

# HYDROGEN IN THE PORT OF ROTTERDAM

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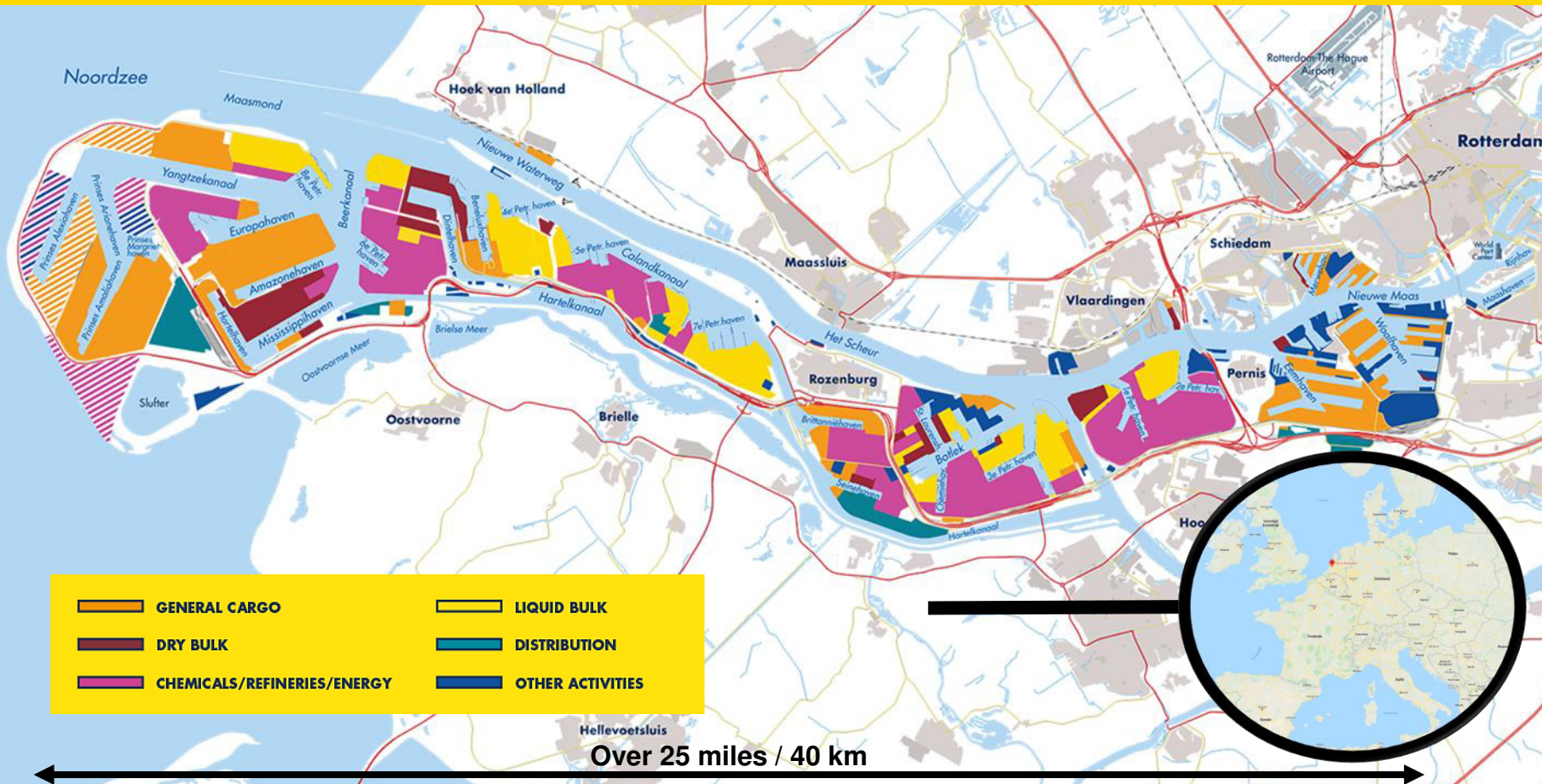


