









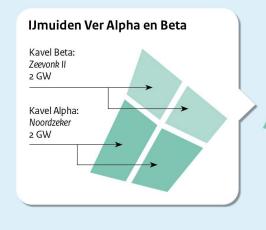
Wind meets Gas

Keynote

Caroline Kollau







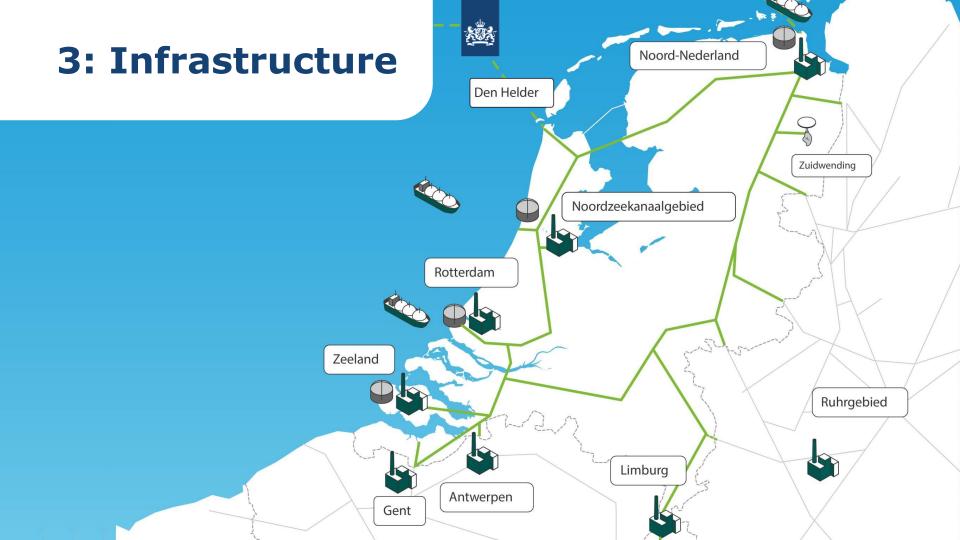
From mind to matter:

IJmuiden Ver











Wind meets Gas

Keynote

Caroline Kollau

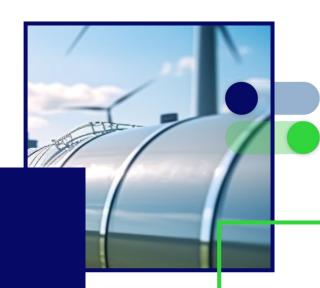




H2Global: Bringing the clean H2 market to fruition
September 2024



The clean hydrogen opportunity

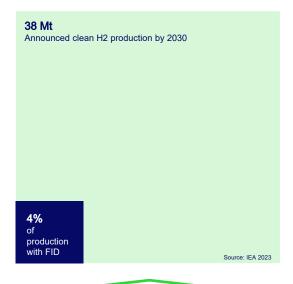


Clean hydrogen: targets and ambition vs reality

- Estimated GWs to meet targets
- GWs installed today

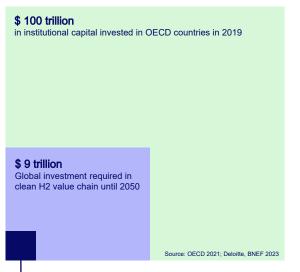


- Announced annual production by 2030
- Announced production with FID (%)



1 FID achieved through H2Global pilot auction in 2024

- Invested institutional capital
- Investment required and public funding available



\$ 280 billion public subsidies made available in Americas, Europe, Middle East, Africa and Asia Pacific



Market creation first, then market ramp up.

