



H2PORTS: FINAL CONFERENCE

Key findings on hydrogen deployment in ports and coastal industrial areas

December 2025

Introduction – Hydrogen Center of Excellence at Deloitte



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Supply-side (e.g.)


NorthH₂ 
Clean H₂ hub development (US, Spain)

Marketing plans (incl. Blue Horizons Oman) 


Mid-stream (e.g.)


gasunie 
crossing borders in energy

HPA 
Hamburg Port Authority

Offshore Energy Infrastructure Plan 


Demand-side (e.g.)

Low emission H₂ demand market assessments 

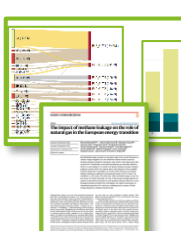
Sector assessments 

National hydrogen strategies (e.g.) 

Regulation designs and policy assessment (e.g.) 

Offtake agreements & coalition and hub orchestration (e.g.) 

Leading assets (e.g.)

 Hydrogen Pathway Explorer (HyPE)

- State of the art delivery chain optimization model with Nature publication


Partnerships (e.g.)


 
one million tons of green hydrogen

POVs (e.g.)

 *Green Hydrogen: Energizing the path to net zero*

 *Hydrogen: Making it Happen*

Our study on hydrogen in ports and industrial coastal areas

100+

Stakeholders

representing the European hydrogen port community have been involved throughout the course of the study

3

Reports

were published, providing

- an assessment of the hydrogen demand, supply and associated infrastructure in ports and industrial coastal areas;
- new guidance for R&I, safety codes and standards, and policy and regulation;
- new case studies and project concepts



Study on hydrogen in ports and industrial coastal areas



Deloitte.



60-80

Members

of the European hydrogen port community participated in each of the three European Hydrogen Port Network events



18

Advisory Board members

who oversaw and guided the delivery of the study, providing detailed feedback for each workstream