**Randolf Weterings**  
Port of Rotterdam





# Port and industrial area



## Port of Rotterdam

- Largest port in Europe, 10th port worldwide
- Total employment 385,000 people\*
- Total added value € 45,6 billion (6.2% GNP)\*
- Visits (2018):
  - 29,476 sea-going vessels
  - 107,000 inland navigation
- 3.000 companies
- Throughput (2018): 469 mln tons
  - 45% Liquid bulk
  - 32% containers
  - 17% dry bulk
  - 6% Breakbulk

\* source: Erasmus University

# Current situation in Rotterdam

## Position of Rotterdam in the current energy system (2018 figures)

- 8.800 petajoule (PJ) per seagoing vessel (more than 3x the Dutch energy consumption & 13% of the energy consumption of Europa).
- For the production of steam, heat and electricity in the Port of Rotterdam, 430PJ of energy was used (29 Mton CO2 emissions / 20% of the total Dutch emissions).

## Current hydrogen market in Rotterdam

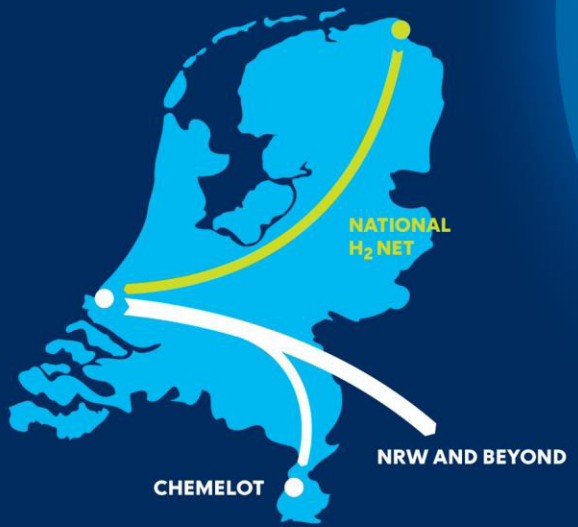
- Current hydrogen demand per year in Rotterdam is 450 kt, mainly used for oil refinery
- In the Port of Rotterdam 2 hydrogen grids exist from Air Products (local network) and Air Liquide (international network)



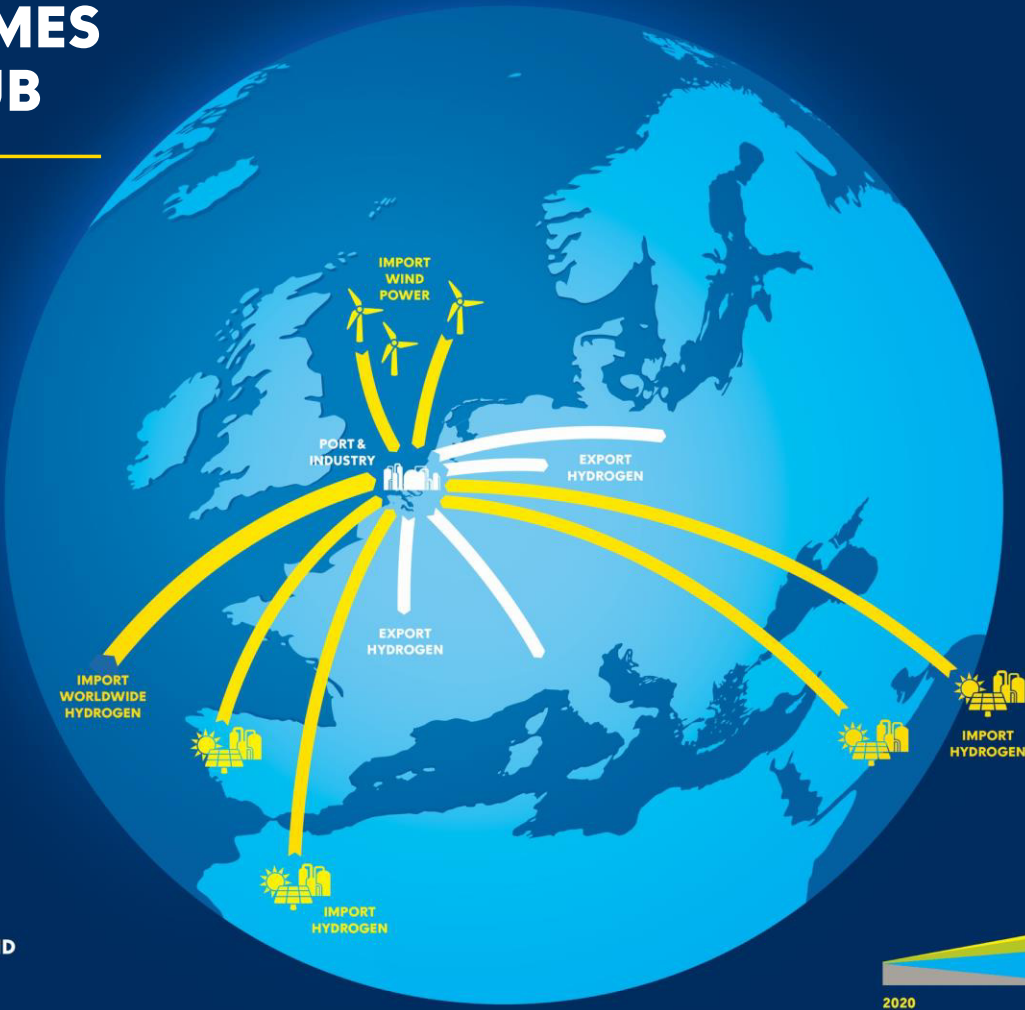
Pipeline network of Air Liquide, hydrogen in RED



