



Port of  
Rotterdam

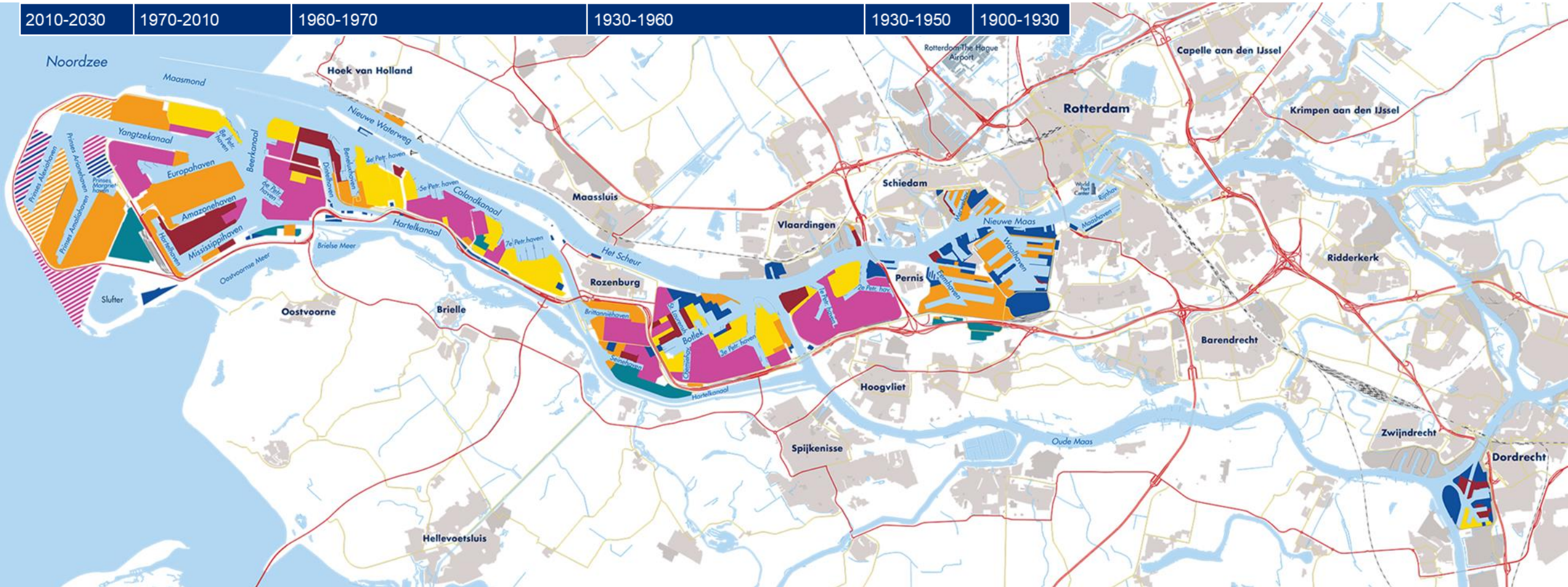
1932 | 2022  
90 JAAR



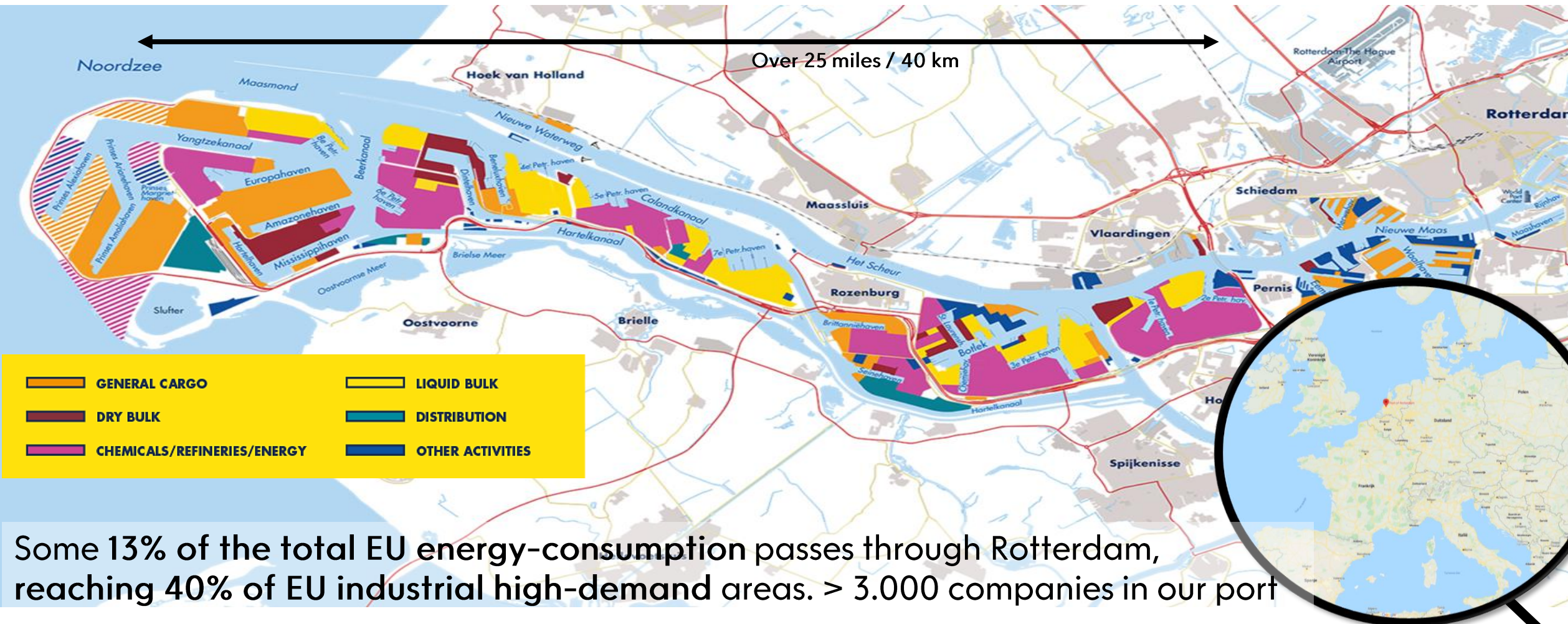
**Presentation on Rotterdam Hydrogen Hub**  
Monica Swanson