20+

European seaports and inland ports

Actively took part in the study through interviews and the case studies



The European Hydrogen Observatory

COLLABORATION



+ **Deloitte.**

Commissioner

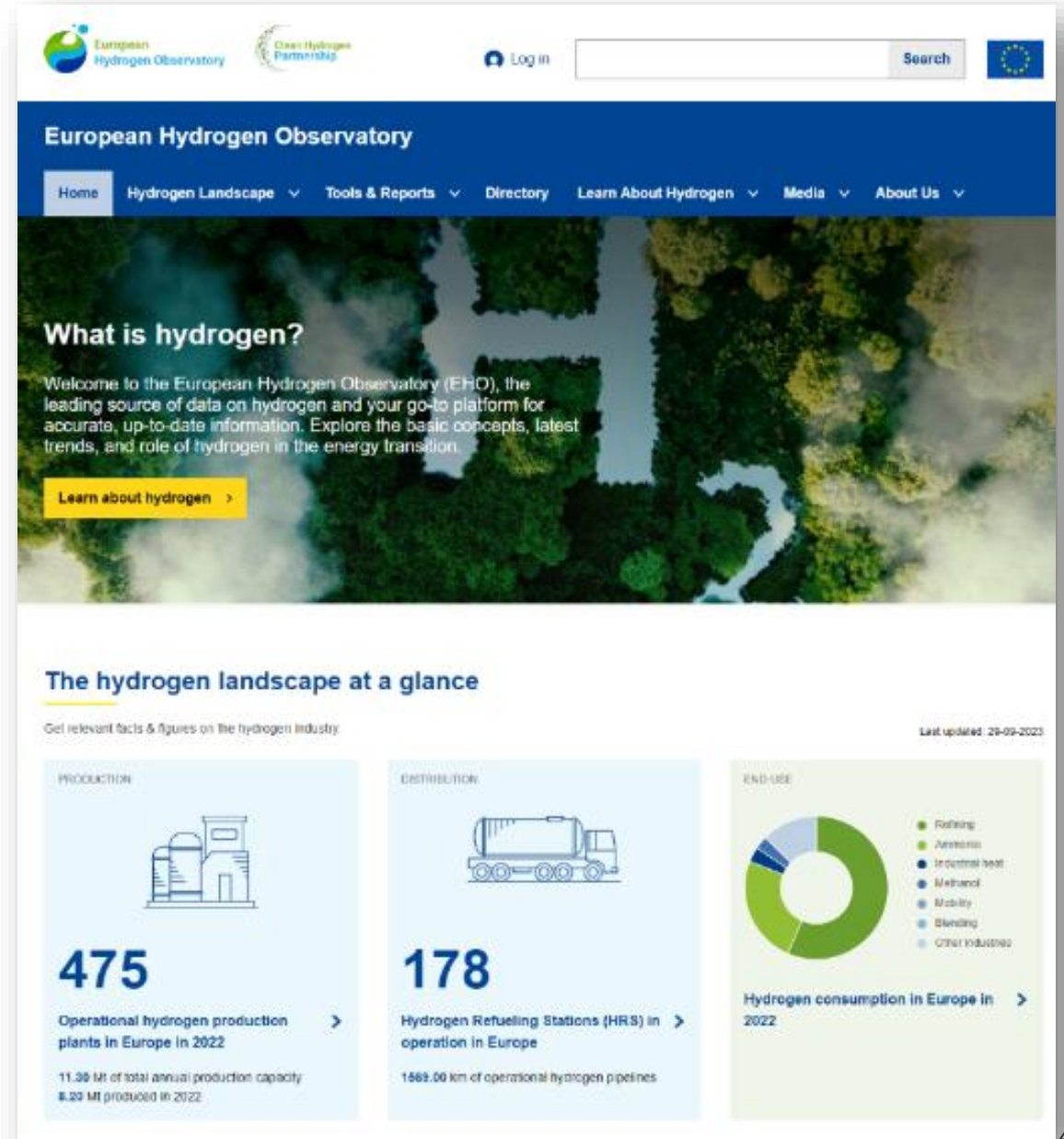
Contractor

OBSERVATORY MAIN GOAL

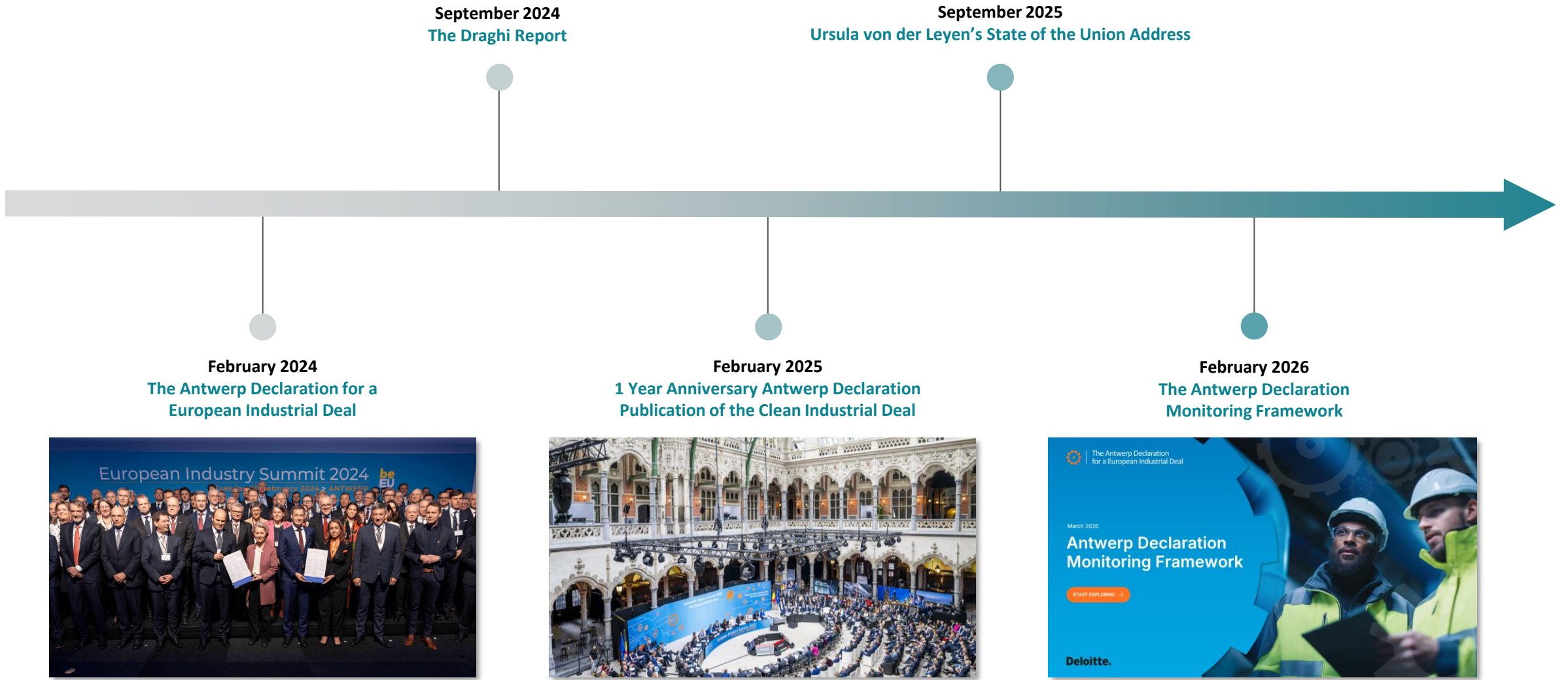
“The primary role of the new Observatory will be to act as the official European one-stop shop for reliable information on hydrogen.”

FOR WHOM IS THE OBSERVATORY?

