

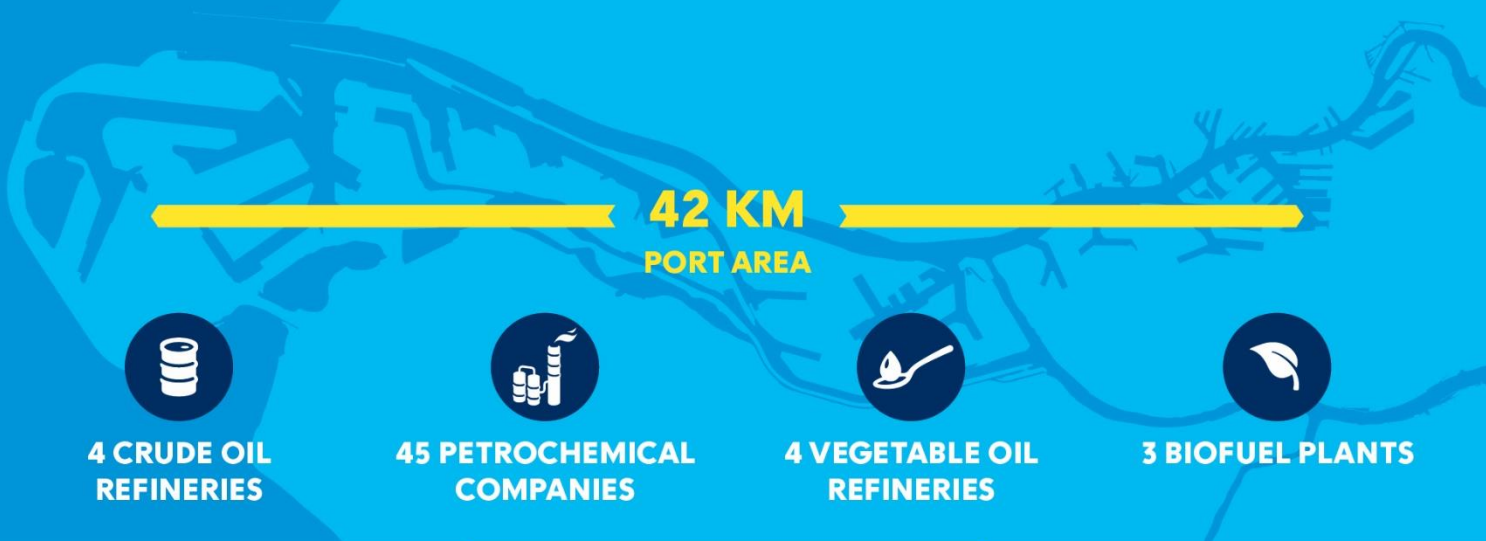
# 23 NOV. 2022

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# PORT OF ROTTERDAM FACTS

## 2022



**AWARDED BEST  
PORT INFRASTRUCTURE**



**€63 BILLION**  
ADDED VALUE,  
8.2% OF DUTCH BBP



**30.000**  
SEA-GOING  
VESSELS  
PER YEAR



**FRONTRUNNER  
IN SUSTAINABILITY**



**NR. 1 BIOPORT**



**469 MILLION TONNES  
OF FREIGHT THROUGHPUT  
IN 2021**



**LARGEST EUROPEAN PORT**



**565.000**  
DIRECT & INDIRECT JOBS



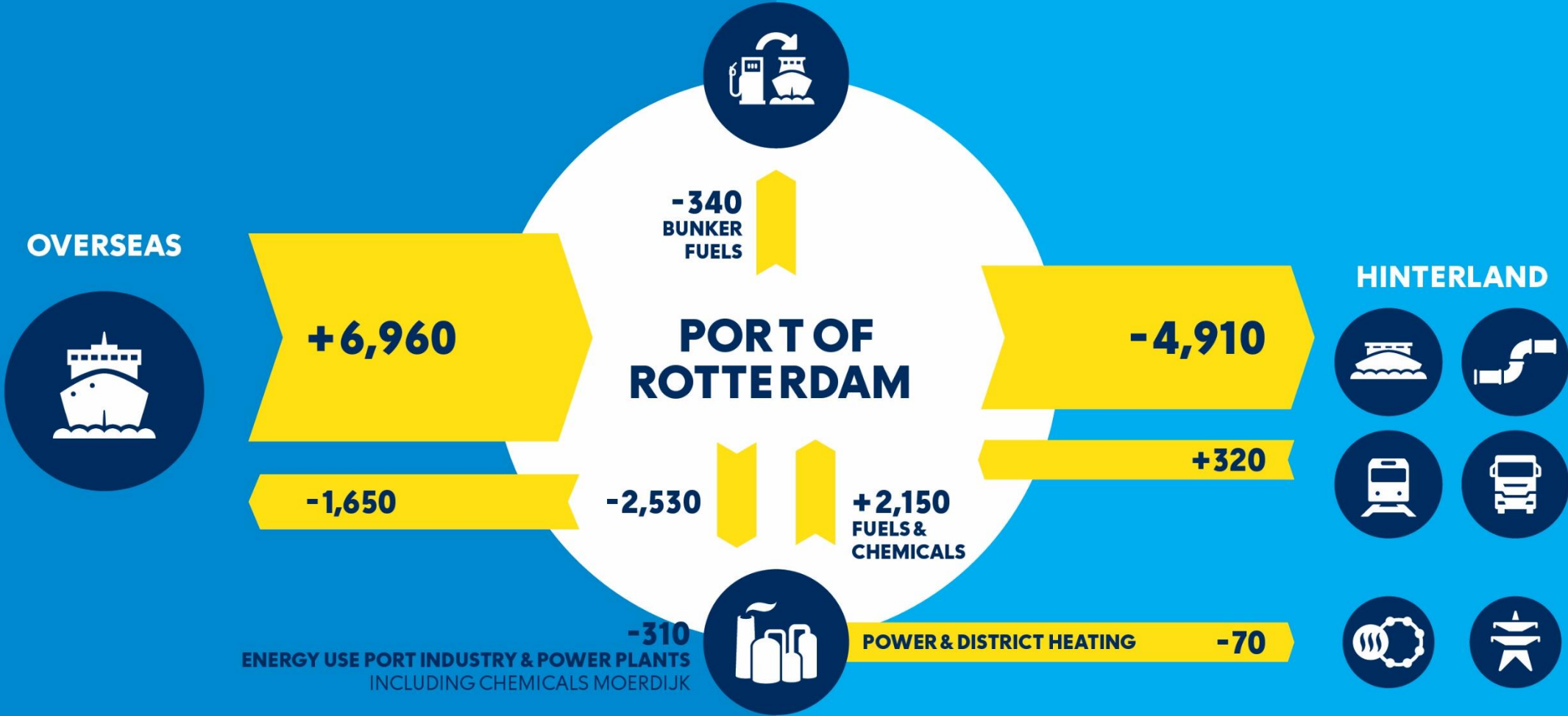


## Mission:

The Port of Rotterdam Authority creates **economic and social value** by working together with clients and stakeholders on the realisation of **sustainable growth** in Rotterdam's world-class port.

# THE PORT OF ROTTERDAM IS AN ENERGY HUB

Numbers in PJ





# THE PORT INDUSTRY IS CARBON INTENSIVE

Crude oil

Oil Products

Coal

LNG

Waste

Biomass



> **30**  
refinery  
processes



> **40**  
petrochemical  
processes



> **70**  
electricity  
generation  
units

Fuel & Feedstock

Products

Natural Gas

Electricity

**14%**

of the Netherlands'  
total CO<sub>2</sub> emissions

# ENERGY TRANSITION: BASED ON 4 PILLARS

PILLAR

**1**

**EFFICIENCY AND  
INFRASTRUCTURE**

PILLAR

**2**

**A NEW ENERGY SYSTEM**

PILLAR

**3**

**A NEW RAW MATERIALS  
AND FUEL SYSTEM**

PILLAR

**4**

**SUSTAINABLE TRANSPOR  
T**

**-55% CO<sub>2</sub> IN 2030**

**CO<sub>2</sub>-NEUTRAL IN 2050**



# ENERGY TRANSITION: BASED ON 4 PILLARS

## PILLAR

# 1

### EFFICIENCY AND INFRASTRUCTURE

- Warmteling
- Porthos (CCS)
- Electricity grid
- Offshore wind
- Hydrogen network
- Delta Corridor