Functioning markets have:





Price transparency



Indexes based on assumptions



Liquidity

- Limited number of transactions, large volumes only
- Over the Counter (OtC) and "point-to point" only



Legal security / rules based

- Lack standards and certification schemes
- Insecurity in terms of recognition and methodologies



Low market barriers

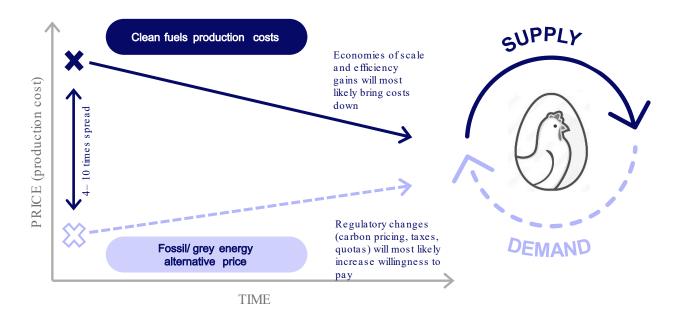
High entry barriers

KEY TAKEAWAY

Clean
commodity
markets are
nascent,
and to meet
climate targets
we need to
accelerate
their creation



Clean fuels "Offtake -Conundrum"



- Despite several announcements there are no long -term and cost -covering offtake
- Without offtake there is no Final Investment Decision (FID)
- Expected decrease of production costs delays FID further

- Without regulatory stimulus, there is no/limited willingness to pay a "green premium"
- Without supply security at price-comparable conditions, there is no demand uptake



The H2Global Mechanism

H2Global's mechanism promotes timely and effective market creation for green commodities such as clean hydrogen

Key elements

Investment Security



Defined System



Cost of Difference compensation



Competition



Creating business cases and investment security.

Shifting the timing of market creation by promoting the market ramp-up until a viable low-carbon market has developed.

Long -term purchase agreements over 10 years.

Clear definition of max. funding volume, products, geography and (sustainability) criteria by funding body. Financial compensation of Cost of Difference.

Set up of an intermediary – the Hydrogen Intermediary Company.



Double -auction: Market - based bidding procedures on the supply and demand side.

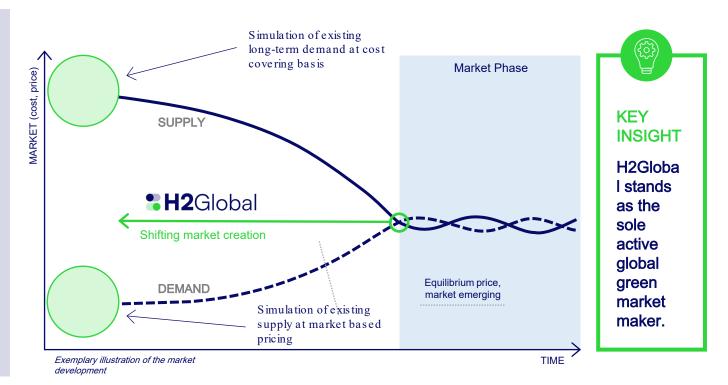
Minimization of the price difference to be compensated by public funds.



Market simulation has a catalytic effect and shifts market creation forward

Simulat e to create

Immediate creation of simulated market on supply and demand side.





The Double -Auction Sequence

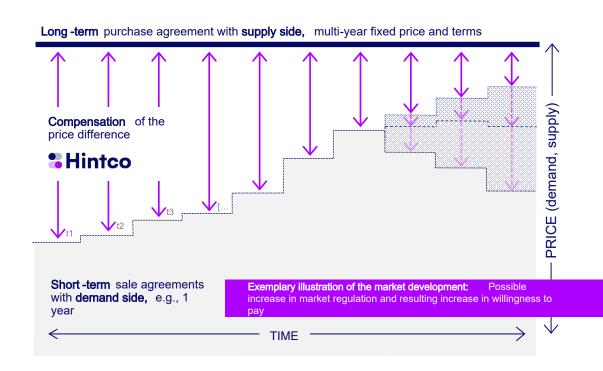
SUPPLY SIDE **DEMAND SIDE** APPR. 12MONTH PRIOR TO DATE OF DELIVERY /Region Consortium Industry Country H2 Project Example: Egypt Green Offtaker A: Steel Country / Region Competition-based Competition-based Consortium **Transport** → # Hintco → procurement process sale process H2 Project 10 year Hydrogen 1 year Hydrogen Sales Agreement Purchase Agreement Offtaker B: Port Compensation Country / Region of the price difference \Box **Transport** Company C Funding body, grant H2 Project authorities Offtaker C: Shipping