- Industry
- Policy makers
- Academics
- Opinion leaders
- Citizens



European industrial competitiveness timeline



Hydrogen demand and market potential in Europe

Sectoral scope of the hydrogen demand assessment



- > Hydrogenation of mineral oil in refineries
- > Production of ammonia for fertilizers
- > Production of methanol for current uses

- > Production of primary steel
- > Production of High Value Chemicals
- > Generation of heat for industrial processes



- > Domestic shipping
- > International shipping



- > Heavy-duty vehicles



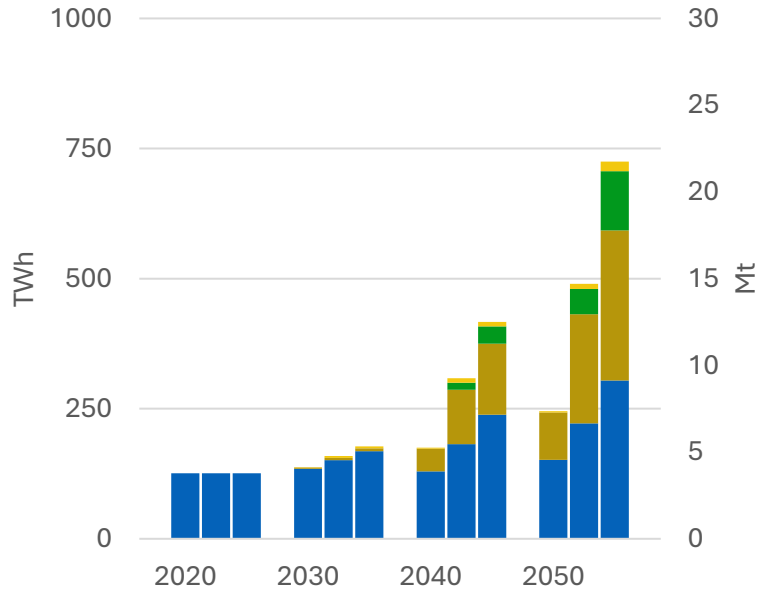
- > Heating of residential buildings
- > Heating of service buildings



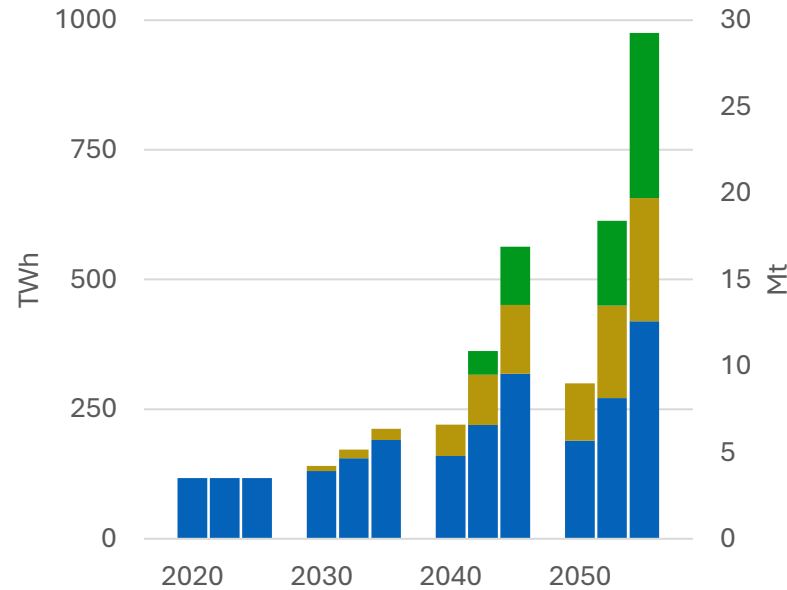
- > Cold ironing
- > Cargo handling
- > Port vessel fleet

High-level results across all demand segments

Hydrogen demand in ports



Hydrogen demand outside of ports

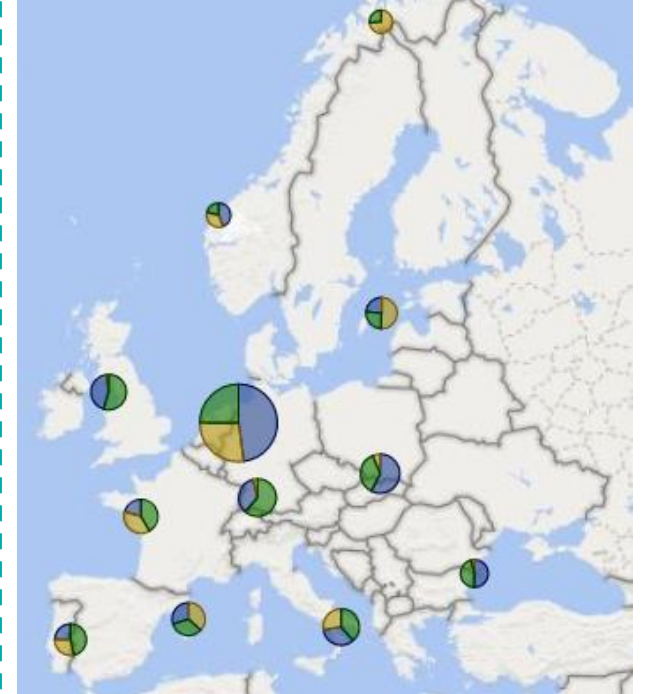


● Industry ● Transport ● Urban areas ● Port activities

1. Conservative scenario
2. Moderate scenario
3. Ambitious scenario

Estimated hydrogen demand per cluster and per demand segments (Ambitious scenario in 2050)