# DEVELOPED SINCE 1250, A PORT AUTHORITY SINCE 1932



# PORT OF ROTTERDAM - ENERGY HUB OF NW EUROPE



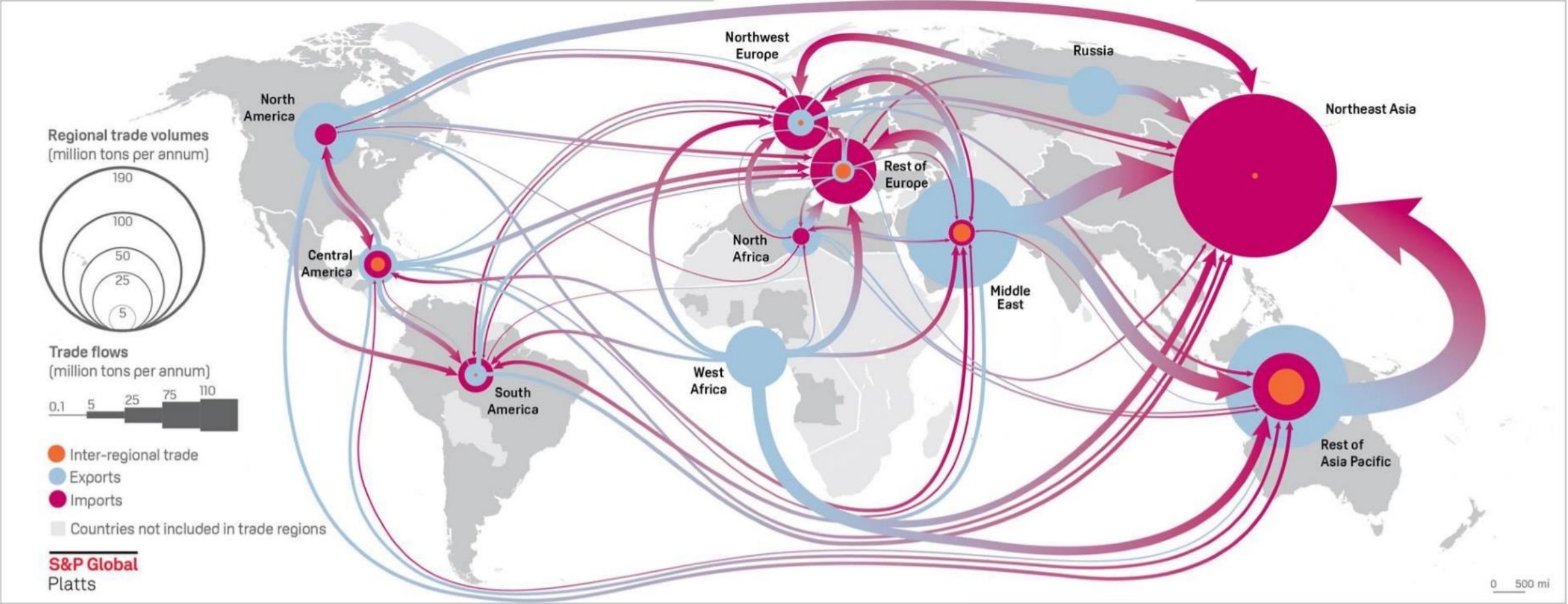
# WHAT DOES IT MEAN TO BE A PORT IN TRANSITION?



