

# CO<sub>2</sub> reduction through storage beneath the North Sea

International CCUS and Hydrogen Symposium Japan



Mark Driessen  
11 March 2021

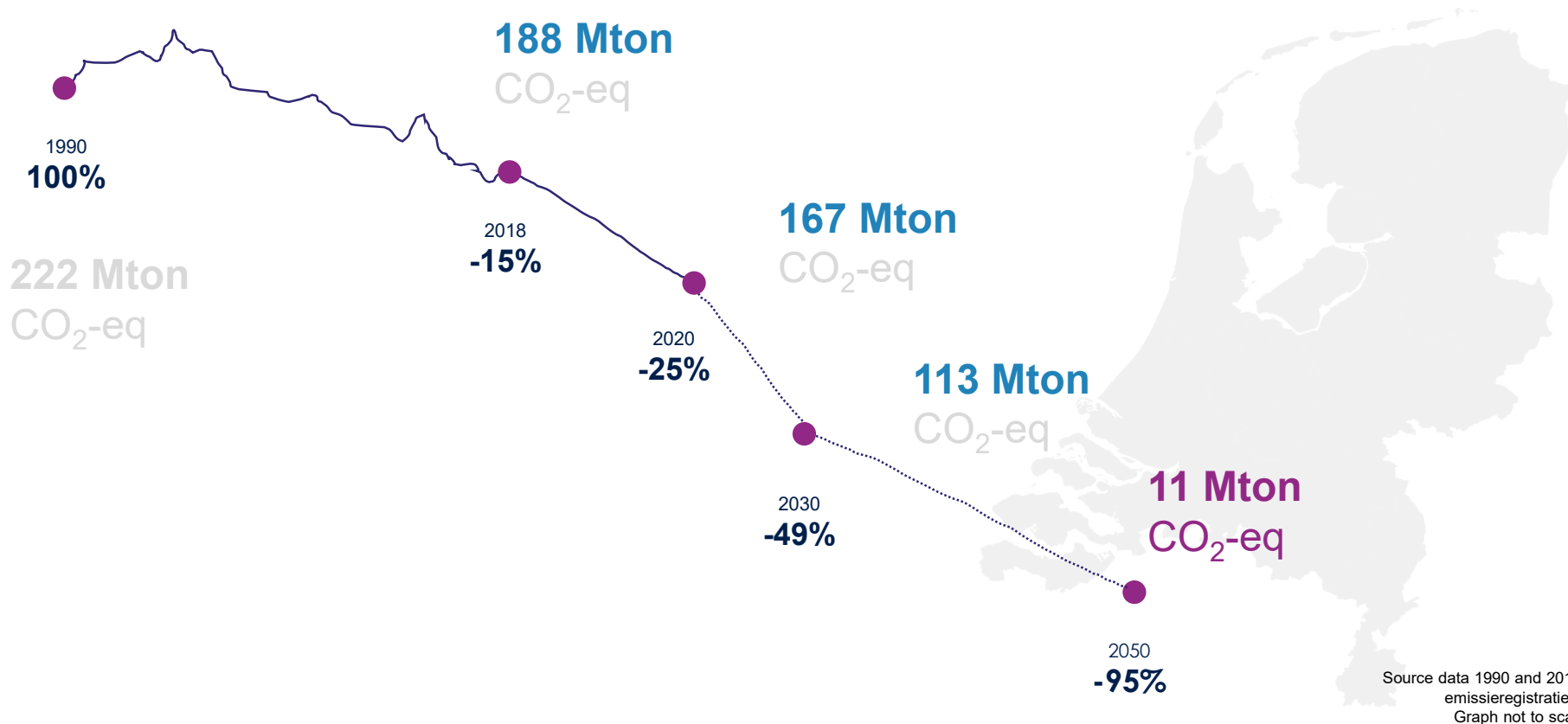


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**Porthos**  
CO<sub>2</sub> TRANSPORT & STORAGE