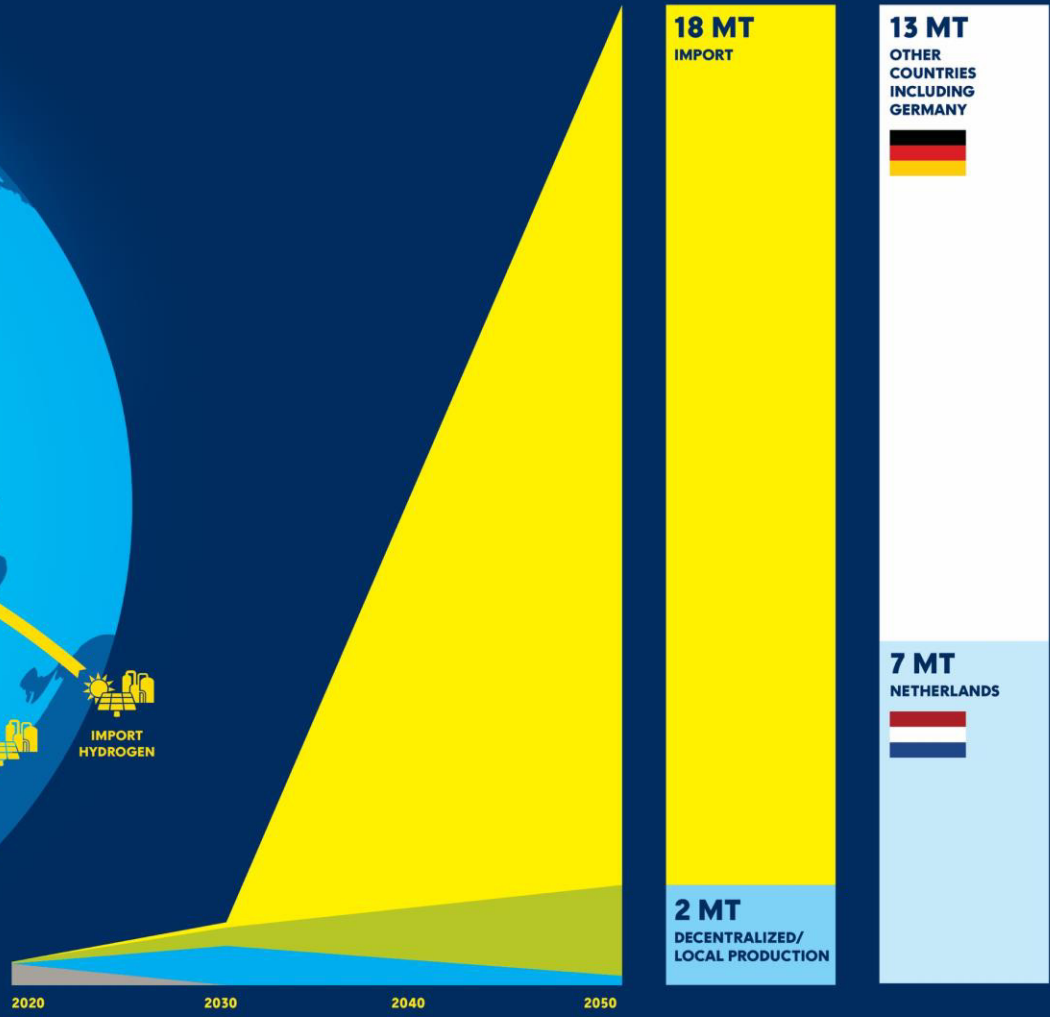
# ROTTERDAM BECOMES KEY HYDROGEN HUB



Connection with national H<sub>2</sub> grid, Chemelot and North Rhine–Westphalia (NRW).



Strong growth in hydrogen flow through Rotterdam due to imports.

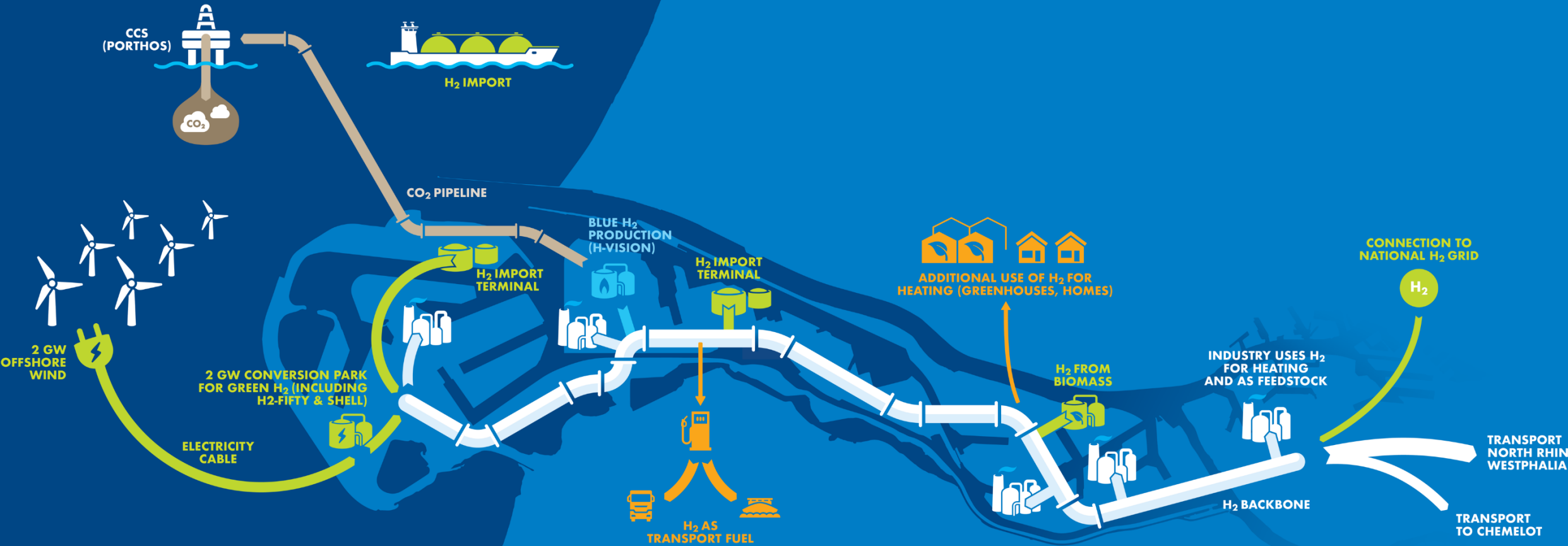


Grey hydrogen  
Blue hydrogen  
Green hydrogen  
Imported hydrogen

Green & Blue hydrogen made with 20-25GW offshore wind.  
Estimated use of 20 MT hydrogen by country.

Hydrogen vision: <https://bit.ly/32M6Wrl>

# HYDROGEN ECONOMY IN ROTTERDAM STARTS WITH OPEN ACCESS BACKBONE



The locations depicted are approximate.

