrogen logistics, vessels, bunkering, storage and safety. In 2026, this work will be reinforced through a study supporting the European Commission strategy, as well as the Hydrogen Global Ports Coalition.

The goal To demonstrate hydrogen as a safe, reliable and commercially viable solution for heavy-duty port operations while creating the knowledge, operational experience and confidence needed to accelerate hydrogen deployment across Europe's ports.

Key results H2Ports demonstrated hydrogen-powered heavy-duty port equipment and refuelling infrastructure under real operating conditions at the Port of Valencia. Beyond validating the technology, it established the operational experience that now supports the wider deployment of hydrogen across Europe's ports through Hydrogen Valleys, maritime projects and European policy initiatives.



¹Including GREEN HYSLAND, TRIERES, BalticSeaH2, NAHV, CONVEY, H2tALENT, HiWhyV, NORHy-WAY, H2B-Impact and FIHyPorts

KEY ACHIEVEMENTS

FIRST-OF-THEIR-KIND DEMONSTRATIONS

World's first hydrogen fuel-cell-powered reach stacker and retrofitted hydrogen yard tractor operating in an active port.

REAL-WORLD VALIDATION

Hydrogen-powered equipment successfully demonstrated under operational conditions at the Port of Valencia.

HYDROGEN REFUELLING INFRASTRUCTURE

Mobile hydrogen refuelling station with a 50 m³ buffer tank capable of storing 180 kg of hydrogen.

OPERATIONAL READINESS

Development of safety procedures, operational protocols and specialised training programmes for hydrogen use in ports.

ENABLING FUTURE DEPLOYMENT

Experience informing a growing portfolio of hydrogen port projects across Europe.

IMPACTS

SUPPORTING THE EU PORTS STRATEGY

Providing practical experience that aligns with Europe's ambitions for cleaner, more competitive and resilient ports.

ACCELERATING HYDROGEN VALLEYS

Supporting hydrogen deployment in port-based Hydrogen Valleys across Europe.

BUILDING THE HYDROGEN ECOSYSTEM

Advancing hydrogen production, logistics, bunkering, storage, vessels and supporting technologies within port environments.

REDUCING INVESTMENT RISK

Providing operational evidence that enables ports and terminal operators to make informed decarbonisation decisions.

SUPPORTING POLICY DEVELOPMENT

Contributing knowledge that will inform the Hydrogen Global Ports Coalition through a new Clean Hydrogen Partnership study.

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H2Ports
Clean Hydrogen Partnership project repository



Co-funded by
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