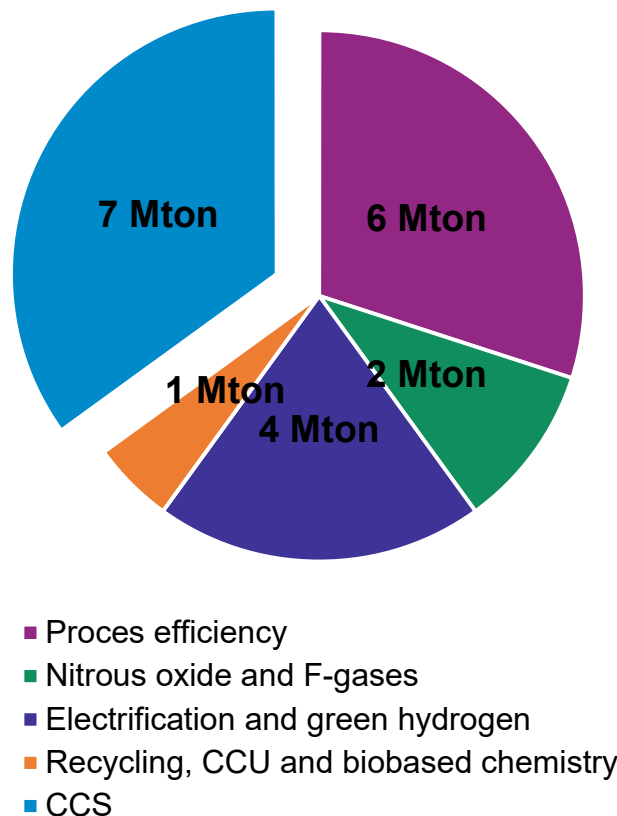
# Climate objectives of the Netherlands



# Situation in the Netherlands

Paris Agreement translated into Dutch Climate Agreement:

- Ambition: 49% CO<sub>2</sub> reduction by 2030, compared to 1990
- Industry: 14.3 Mton reduction, in addition to the previously agreed 6 Mton by efficiency improvement
- Starting point PBL Netherlands Environmental Assessment Agency:  
7.2 Mton CCS in 2030 = **50%** industry



# Rotterdam: a carbon neutral port in 3 steps

1

## Efficiency and infrastructure

Residual heat will be used to heat homes, buildings and greenhouses, CO<sub>2</sub> will be captured and stored

→ Requires a lot of additional infrastructure, including pipelines and cables

2

## New energy system

Industry will use electricity and (green) hydrogen instead of oil and gas

→ Demands a lot of and affordable electricity from sustainable sources (e.g. wind and sun)

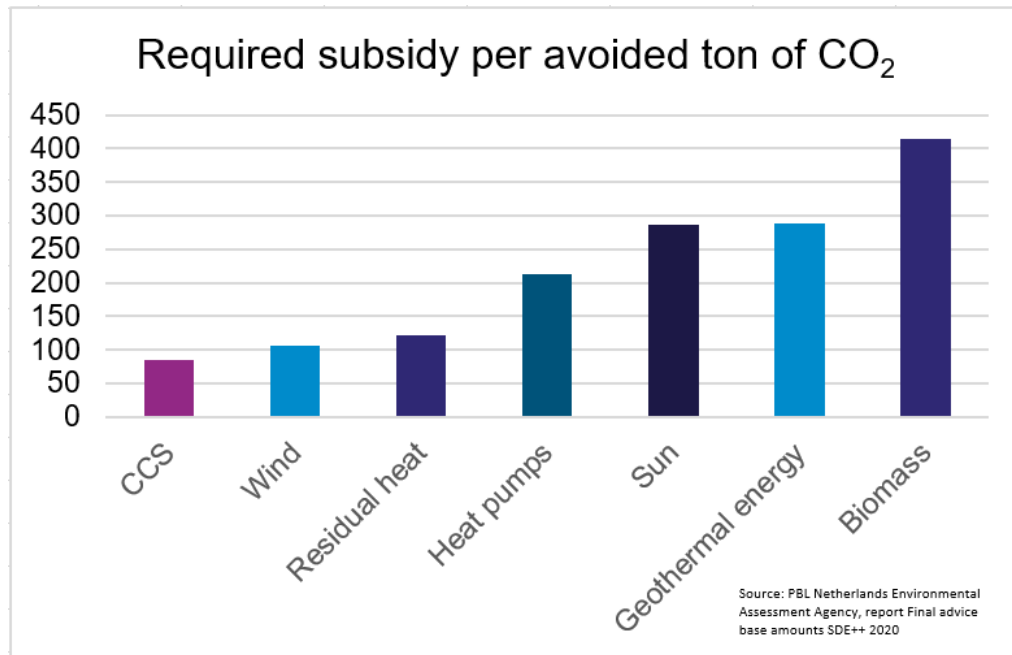
3

## New raw materials and fuel system

Fossil fuels will be replaced by biomass, recycled materials, green hydrogen and CO<sub>2</sub>

# Why CC(U)S?

- Has the potential to reduce large volumes of CO<sub>2</sub>
- Can be realized in the short term, crucial in terms of carbon budget
- It is cost effective
- Potential for utilisation, mainly in greenhouses
- Important for the development of hydrogen: via blue to green
- On the long term: commodity for industrial use (circular)