## PILLAR

# 2

### A NEW ENERGY SYSTEM

- Electrification industry; FLIE
- Production green hydrogen (Shell, BP-HyCC, Air Liquide, Uniper)
- H-vision
- Import hydrogen (ammonia, LOHC)

## PILLAR

# 3

### A NEW RAW MATERIALS AND FUEL SYSTEM

- Production biofuels (Shell, Neste, UPM)
- Biomethanol (Gidara)
- Plastic recycling
- Waste-to-jet
- TES battery recycling

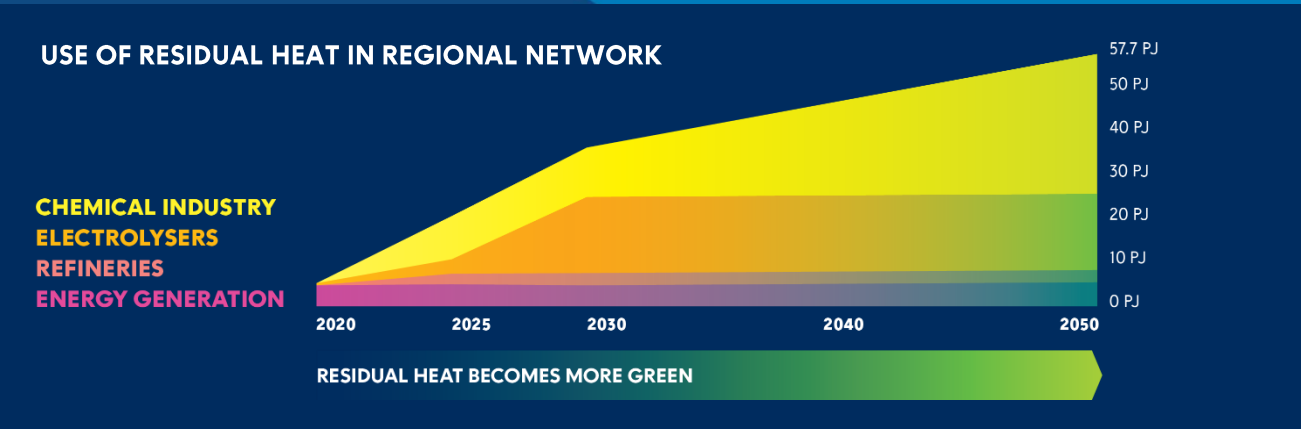
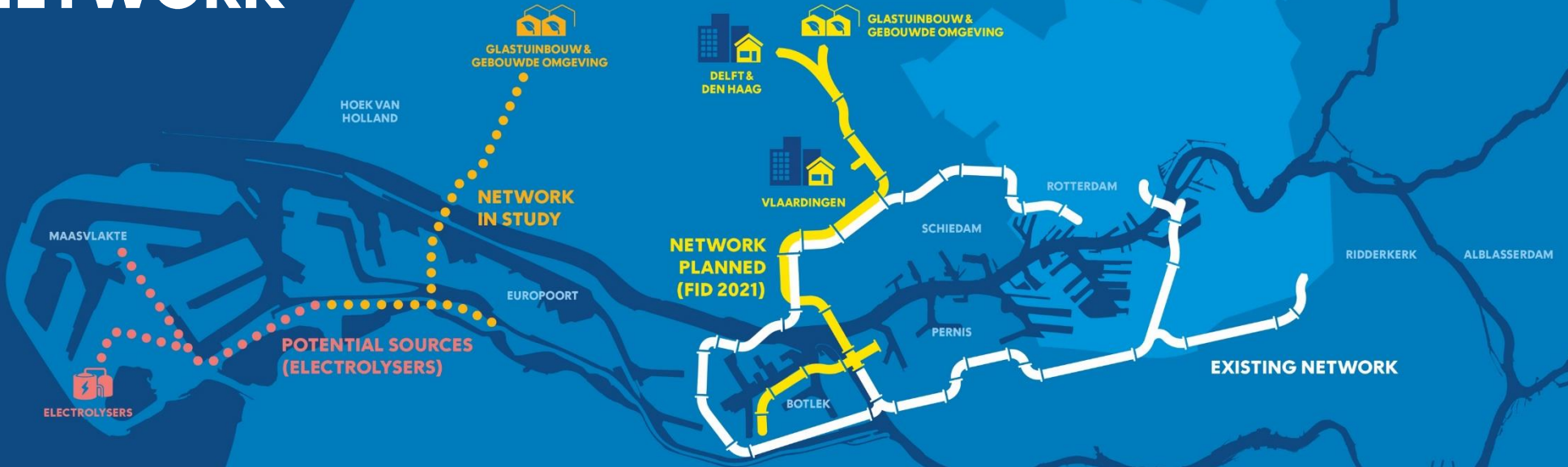
## PILLAR