The H2Global market -driven compensation mechanism ensures the most efficient use of funds for maximum impact

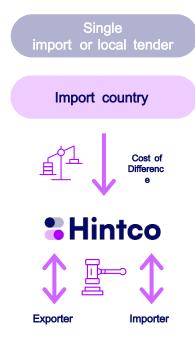
H2Global auctions uncover supplier and offtake pricing dynamics.

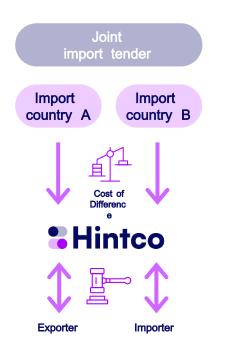
To create **liquidity** and support market development, **short** -term and **broad** - **based price signals** are **decisive**.

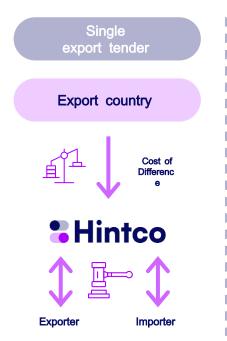


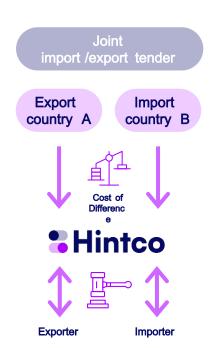


Exporters and importers of clean hydrogen can all make use of H2Global tenders















The H2Global mechanism is flexible and can be customized according to funders' objectives

and Climate Action

In implementation

1st BMWK

tender

€0.9bn

2024-2033

To date, €5.83bn billion have been committed or earmarked for the H2Global tenders

Customized regarding:

- Geography (global, regions, countries)
- H2 product selection
- Product and sustainability criteria

Adaptable to targets:

- Price optimization
- Promotion of green technologies
- Energy security
- Decarbonization of specific sectors
- Development policy



Federal Ministry for Economic Affairs and Climate Action

In preparation

2nd BMWK

tender

In preparation

1st Joint

tender

€0.3bn (+€0.3bn)



In preparation

3rd Joint

tender

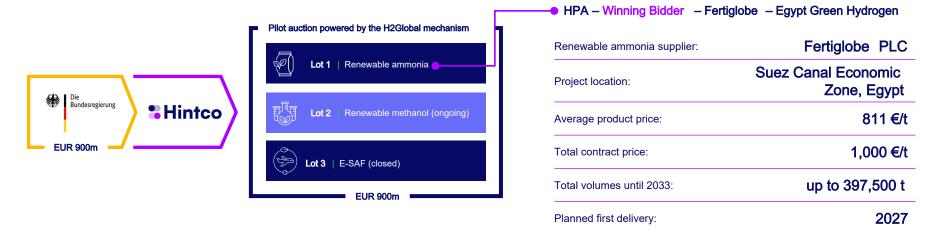
€0.4bn

In preparation

2nd Joint

tender

First results of H2Global pilot auction



Detailed information on the first results, please visit: https://www.hintco.eu/lot-1-renewable-ammonia



H2Global's 2nd tender EUR 3.53bn + EUR 0.3bn in preparation

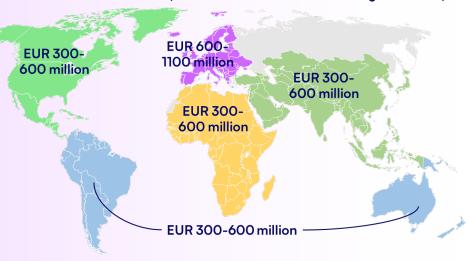
Objectives of tender*

- Support market creation and FID
- Discover real market prices
- Diversify supply geographies and increase security of supply