# Rotterdam ideal location

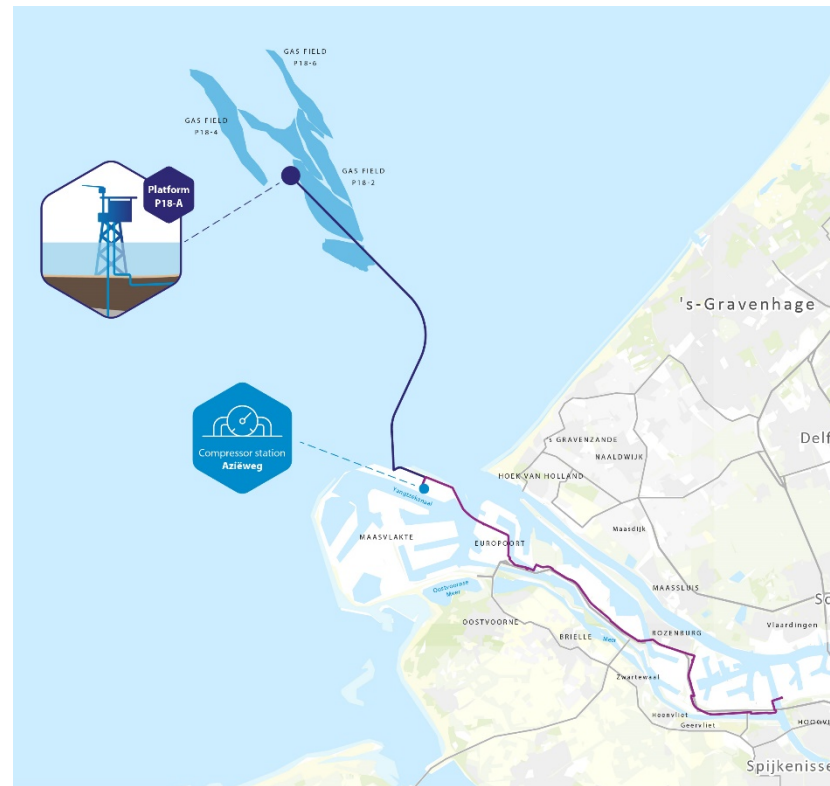
- ~ 16% national CO<sub>2</sub> emissions
- Large industrial cluster
- Relatively small area
- Cost effective
- Storage locations offshore
- Combination with other developments in the port, e.g. hydrogen and circular





# Project overview 1/2

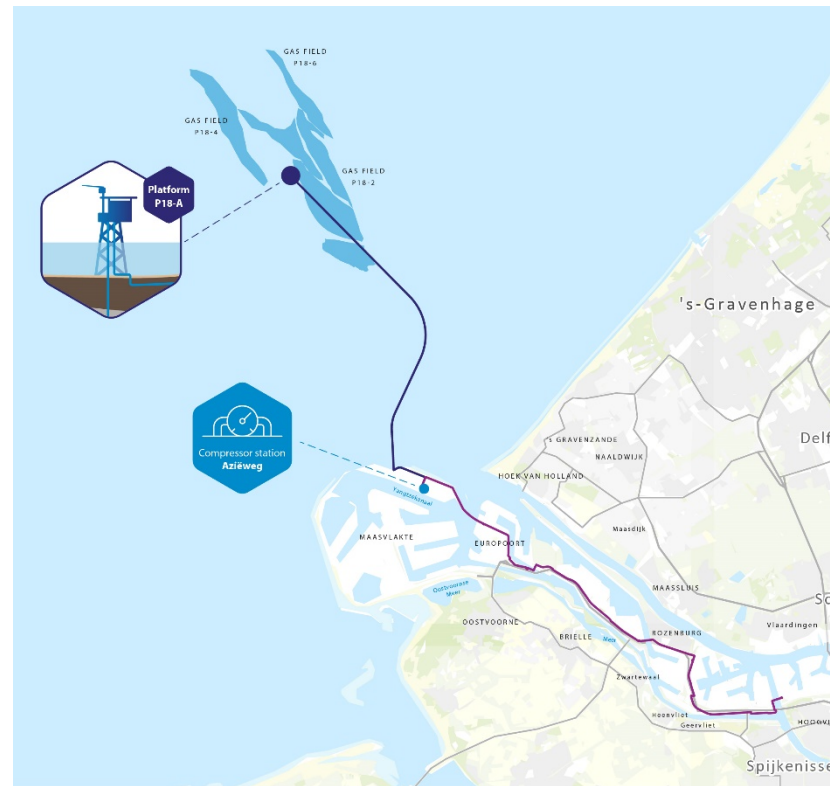
- Infrastructure for CO<sub>2</sub> transport and storage
- CO<sub>2</sub> capture by customers
- Collective pipeline through Rotterdam port area
- Compressor station on the Maasvlakte
- Offshore pipeline to platform in the North Sea
- Storage in empty gas fields beneath the North Sea