The circles on the map are located in the center of the relevant cluster



Hydrogen supply

Hydrogen supply sources in scope



Local European production of green hydrogen from onshore and offshore windfarms



Local European production of green hydrogen from solar PVs



Imported green and blue hydrogen (incl. from Norway and UK)



Local European production of blue hydrogen

Role of ports



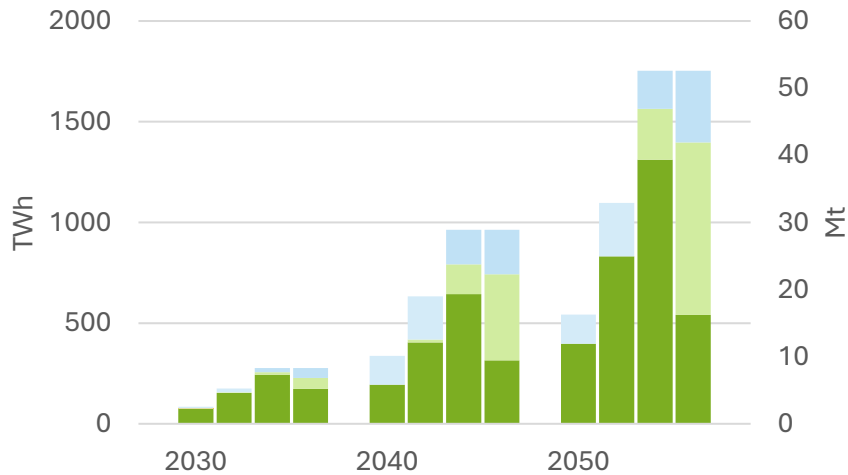
Ports are expected to play a key role in facilitating the **hydrogen supply to the wider port community or even the hinterland in their role as energy hub.**

Type of import

When importing via ship, **ammonia** was projected to be the **most cost-effective** option

Hydrogen source of supply

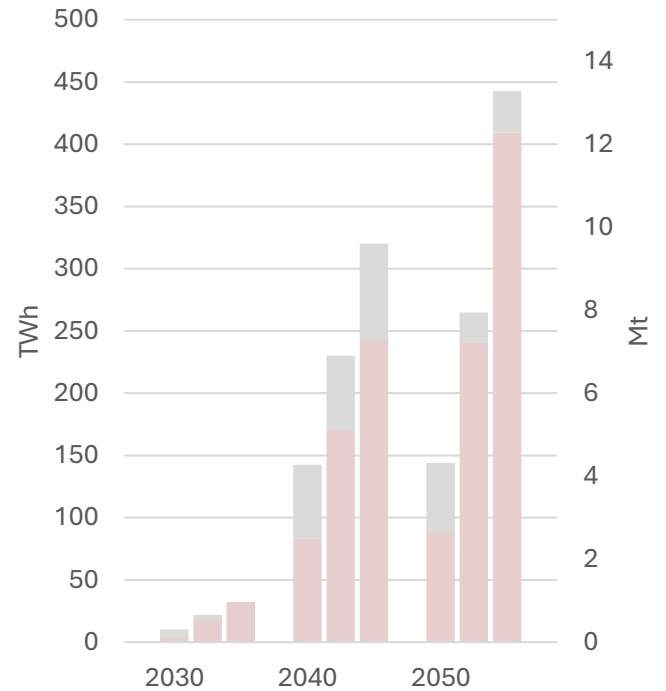
Local European hydrogen production vs hydrogen import



Estimated hydrogen supply per cluster and per type (Ambitious base scenario in 2050)