# FIRST PROJECTS OPERATIONAL IN 2023

**2023**

Backbone and Maasvlakte  
conversion park operational  
(investment decision 2021)

Shell goes operational with  
150-250 MW electrolyser  
on conversion park  
(investment decision 2021)

**2023**

**2025**

H2-Fifty's 250 MW  
electrolyser goes  
operational  
(investment decision 2023)

Road transport: 500  
hydrogen-powered trucks

**2025**

**2026**

Installation of H-vision  
operational  
(investment decision 2022)

Import terminal,  
pipelines to Chemelot and  
North Rhine–Westphalia  
operational

**2030**

# CONVERSION PARK ON THE MAASVLAKTE PORT AREA

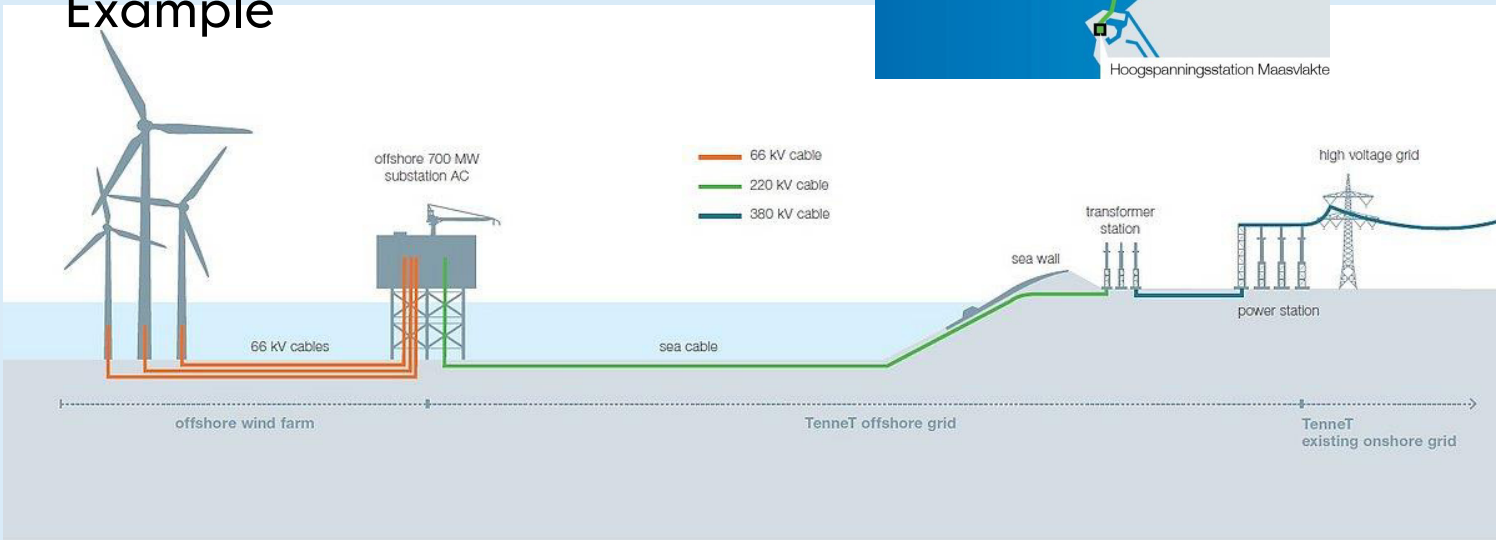
- **Installed capacity:** 500MW before 2025, 2 GW before 2030
- **System integration:** Electricity, Hydrogen & Heat
- **Customers:** Shell, Nouryon & BP





# CHALLENGE: LARGE SCALE ELECTROLYSIS REQUIRES A LOT OF SPACE

Hollandse Kust (Zuid)  
Example



1 GW electrolyzer (~ 80 kton/a)



1GW: 17.000 ha  
↓ X 25

5,5 ha  
↓ X 25

17 ha  
↓ X 25 (25GW=2Mton/a)