# Project overview 2/2

- Dutch state-owned parties: EBN, Gasunie, Port of Rotterdam Authority
- Potential customers: Air Liquide, Air Products, ExxonMobil, Shell
- Capacity P18 fields: 37 Mton
- Storage: 2.5 Mton per year
- CAPEX: ~ € 500 million
- Planning: operational in 2024



# Transport: onshore pipeline

- In the Rotterdam port area
- In existing pipeline corridor
- Length: ~ 30 km
- Diameter: 108 cm

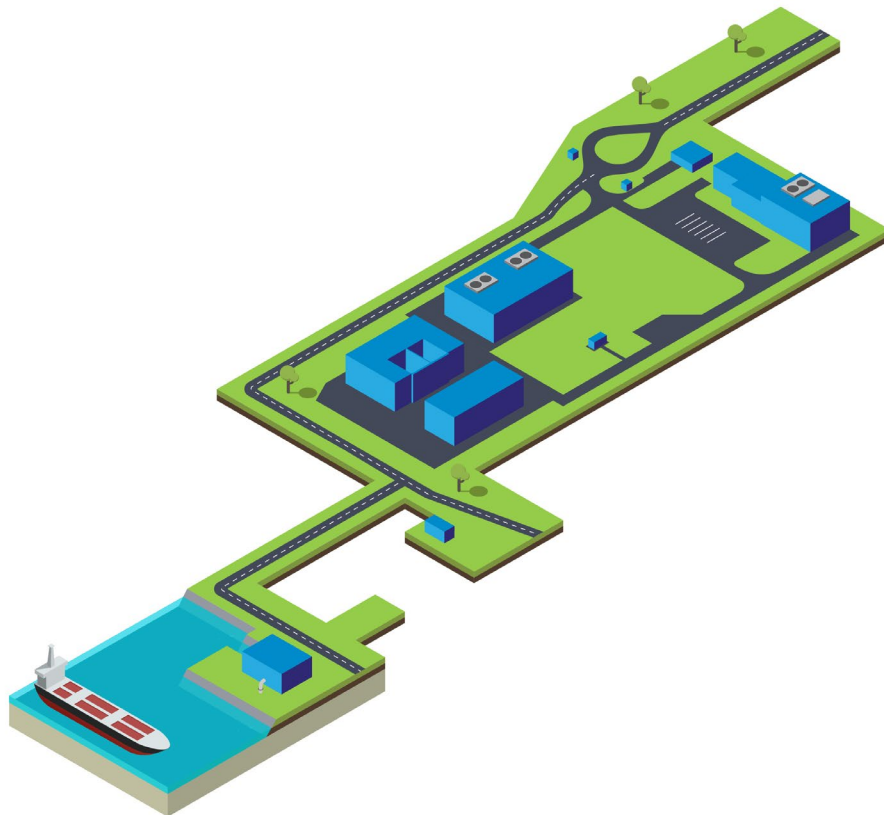


# Transport: compressor station

- Location: Aziëweg
- Plot: ~ 2 hectare

## Facilities:

- Electricity
- Cooling installations
- Measure and control systems



# Transport: offshore pipeline

- From the compressor station, beneath the North Sea seabed to platform P18-A
- Length: ~ 22 km
- Diameter: 40 cm





# Storage

- From the platform to the P18 gas fields
- ~ 20 km off the coast
- Depth: between 3.175 and 3.455 meter
- Capacity: 37 Mton
- 2.5 Mton CO<sub>2</sub> per year
- Natural closing through sealing layers
- Re-use of existing platforms and wells





# Public-private partnership for a successful project

## State owned companies

Lead role,  
invest in infrastructure



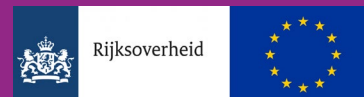
## Private companies

Invest in capture,  
pay for storage



## Public authorities

Funding, mandate,  
responsibility



# Commercial process

- Capture – transport/storage
- Alignment necessary
- SDE++ Dutch subsidy scheme
- Funnel approach:
  - ✓ Expression of Interest
  - ✓ Joint Development Agreement 1
  - ✓ Joint Development Agreement 2
  - ✓ Transport and Storage contracts



