

How to finance H2 Terminals?

Framework for Hydrogen port terminal investments – the private sector view

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HPC's sectors of activities

Covering the maritime supply chain

INVEST

MANAGE

OPTIMISE

Empowering sustainable growth and excellence



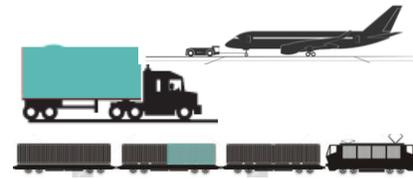
SHIPPING



PORTS



TERMINALS



HINTERLAND



STORAGE

HPC has first-hand experiences on green terminal development

HPC Facts

1,700

Projects in

130 COUNTRIES



**Guiding Port of
Hamburg's green
Transition**



180+
PORTS

and terminals
planned and
optimised

1976

Founded as subsidiary
of HHLA

1st
**FULLY
AUTOMATED**

Terminal of scale.
Doubled capacity
on the same
footprint



100
ENTHUSIASTS



With background
from port and
terminal operations
and software

**GREEN
TRANSITION**

Alternative
Energies



140+

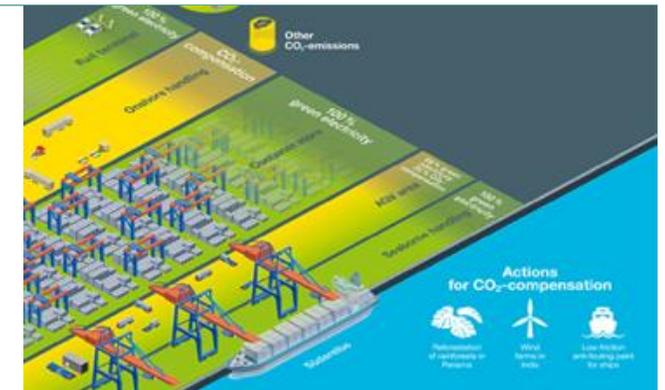
OPTIMISATION

Improved working
conditions and
reduced costs



WORLD'S
1st

Carbon Neutral
Container Terminal



International H2 terminal projects focus on conversion of Ammonia

Examples of H2-terminals projects world wide

Location	Capacity	H2 from Derivative	Investor	Date	Invested Amount
Hamburg Germany	<u>Import/ Conv.:</u> approx. 100.000 t H2 p.a.	Ammonia	Air Products, Oiltanking (Mabanaft)	Expected to be ready in 2026	1. Phase 500 million €
Rotterdam Netherlands	<u>Import/ Conv.:</u> approx. 1 million t H2 p.a.	Ammonia	Gasunie, Vopak, HES International	Expected to be ready in 2026	
Brunsbüttel Germany	<u>Import/ Conv.:</u> up to 2 million t Ammonia p.a.	Ammonia	RWE	Expected to be ready in 2026	Approx. mid three-digit million € range
Lüderitz Namibia	<u>Conv/Export:</u> approx. 1,7 million t Ammonia p.a.	Ammonia	HYPHEN Hydrogen Energy /RWE/ NIPDB	Expected to be ready in 2026/27	Total project: 1. phase US\$ 4.4 billion
Hastings/Kobe Austr./Japan	<u>Exp/ Import:</u> approx. 225,000 t LH2 p.a.	LH2	Governments of Australia, Victoria, Japan and Project Partners	Pilot Phase 2022, Operations targeted in the 2030s	Among others: US\$ 1,57 billion from the Japanese Government's Green Innovation Fund

Public bodies provide funds for H2 terminal investments

Public funds rather focus on setting up the infrastructure and production facilities

National Funds

Developing national ports, implementing policy goals to reduce CO2 emission, to develop national sustainable energy supply

Co-financing:

Necessary infrastructure for production, storage and pipelines to enable H2 Terminals by

- Green Hydrogen Sector Fund (Uruguay)
- Roadmap of Green Hydrogen (Morocco)
- National Hydrogen Program, PNH2 (Brazil)
- The Norwegian Government's

Hydrogen Strategy

European Commission

EU Hydrogen Strategy: to decarbonise hydrogen production and expand its use in sectors where it can replace fossil fuels to reach CO2 goals until 2030/ 2050

Co-financing:

- EU IPCEI H2, €10,6 billion public funding in 2022
- EU Recovery and Resilience Plan, EUR 9.3 billion allocated to H2 projects
- **Global Gateway**, €300 billion €, also for sustainable transport hubs
- **Global European Hydrogen Facility/ European Hydrogen Bank** (€3 billion)

Int Development Institution

Supporting governments of developing countries to produce and transport H2 (or derivatives) by TA, networking but also by loans :

- World Bank: Hydrogen for Development Partnership (H4D), catalyse significant financing for hydrogen investments
- African Development Bank: Sustainable Energy Fund for Africa by AFD
- EIB Global (Green Hydrogen Fund)
- Asian Development Bank

Private companies may provide funds for H2 terminal investments

Private investors rather focus on attractive business cases

Motivation

- Profitability, profitability, profitability
- Sustainability as a corporate identity

Private maritime companies

- Terminal investors (e.g. APM Capital)
- Shipping lines

Private non-maritime companies

- International pension funds, insurance companies, venture capital firm, asset management firms



BLACKROCK

J.P.Morgan



Investments in H2 terminals require a particular business environment

General expectation framework from terminal investors

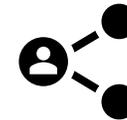
Attractive business case

Qualified and realistic feasibility and commercial viability study



Risk sharing / Guarantees

Availability of additional private or public (PPP) investors to share the risk



Ease of doing business

Stable and long term national and regional political and social environment to ensure full compensation of investment



Timing

Concrete and realistic project implementation schedule to ensure the achievement of the financial key figures.



Investments in H2 terminals require a particular public framework

Particular expectations from H2 terminal investors towards national governments but also international institutions

Effective governmental support

Realistic policy and regulations, flexible and fast application process, improved cooperation among stakeholders

Stable supply environment

International governmental agreements (MoU, Energy Partnership) with H2 supplying /producing countries ensuring a continuous utilization of the H2-terminals

Easy and extensive co-funding

Investments into new technology and markets are expensive and risky. Easy access to public co-funding will help to mitigate the risks.

International standards for H2-terminal infrastructure and technology

Technology standards helping to design and construct compatible port handling and storage infrastructure (ISO/TC 197 - Hydrogen technologies)



Summary: Financing of H2 Terminals

- Time will clarify what will be the main H2 form or derivative for international sea transport (Ammonia?), so terminal investments can be more focused
- Public funds are available to prepare basic H2 production and terminal infrastructure to facilitate private investments
- Private funds will be available as soon as there is a commercially viable business case.



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