H<sub>2</sub> VISION\*: 425.000 ha

137,5 ha

425 ha

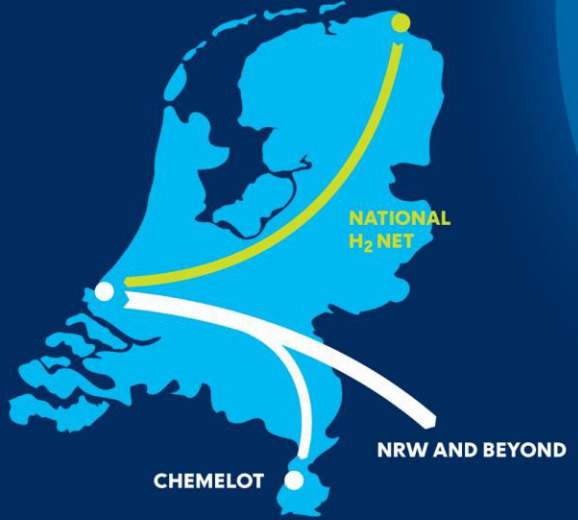
\*H<sub>2</sub> VISION: 2 Mton of local hydrogène production



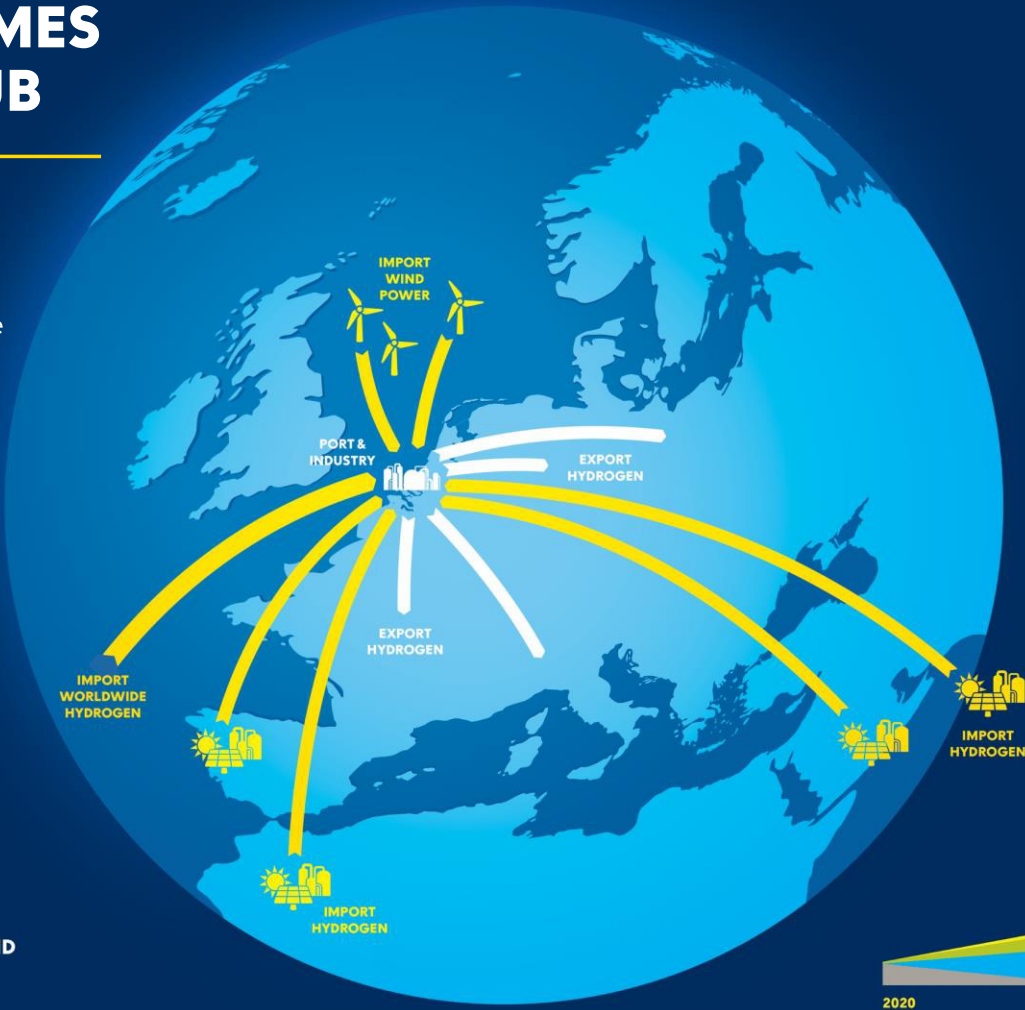
# ROTTERDAM BECOMES KEY HYDROGEN HUB

Focus on system integration on strategic places (hubs)