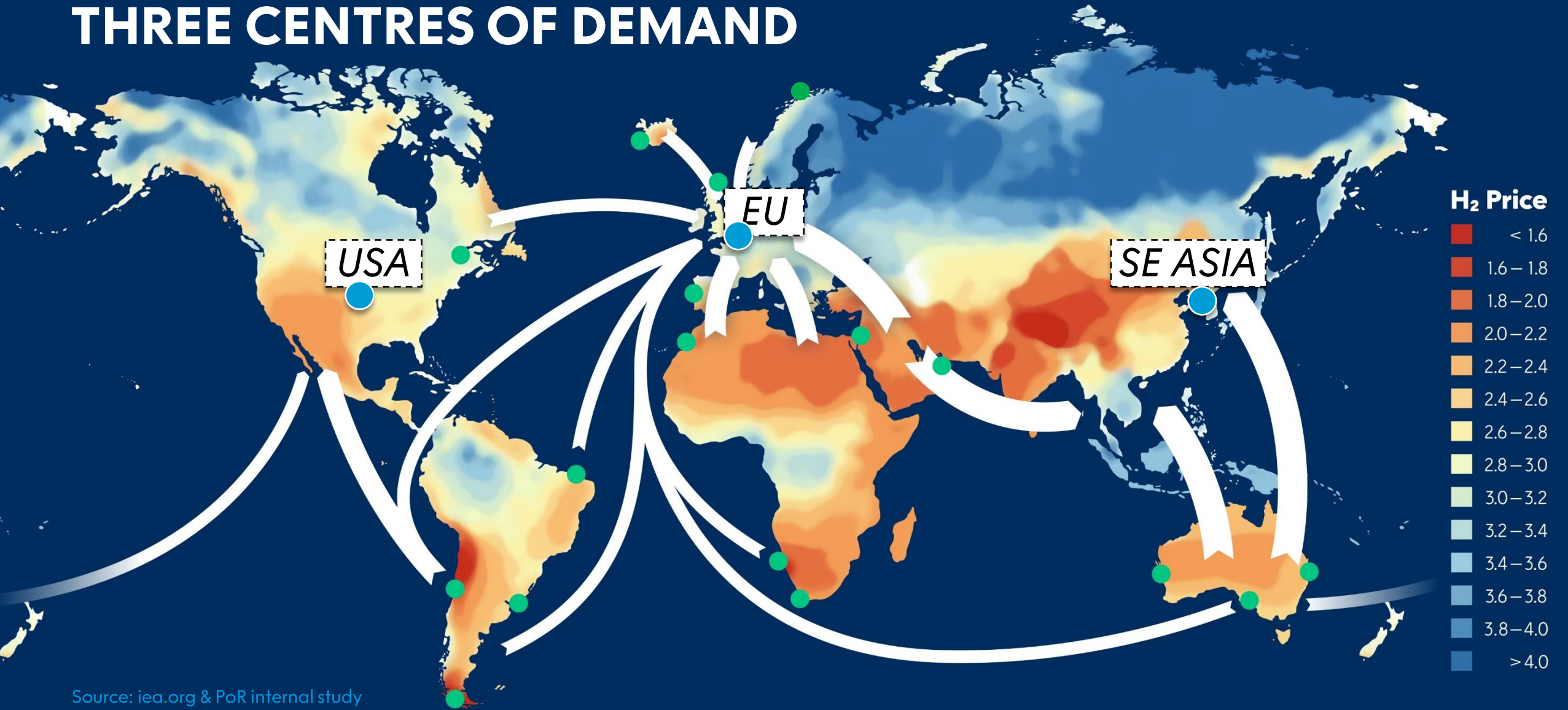
# ARE WE READY FOR CHANGE?



# THE WORLD'S TRADITIONAL OIL AND GAS TRADE

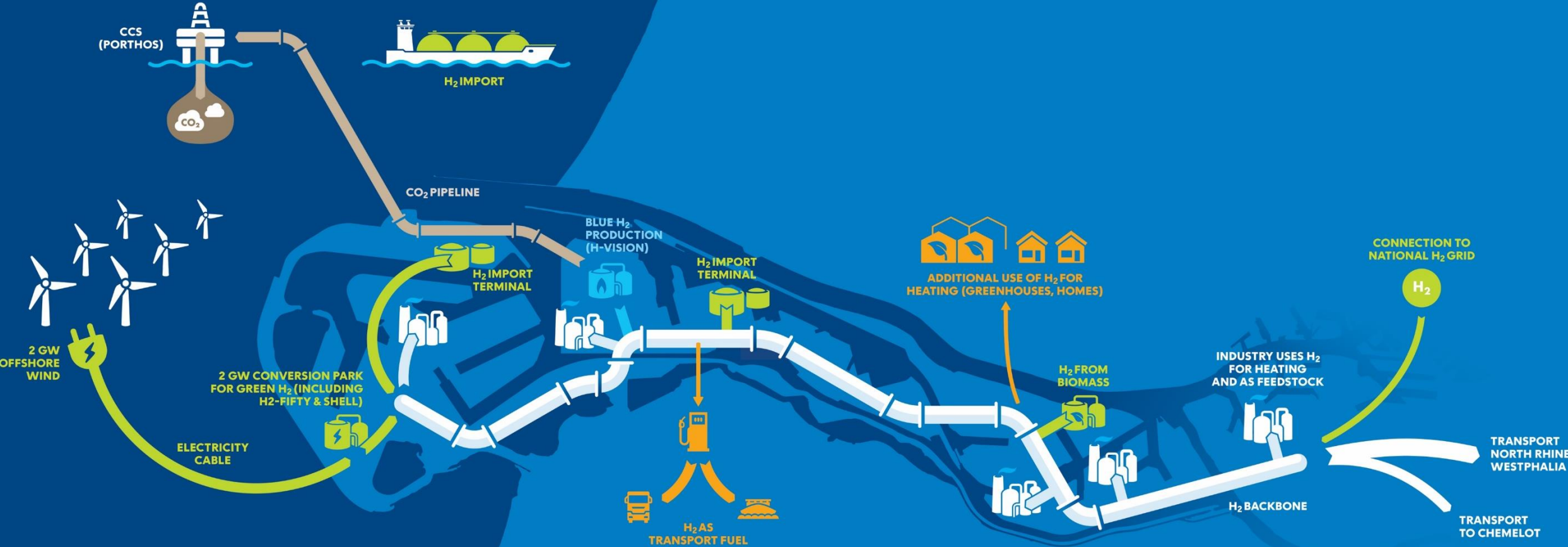


# THREE CENTRES OF DEMAND



Source: iea.org & PoR internal study

# HYDROGEN ECONOMY IN ROTTERDAM INFRASTRUCTURE 2020-2030



The locations *depicted* are approximate.