# CEF funding in media

## The World News Monitor

Business Information for Sustainable Development

### 102 million euros in funding on the horizon for Porthos carbon storage project

Hellenic Shipping News | Oct 6, 2020 at 2:00 AM



- The European Commission has proposed awarding 102 million euros in funding to the Porthos project.
- The European Commission wants to financially support the construction of Porthos because the capture and sequestration of CO<sub>2</sub> (known as Carbon Capture and Storage, CCS) is widely seen as a necessary measure to keep global warming below 2 degrees Celsius.
- The precise amount of this fee is determined by the costs incurred by Porthos for the system's construction and exploitation (including the energy costs for the pressurised injection of CO<sub>2</sub> in the deeper substrate).

ship.energy



### EC proposes €102 million funding for Porthos carbon capture project

Lesley Barles-Hughes | 1 week ago | 2 min read

The project will store CO<sub>2</sub> supplied by the Rotterdam operations of Air Liquide, Air Products, ExxonMobil and Shell in the North Sea seabed

gasworld



### €102m proposed for Porthos CCS project

By Molly Burgess | 12 October 2020

The European Commission has proposed a €102m award to a Netherlands-based carbon capture and storage project, as part of a necessary measure to keep global warming below 2 degrees celsius.

If endorsed by the European Parliament, Project Porthos will benefit from the new capital that will help to push forward its goals and contribute to the Netherlands' achievement of its climate targets.



Sea Wanderer

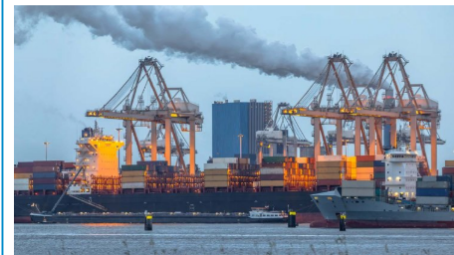


Ports

### 102 million euros in funding on the horizon for Porthos carbon storage project

The European Commission has proposed awarding 102 million euros in funding to the Porthos project

Oct 5, 2020 - 06:50



The Porthos project centres on the capture and storage of CO<sub>2</sub> in the North Sea floor. If the European Parliament endorses this proposal, Europe will bear a substantial share of the investment in Porthos, which totals 450 to 500 million euros.

# Status and planning

2021

- Technical development
- Environmental Impact Assessment and permits
- Agreements with companies and government

2022

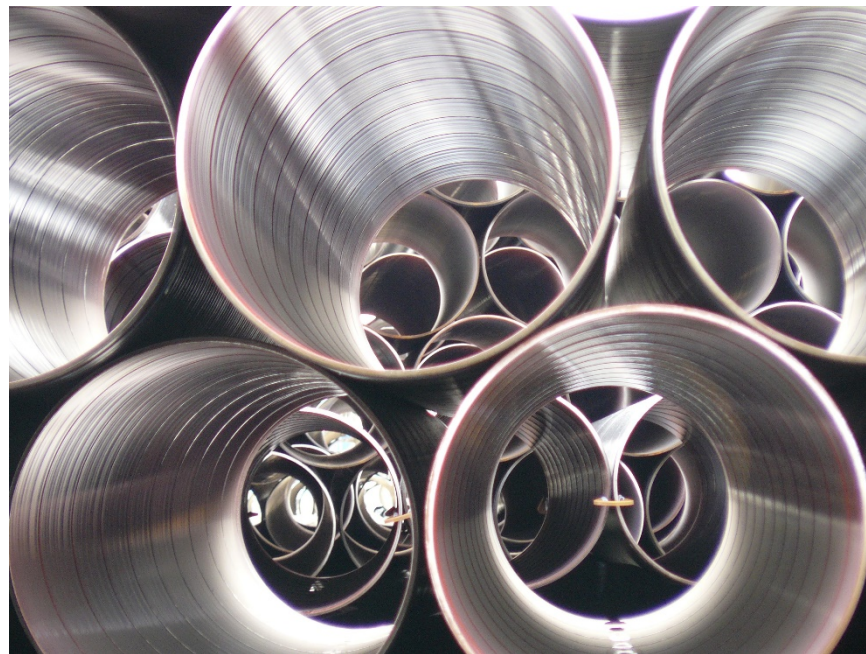
- Final Investment Decision (FID)

2022-2023

- Construction of the system

2024

- System operational





# Thank you for your attention!

For more information, please visit:  
[www.porthosCO2.nl](http://www.porthosCO2.nl)



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