Design*

- Application of RFNBO criteria of RED II and Delegated Acts
- Vector-open or product-open design
- Point of first delivery: GER or NL
- HPA:
 - 10 years (2026-2036)
 - fixed price
 - awarded by price per ton or energy (70%) and maximum volume or basic volume plus optional quantities (30%)
 - Marginal bidder will be offered reduced volume to make maximum use of the budget
- HSA: "significantly shorter" contract duration awarded by price

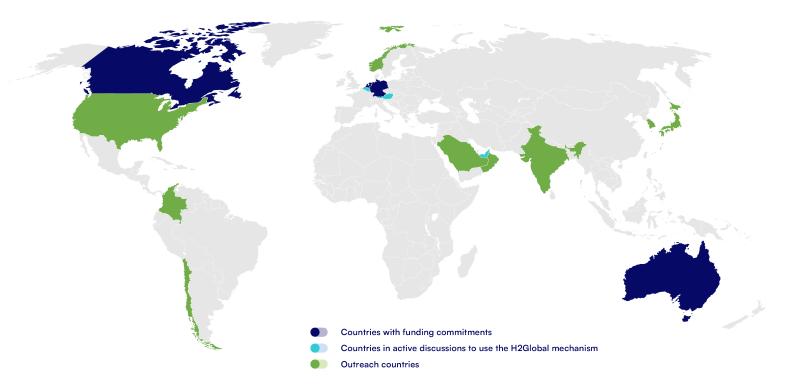
Global lot: EUR 600 million (EUR 300 million from the Dutch government)



*Information is based on the BMWK's market consultation publication (11 June to 22 July 2024). All information is subject to changes in the tender documents. Countries under sanctions are excluded from participating in the auctions.

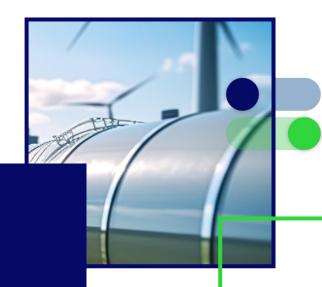


H2Global worldwide









Research

H2Global supports the clean hydrogen market creation through

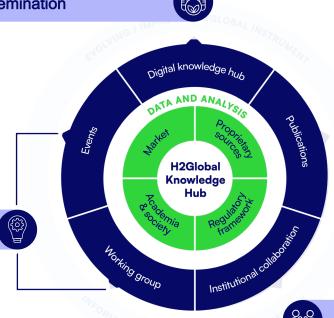
targeted research activities

Knowledge dissemination

- Starting with basic knowledge on the general role of clean hydrogen in the energy transition
- Adding new and advanced insights over time