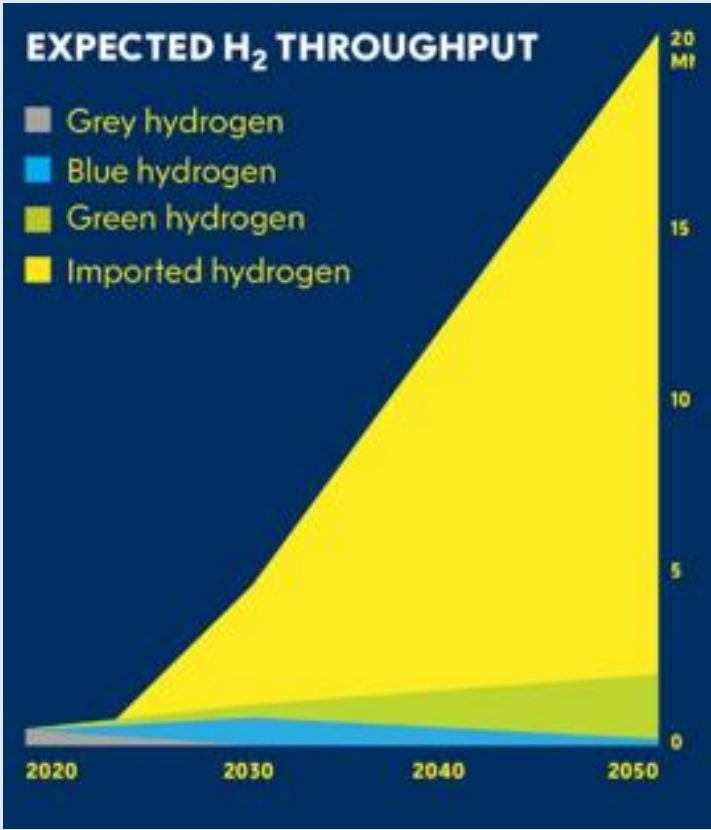


# DEMAND DEVELOPMENT 2020 - 2022:

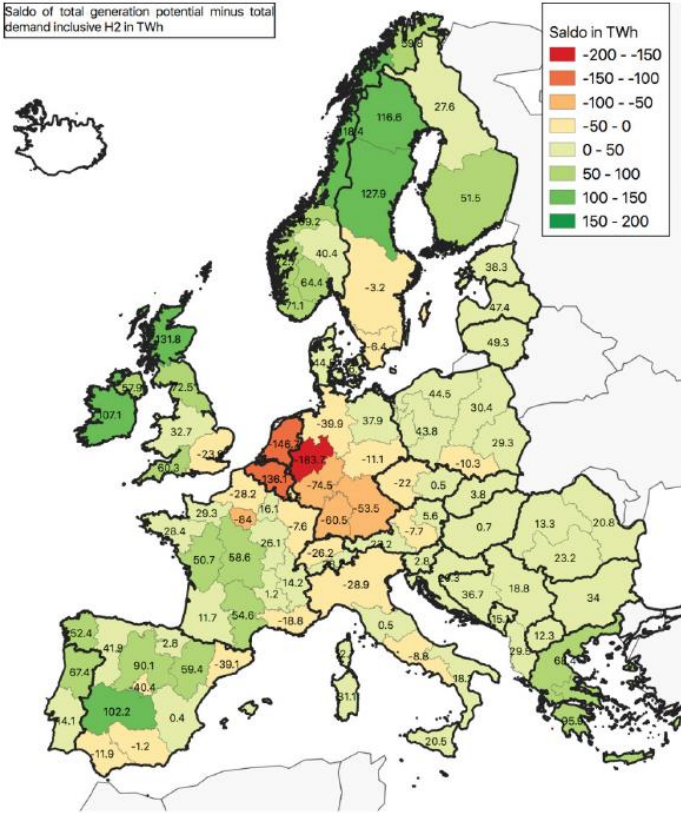
2020



2022

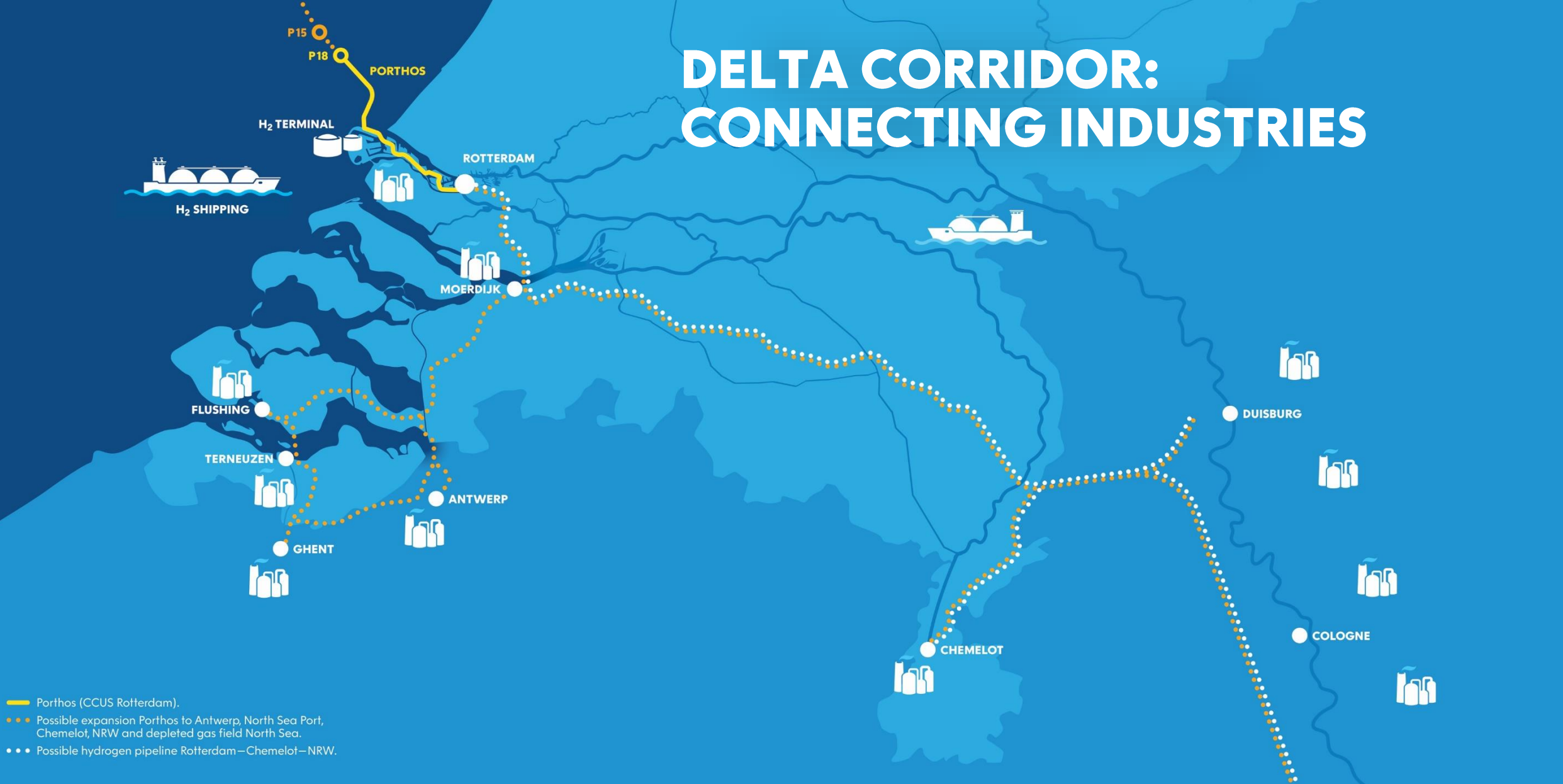


# HINTERLAND CONNECTIONS VERSUS