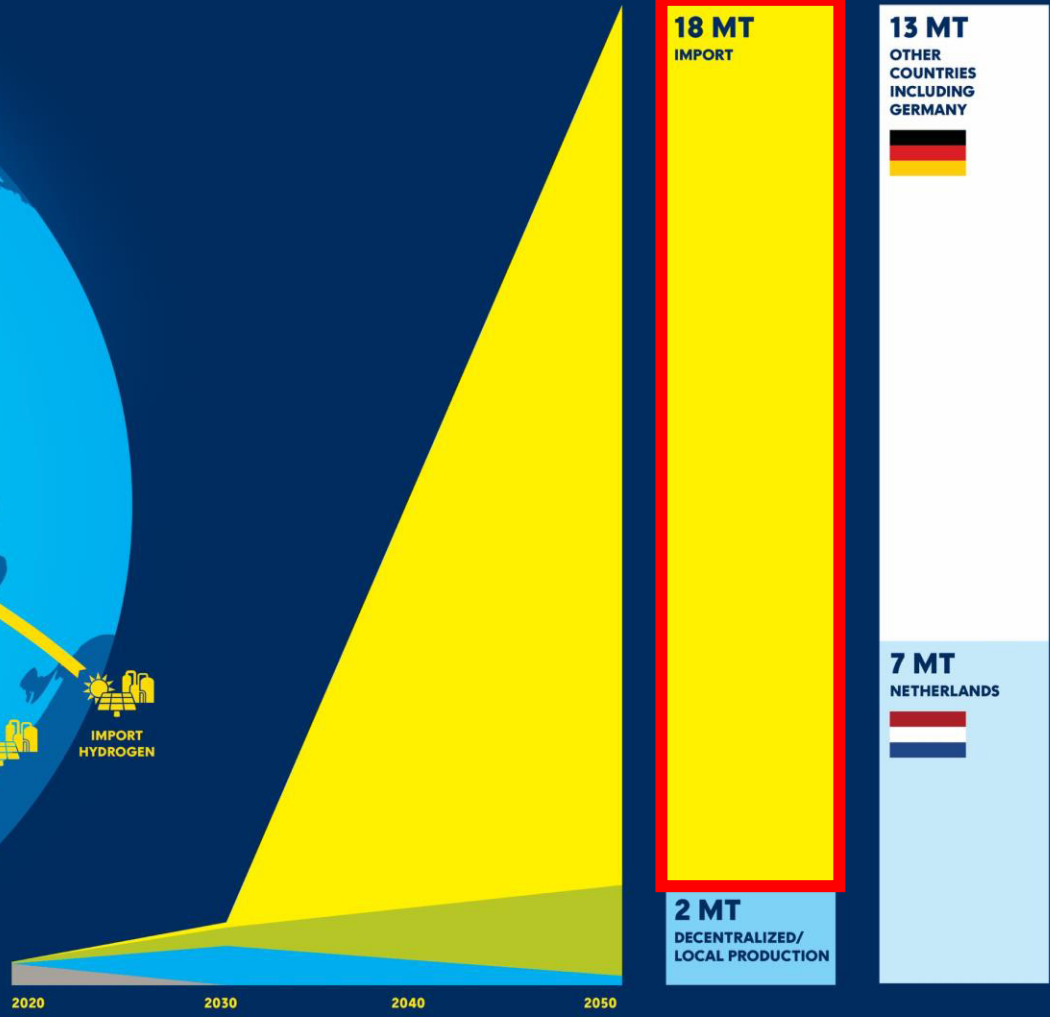
Europe will require Hydrogen import in the future



Connection with national H<sub>2</sub> grid, Chemelot and North Rhine–Westphalia (NRW).



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**POWER UP  
YOUR IDEAS  
MAKE IT HAPPEN**

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**LET'S CONNECT**