Engaging with industry

Practical insights into the hydrogen economy



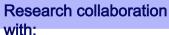






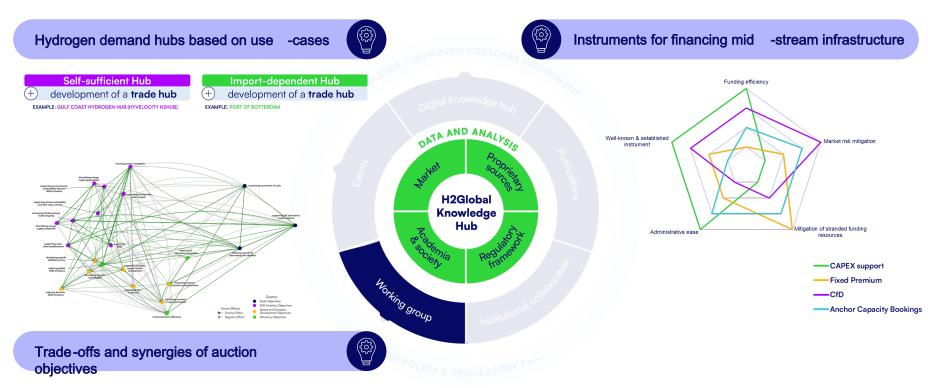






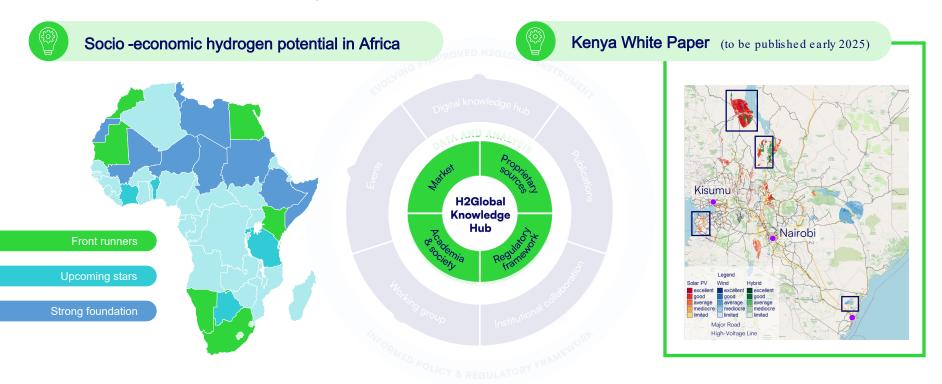


The *H2Global Knowledge Hub* hosts three working groups on critical issues affecting clean hydrogen market creation





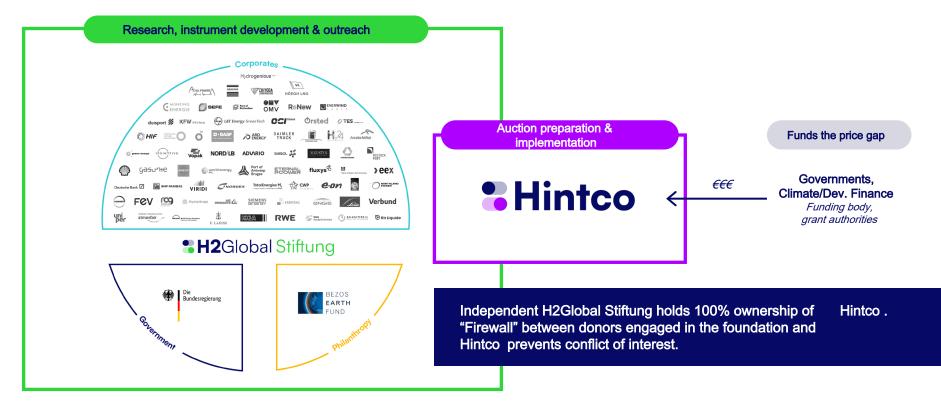
H2Global meets Africa identifies opportunities for clean hydrogen development in the region