DEMAND

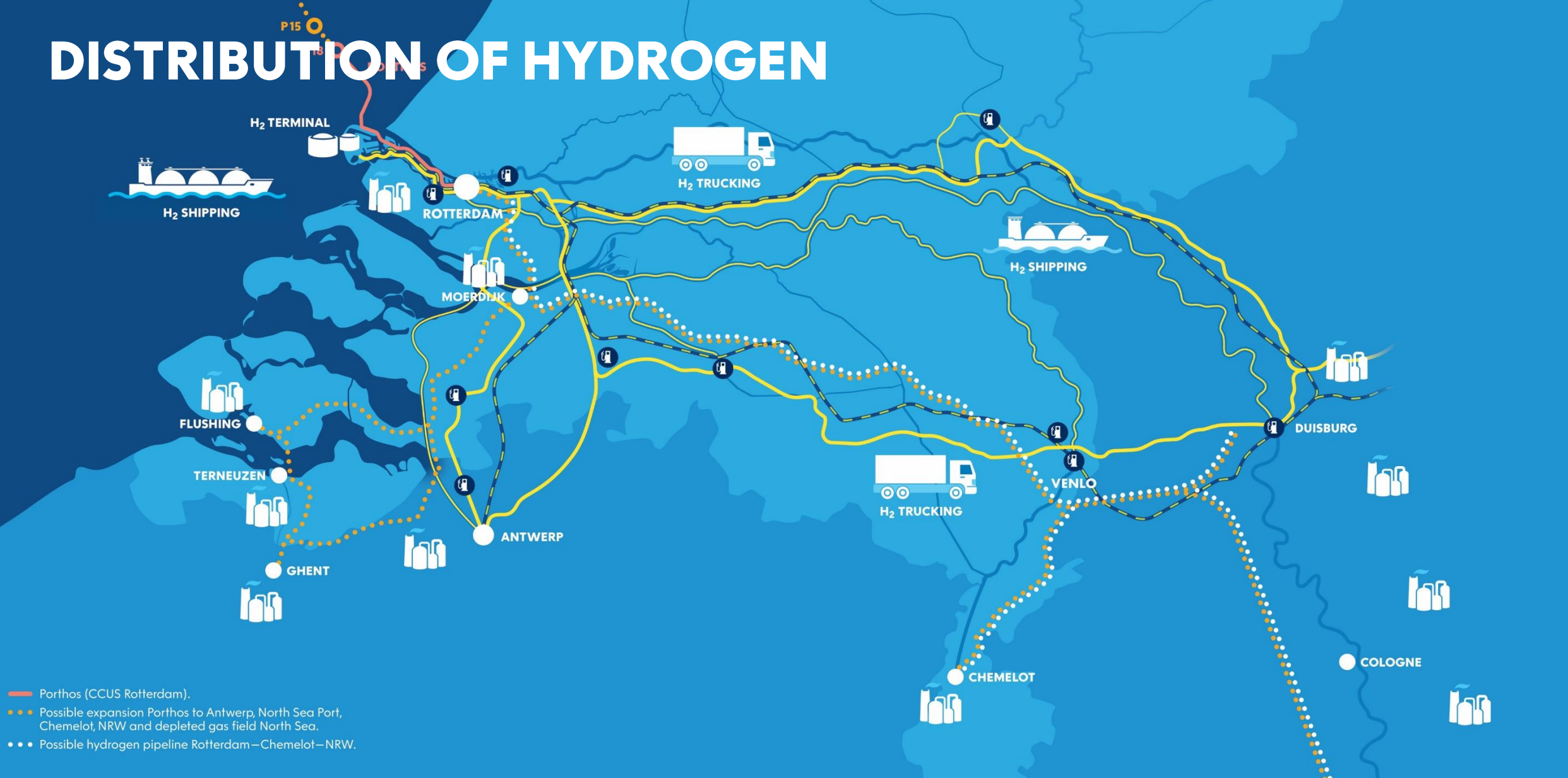


Source: Wuppertal Institute

# DELTA CORRIDOR: CONNECTING INDUSTRIES

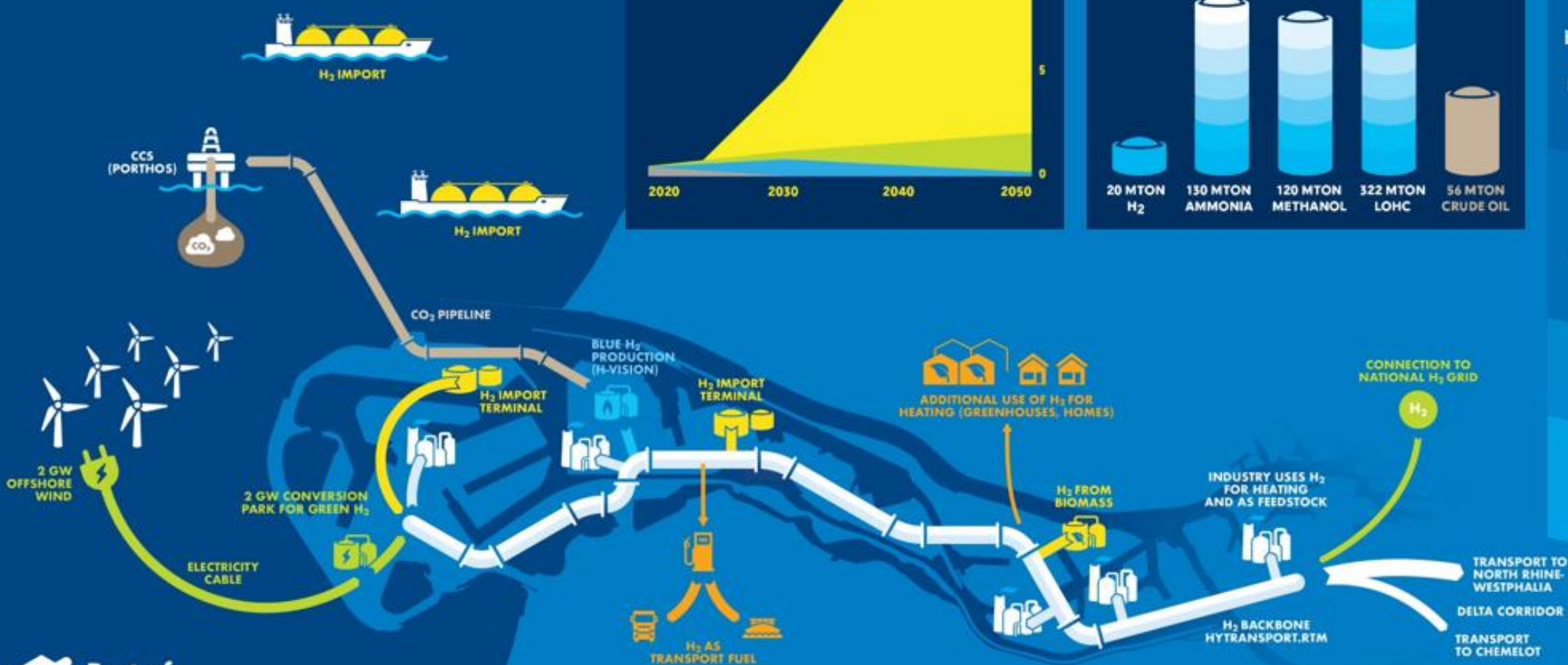


# DISTRIBUTION OF HYDROGEN



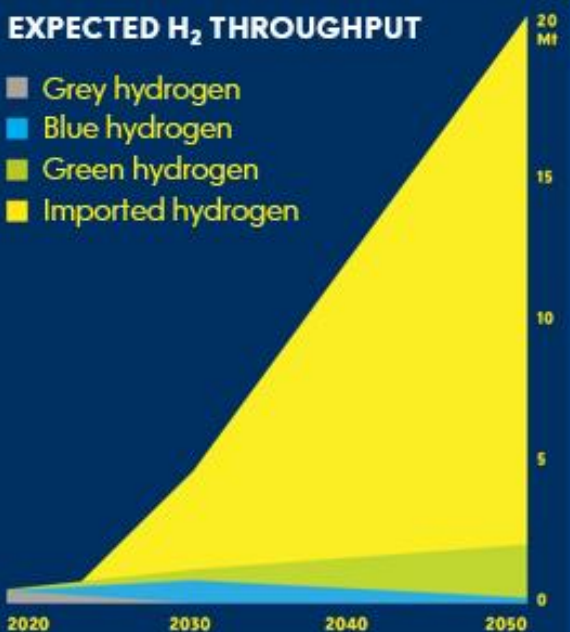
- Porthos (CCUS Rotterdam).
- Possible expansion Porthos to Antwerp, North Sea Port, Chemelot, NRW and depleted gas field North Sea.
- Possible hydrogen pipeline Rotterdam–Chemelot–NRW.