Maritime vs. Pipeline import



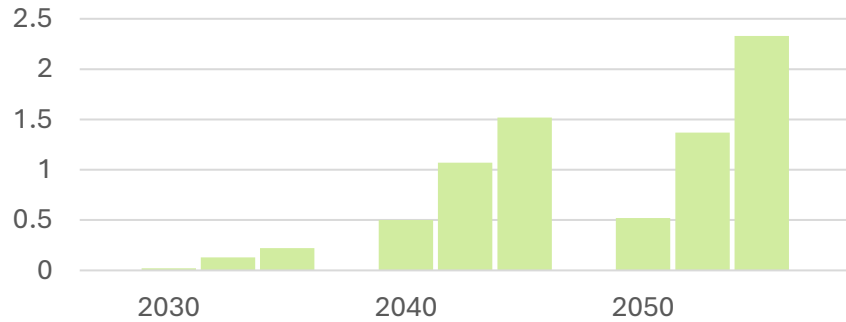
Maritime import
Pipeline import

1. Conservative scenario
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3. Ambitious scenario

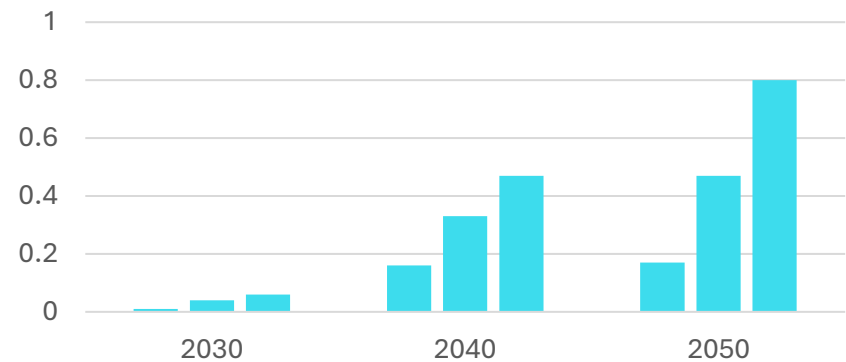
Required investments

Required investments in ports

Required investment in reconversion infrastructure (bEUR)



Required investment in import terminal infrastructure (bEUR)

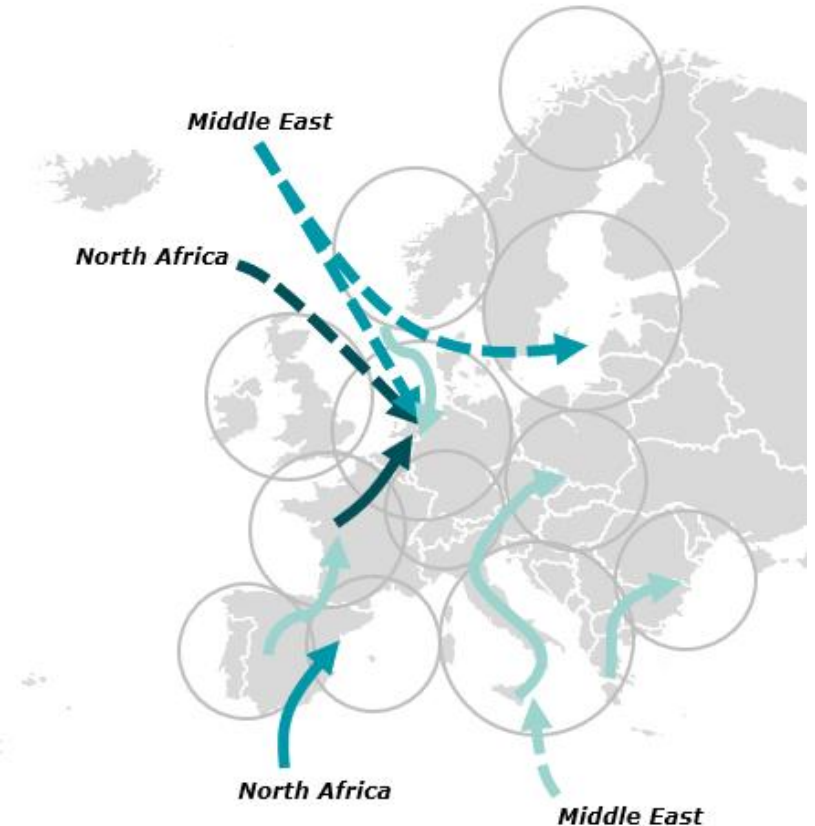


1. Conservative scenario
 2. Moderate scenario
 3. Ambitious scenario

No-regret investment roadmap

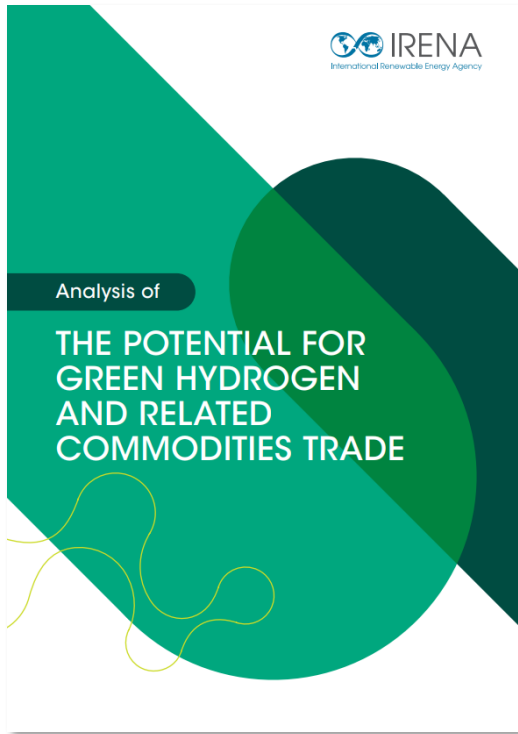
Boundary conditions can be translated in 'no-regret' investments:

- > **In 2030:** Corridor from Spain to France (Atlantic coast), from Italy, Croatia and Greece to Eastern Central Europe and from Greece to Bulgaria and Central/South Romania. Import infrastructure is required in Italy, Croatia and Greece to accept hydrogen for the hinterland.
- > **In 2040:** Import infrastructure in Belgium, Netherlands, Denmark and North of Germany, and in Baltics, Finland and Sweden. A corridor from North Africa to Western Mediterranean coast.
- > **In 2050:** Corridor from France (Atlantic coast) to Belgium, Netherlands, Denmark and North of Germany.



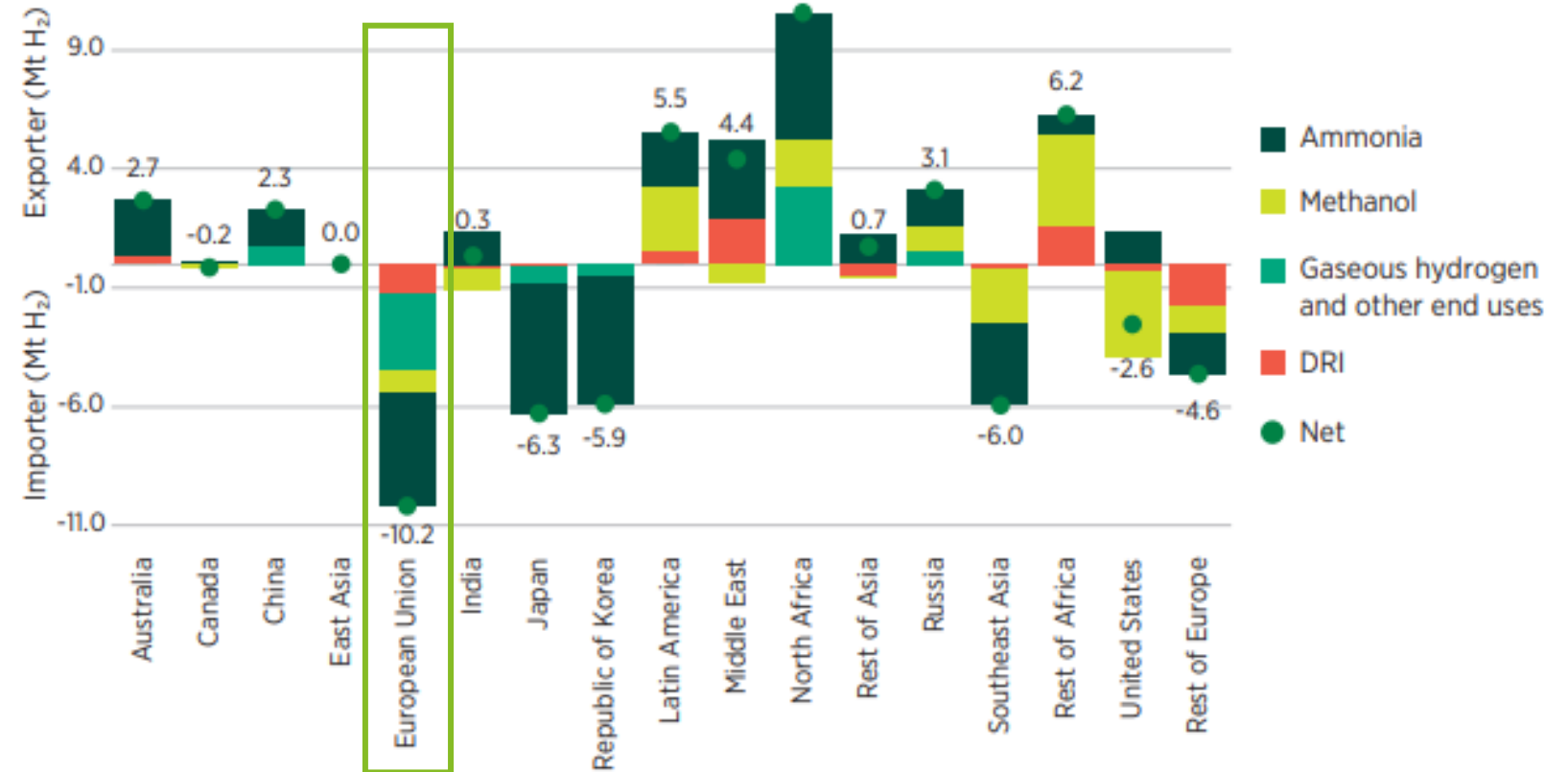
Recent work of IRENA on green hydrogen trade