The H2Global Set-Up

A non-profit foundation with a for -profit intermediary







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Markus Exenberger

H2Global Stiftung Executive Director

Trostbrücke 1 20457 Hamburg +49 40 36197 500 markus.exenberger@h2-global.org



Susana Moreira, PhD

H2Global Stiftung Executive Director

Trostbrücke 1 20457 Hamburg +49 40 36197 500 susana.moreira@h2-global.org



Timo Bollerhey

HINT.CO GmbH Chief Executive Officer

H2Global Lead Strategist

Trostbrücke 1 20457 Hamburg +49 40 36197 500 timo.bollerhey@h2-global.org



H2Global: Bringing the clean H2 market to fruition









How can the Northern flank of Europe give substance to hydrogen ambitions

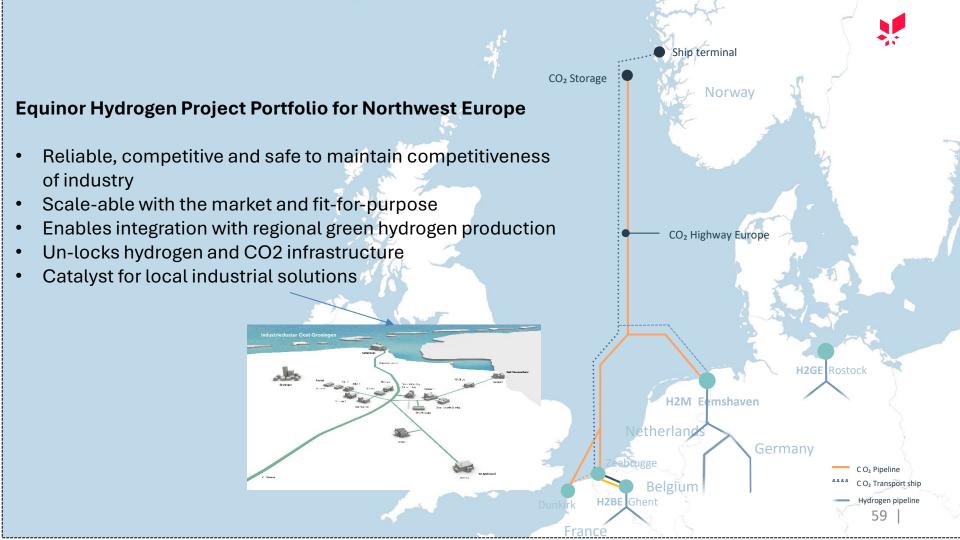
Presenting essay

WIND MEETS GAS.