# HYDROGEN DEVELOPMENTS IN ROTTERDAM

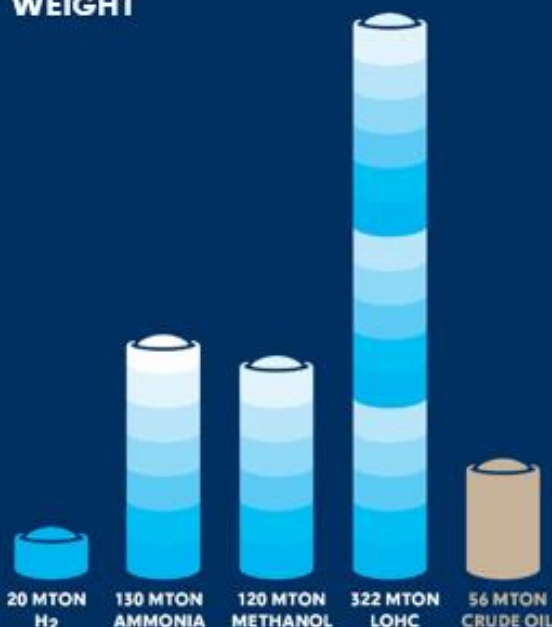


## EXPECTED H<sub>2</sub> THROUGHPUT

- Grey hydrogen
- Blue hydrogen
- Green hydrogen
- Imported hydrogen



## WEIGHT



## TIMETABLE

Shell 200 MW electrolyser  
**2024**

H<sub>2</sub> backbone HyTransport.RTM;  
Green ammonia imports start  
**2024**

bp-HyCC 250 MW electrolyser;  
Uniper 100 MW electrolyser;  
LOHC import at industry scale;  
1000 H<sub>2</sub> powered trucks  
**2025**

Pipelines Delta Corridor  
Chemelot-NRW;  
12 H<sub>2</sub> powered inland barges;  
H-vision (blue H<sub>2</sub>)  
**2026**

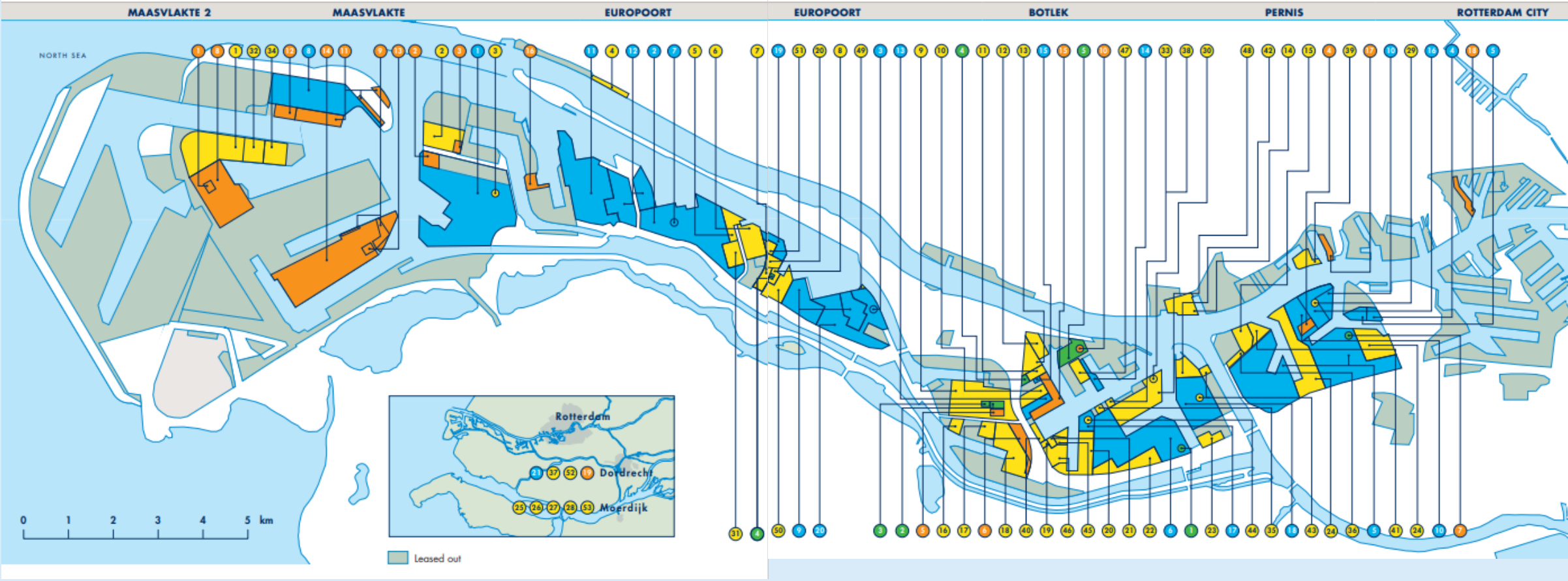
LH<sub>2</sub> terminal  
**2027**

2 – 2,5 GW electrolyzers  
4 Mton imports  
**2030**

# > 3.000 RDAM COMPANIES— WANTING TO CONNECT



# ENERGY RELATED INDUSTRY IN ROTTERDAM



# IN MORE DETAIL...

## OIL & OIL PRODUCTS

### Refineries

- 1 BP Raffinaderij Rotterdam
- 2 Gunvor Petroleum Rotterdam
- 3 Koch HC Partnerships
- 4 ExxonMobil Lubricants
- 5 Shell Nederland Raffinaderij
- 6 Esso Nederland (ExxonMobil)