Released July 2025



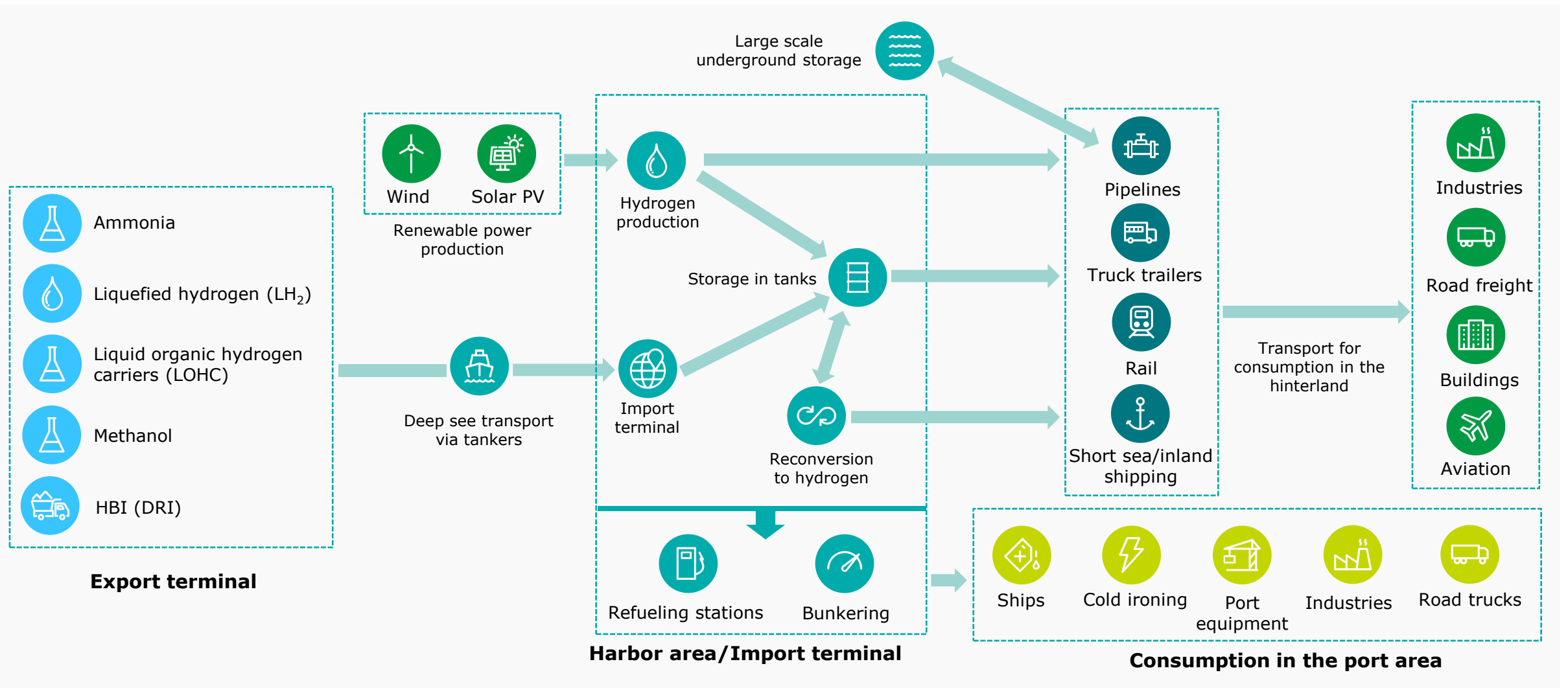
By 2050, 30% of hydrogen demand in EU is expected to come from imports

Hydrogen will be mainly imported via ammonia, as well as methanol derivatives, but also gaseous hydrogen (via pipeline) and DRI



Notes: DRI = direct reduced iron; Mt H₂ = million tonnes of hydrogen.

The ports bring together almost all steps of the hydrogen value chain



Ports can play important roles in the future hydrogen economy

Landlord



Providing land for hydrogen economy

Key investments for ports to consider

- > **Provide land and/or make land available** to foster hydrogen activities across the value chain production facilities, import terminals, pipelines, bunkering facilities, fuel stations etc.
- > **Partner with companies** willing to place their facilities/assets/infrastructure on the available lands

Community builder and enabler

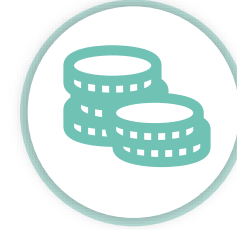


Bringing the right parties together locally and globally

Key investments for ports to consider

- > **Taking part in regional and global alliances and networks**
- > For larger port with larger capacity, **forming a local platform** with actors to discuss hydrogen for the port itself
- > **Developing solid relationships with the whole ecosystem** (industry actors, policy makers, government, investors, etc.)
- > **Promoting hydrogen** as a sustainable energy carrier