H2M Eemshaven

Contributing to decarbonisation with low carbon hydrogen

210.000

TONNES PER YEAR

Low carbon hydrogen

1.8

CO₂ Highway Europe

MILLION TONNES CO2

Transported and stored yearly

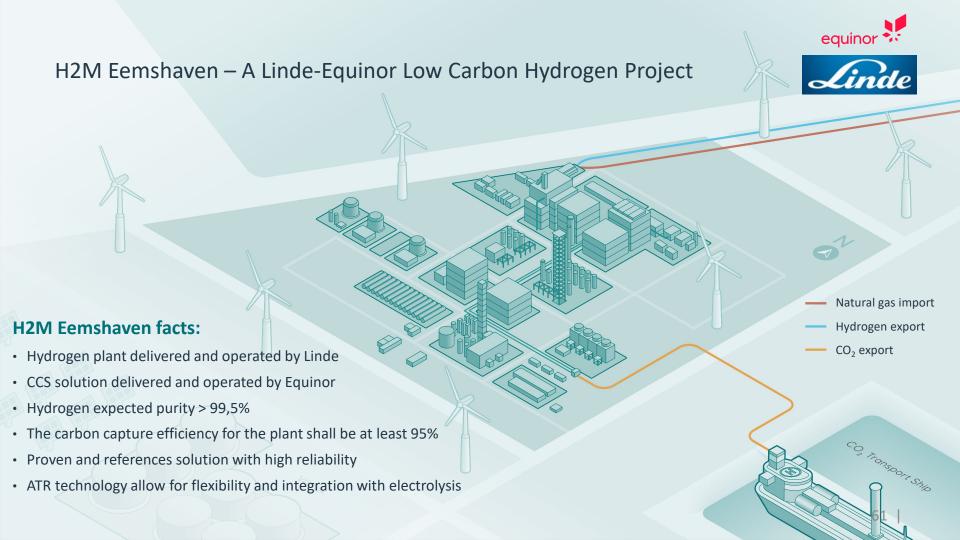
1 - 2 g CO2/Kg Hydro

Kg CO2/Kg Hydrogen

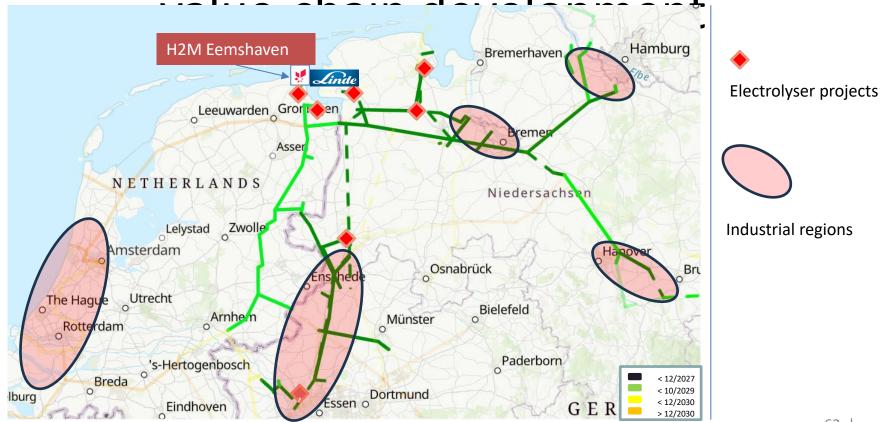
Carbon Intensity



Ship terminal CO₂ Storage **H2GE** Rostock **H2M** Eemshaven Netherlands Germany Zeebrugge Belgium CO₂ Transport ship Hydrogen pipeline **H2BE** Ghent 60 France



H2M Eemshaven can unlock hydrogen



infrastructure and regulatory/funding

Supply

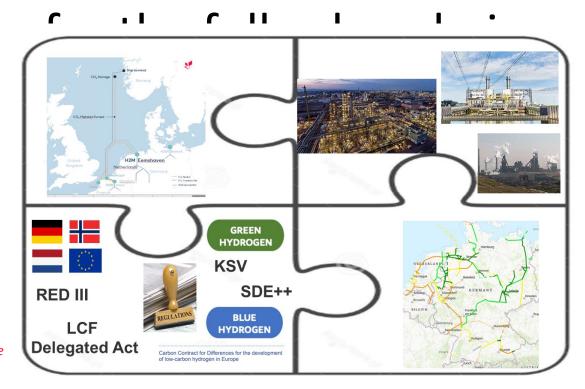
- FEED ready
- NL phase 1

Regulatory:

- RED III
- LCF DA Default values
- Sunset clauses

Funding

- KSV
- Timeline
- Penalty clauses
- Level-play-Field
- Funding envelope and budge constraints
- Risk allocation e.g FOAK, timeline etc



Demand:

- Value-gap and premium
- Strict reliability and flexibility requirement
- RED III uncertainty

Infrastructure

FEED/FID ready





Northern Europe's Clean Energy Reservoir

Wind meets Gas 2024









Samuel Magid, Executive Director, Copenhagen Energy Islands 3 October 2024





Key message



Europe's hydrogen needs can be met largely by domestic supply, mainly from the North Sea



Offshore wind will be a key source of Europe's hydrogen supply



Hydrogen produced offshore will be cheaper than onshore production, if produced from offshore wind



To make this happen two things are needed:

- A hydrogen backbone in the North Sea and the Baltic Sea
- 2. Offshore energy hubs for hydrogen and power production