### Refinery terminals

- 7 Gunvor Petroleum Rotterdam
- 8 Maasvlakte Olie Terminal (MOT)
- 9 Maatschappij Europoort Terminal (MET)
- 10 BP Raffinaderij Nederland
- 11 Shell Europoort Terminal
- 12 TEAM Terminal

### Tank terminals for oil products

- 13 Vopak Terminal Laurens Haven
- 14 Service Terminal Rotterdam
- 15 Sargeant Terminal

- 16 Koole Tankstorage Minerals BV

- 17 Rubis Terminal
- 18 Odfjell Terminals Rotterdam
- 19 Euro Tank Terminal (ETT)
- 20 Vopak Terminal Europoort
- 21 Haan Oil Storage

## CHEMICALS, BIOFUELS AND EDIBLE OILS

### Chemical Manufacturers

- 1 Lyondell Covestro
- 2 Indorama
- 3 BP
- 4 Synres
- 5 Caldic Chemical
- 6 ExxonMobil Chemical Aromatics Plant
- 7 Akzo Nobel Industrial Chemicals
- 8 Kemira Rotterdam BV
- 9 Euroliquids
- 9 Huntsman Holland
- 10 Invista
- 10 Lucite International
- 10 Duacor Petrochemicals
- 10 Emerald Kalama Chemical
- 11 Cabot
- 12 Tronox Pigments
- 13 Kemira Rotterdam BV
- 14 Yara International
- 15 Aliphos

- 15 Cerexagri

- 16 Arkema Rotterdam
- 16 Almatris
- 17 Climax Molybdenum
- 18 Lyondell Chemical
- 19 Hexion UK Ltd
- 20 Akzo Nobel Industrial Chemicals Shin-Etsu
- 20 Akzo Nobel Functional Chemicals
- 21 Organik Kimya
- 22 ExxonMobil Chemical
- 23 Aluchemie
- 24 Shell Nederland Chemie
- 24 Shin-Etsu
- 24 Hexion UK Ltd
- 25 Shell Moerdijk
- 25 LyondellBasell
- 25 Hexion UK Ltd
- 26 Eilba
- 26 Dr. W. Kolb
- 27 Coatex B.V.

- 26 Solvay Solutions Nederland

### Biofuels manufacturers

- 29 Biopetrol Pernis
- 30 Biopetrol Rotterdam
- 31 Abengoa
- 32 Neste

### Edible oils refineries

- 33 MaasRefinery
- 34 IOI-Loders Croklaan
- 35 Cargill Refined Oils Europe
- 36 Wilmar Edible Oils
- 37 Sime Darby Unimills

### Tank terminals for chemicals, biofuels and edible oils

- 38 Maastank
- 39 Vopak Terminal Vlaardingen
- 40 Botlek Tank Terminal (BTT)
- 41 Koole Tank Storage Pernis

- 42 LBC Rotterdam

- 43 Odfjell Terminals Rotterdam
- 44 Rubis Terminal
- 45 Brenntag
- 46 Vopak Terminal Chemiehaven
- 47 Vopak Terminal TTR
- 48 Vopak Terminal Botlek
- 49 Aglobis
- 50 Lyondell Europoort Terminal
- 51 OCI Terminal Europoort
- 52 Standic
- 53 Stolthaven Moerdijk

## GAS AND POWER, COAL AND BIOMASS

### Gas fired

- 1 Uniper Utility Center Maasvlakte Leftbank (UCML)
- 2 Enecogen (Eneco, Dong)
- 3 Indorama Ventures Europe Utility Island
- 4 Rijnmond Energie
- 4 Maastroom Energie
- 5 Air Liquide
- 6 Air Products-Electrabel
- 7 PerGen

### Coal and Biomass fired

- 8 Uniper MPP 1 & 2
- Uniper MPP 3
- 9 ENGIE RC

### Renewables

- 10 AVR

### Natural gas terminals

- 11 Gate terminal
- 12 Gate break bulk facilities
- 13 LNG-Peakshaver Gasunie

### Coal and biomass terminals

- 14 EMO
- 15 European Bulk Services (Botlek)
- 16 European Bulk Services (Europoort)
- 17 RBT (Rotterdam Bulk Terminal)
- 18 BSR VanUden Stevedoring
- 19 ZHD Stevedoring

## INDUSTRIAL GASES AND WATER

- 1 Air Products
- 2 Air Liquide
- 3 Evides Industrierwater
- 4 Linde Gas Benelux
- 5 AVR



# PUBLICLY ANNOUNCED IMPORT PROJECTS (2022)

## AND MORE TO COME...



- 1 Connecting offshore wind energy
- 2 H2-Fifty
- 3 Shell - Holland Hydrogen I
- 4 AirLiquide
- 5 Conversiepark Maasvlakte
- 6 Uniper
- 7 Multiplhy
- 8 AVR e-thor
- 9 H-vision

- 1 Worldwide import of hydrogen
- 2 ACE Terminal
- 3 Global Energy Storage (GES)
- 4 VOPAK
- 5 Koole, Chiyoda, Mitsubishi, Port of Rotterdam
- 6 Airproducts, Gunvor
- 7 Koole, Horisonti Energi
- 8 OCI

# TO CONCLUDE: WE ARE READY