Investor



Investing in infrastructure/equipment/etc. enabling the hydrogen economy

Key investments for ports to consider

- > **Investing financial resources** to build production infrastructure, import terminals, hydrogen pipelines and hydrogen fuel stations
- > **Investing financial resources** in adjacent domains (e.g., windmills park)
- > **Investing financial resources** in port infrastructure to welcome hydrogen infrastructure
- > **Partnering with skilled actors** to set up the right infrastructures & activities
- > **Financing** the transition as leverage for technological innovations & demo-facilities

Some recent demonstration projects

Ammonia cracking: Bringing an industrial unit in Antwerp to life

Published on November 26, 2025 | 4 minutes

Hydrogen Innovation



We went behind the scenes of an exceptional construction site in Antwerp, where a unique pilot ammonia cracking unit has emerged. More than a technological feat, it is the culmination of genuine teamwork in service of the energy transition. This unit, now operational, will make it possible to convert ammonia into hydrogen on an industrial scale. It paves the way for new low-carbon supply chains. Discover it in video.

TotalEnergies Joins Forces with Air Liquide to Decarbonize its Refineries in Northern Europe with Green Hydrogen

02/18/2025 News Decarbonization solution Hydrogen

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- 45,000 tons per year of green H2 produced by the OranjeWind offshore wind farm developed by TotalEnergies (50%).
- 450,000 tons per year reduction of CO₂ emissions from TotalEnergies' Anvers and Zeeland refineries.
- An electrolyzer jointly developed in the Netherlands with Air Liquide to supply the Zeeland refinery.
- A tolling agreement on a second electrolyzer built and operated in partnership with Air Liquide to supply Antwerp platform.

[Download the Press Release](#)

Paris, February 18, 2025 – In line with its 2030 ambition to decarbonize the hydrogen used in its European refineries, TotalEnergies has signed agreements with Air Liquide to develop two projects in the Netherlands, for the production and delivery of some **45,000 tons a year** of green hydrogen produced using renewable power, generated mostly by the **OranjeWind** offshore wind farm, developed by TotalEnergies (50%) and RWE (50%). These projects will cut CO₂ emissions from TotalEnergies' refineries in Belgium and the Netherlands by up to **450,000 tons a year** and contribute to the European renewable energy targets in transport.

Green hydrogen production by TotalEnergies and Air Liquide

The two companies have signed an agreement to set up a joint venture, equally held by TotalEnergies (50%) and Air Liquide (50%), which will build and operate a 250 MW electrolyzer near the Zeeland refinery. This project will enable the production of up to **30,000 tons of green hydrogen a year**, most of which will be delivered to Zeeland's platform. The electrolyzer will be commissioned in 2029 and will cut the site's CO₂ emissions by up to **300,000 tons a year**. This project represents a **global investment of around €600 million** for both partners and has made requests for support under European and national subsidy programs. Project funding will also be sought by the partners.

Some recent demonstration projects

EXMAR launches its first ammonia-powered gas carrier

VESSELS

July 29, 2025, by Ajsa Habibic

Belgian shipping company EXMAR has launched its first ammonia-powered gas carrier at HD Hyundai Mipo shipyard in South Korea.



EXMAR via LinkedIn

Described as the “world’s first” oceangoing ammonia-powered gas carrier, the newbuild hit the water on July 26.

EU backs Brazilian project using clean hydrogen to make green iron for export

Vale and Green Energy Park aim to develop a ‘mega hub’ in Brazil, which will benefit from the €300bn Global Gateway programme



Bart Biebuyck, CEO of Green Energy Park (left) and Rogério Nogueira, EVP Commercial and Development at Vale (right) (Photo: Vale)

Polly Martin
Senior Reporter

Published 18 March 2025, 08:10

Some recent demonstration projects

Port of Rotterdam takes important step in making shipping more sustainable: pilot prepares port for safe bunkering of ammonia

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14 April 2025

Reading time: 3 minutes

Trammo, OCI and James Fisher Fendercare successfully conducted an ammonia bunkering pilot between two vessels at a terminal in the port of Rotterdam on 12 April, 2025. This marks an important step in preparing the port for vessels bunkering clean ammonia. Ammonia is a carbon-free fuel, so no CO₂ is released during combustion. The first ships capable of using ammonia as a bunker fuel are expected in 2026 or 2027.



Maersk's methanol vessel bunkers at Antwerp terminal

April 5, 2024

By Dom Magli

LINKEDIN

EMAIL



A.P. Moller - Maersk's (Maersk) first major methanol-powered deep-sea vessel, the 'Ane Maersk,' has arrived at the MSC PSA European Terminal in Antwerp.

The call at the Antwerp port is part of 'Ane Maersk's' maiden voyage from South Korea to China, fuelled by green methanol.

The container vessel, built by Hyundai Heavy Industries in South Korea, has a notional capacity of 16,000 TEU and is fitted with a dual-fuel engine that can operate on methanol, biodiesel, and conventional bunker fuel.

Ane Maersk is the first of Maersk's 18 big methanol-enabled vessels, scheduled to be delivered between 2024 and 2025, and the world's second methanol-enabled container carrier.