Building value that matters

COMPANY

Year of foundation

2012

Global offices

12

Number of employees

500+

FUNDS

Number of funds

12

Funds raised 2012-2024

€31bn

Global institutional investors

180+

PROJECTS

Countries

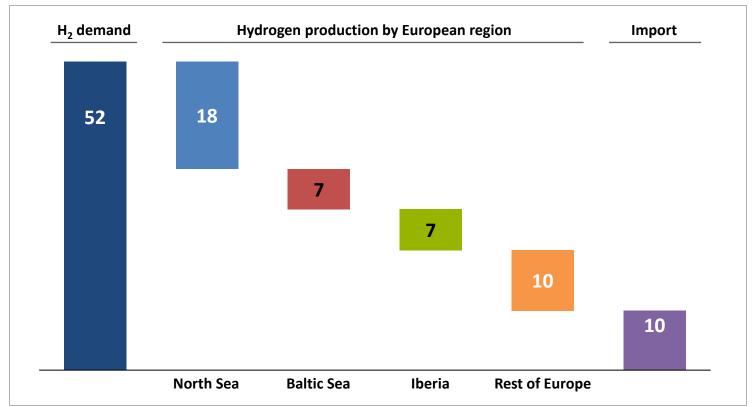
30+

GW pipeline

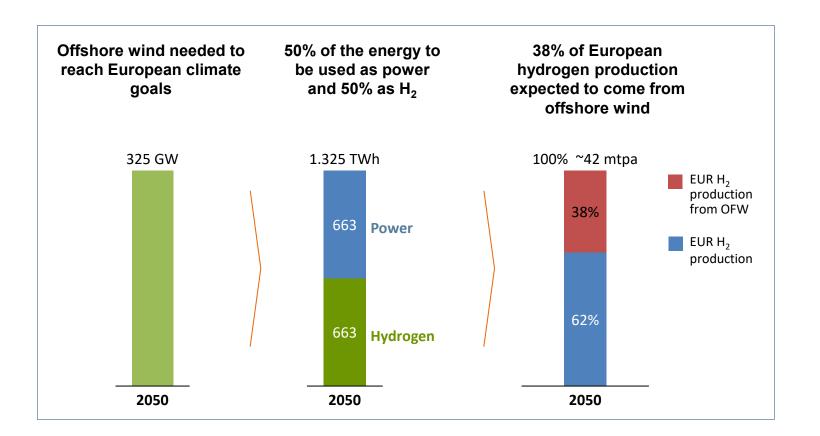
120+

The North Sea will be Europe's main hydrogen supplier towards 2050

European hydrogen demand in 2050, mpta

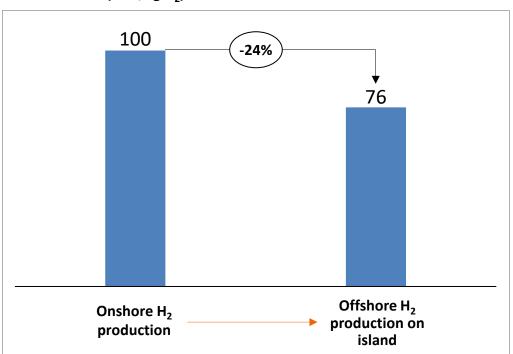


wind



Offshore hydrogen production is 20-25% cheaper than shoreline

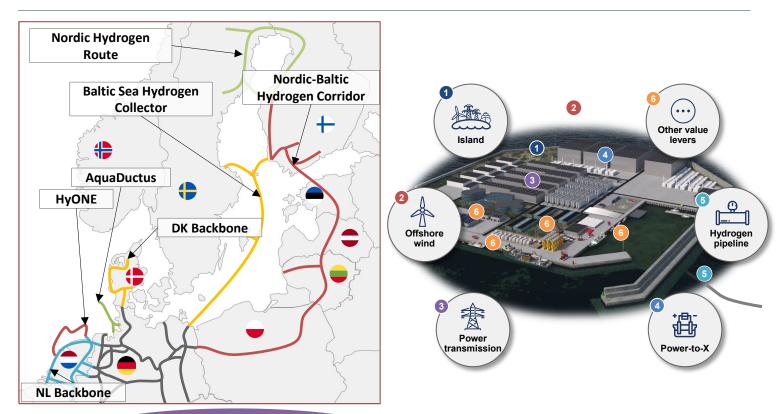
Indexed LCoH (EUR/kg H₂)





- Pipeline cheaper than cables and converter stations
- Lower power losses
- Artificial islands cheaper than platforms at 3-4 GW

Europe needs a hydrogen backbone in the North and Baltic Seas and offshore energy hubs for hydrogen and power production



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An initial exploration for hydrogen prospects for the industrial cluster East Groningen



WIND MEETS GAS.