# 4

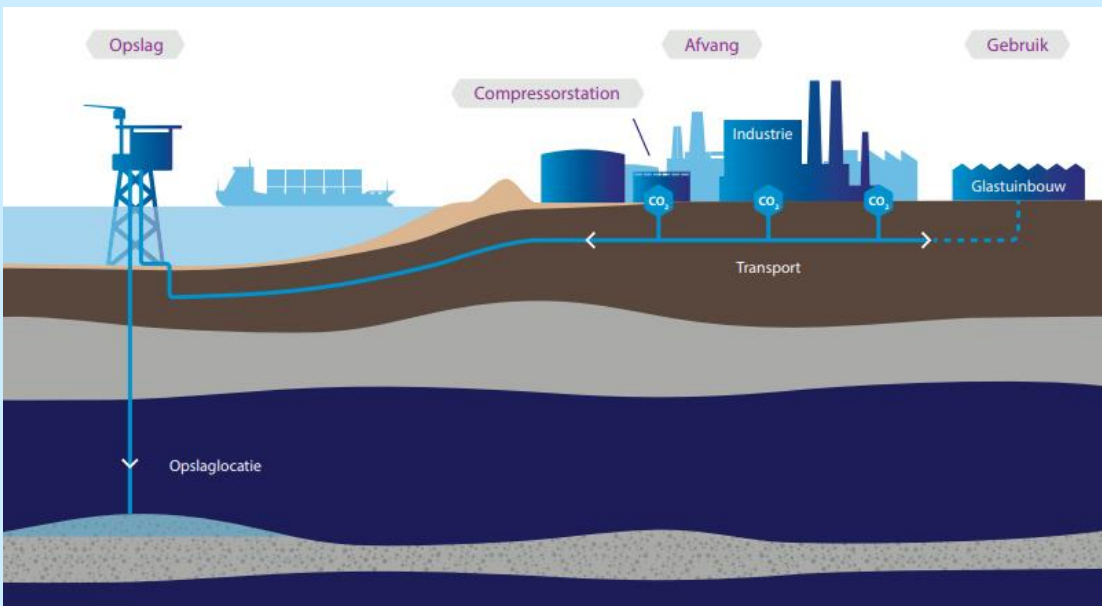
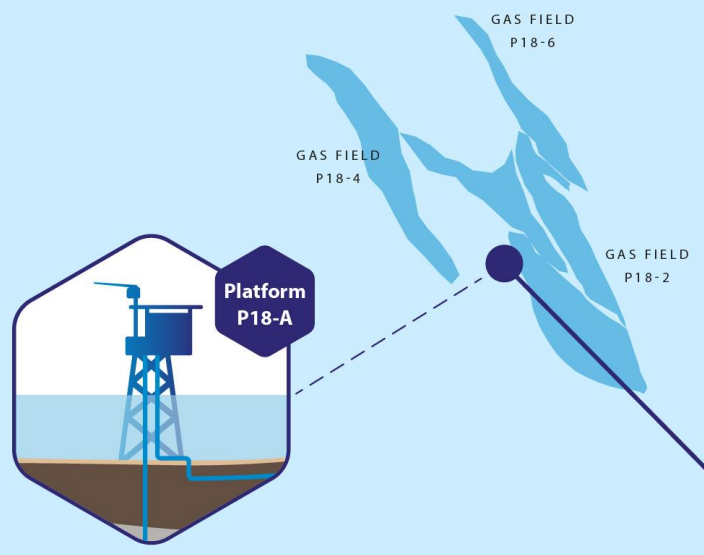
### SUSTAINABLE TRANSPORT

- Zero Emission Services
- RH2INE
- Hytrucks, H<sub>2</sub> fuel station
- Shore power
- Green Corridors
- Digitalisation of logistics

# HEAT NETWORK









# Offshore & Maritime Industry



Sif to produce monopiles for wind turbines at Maasvlakte 2



# CONNECTION WITH WIND FARMS AT SEA









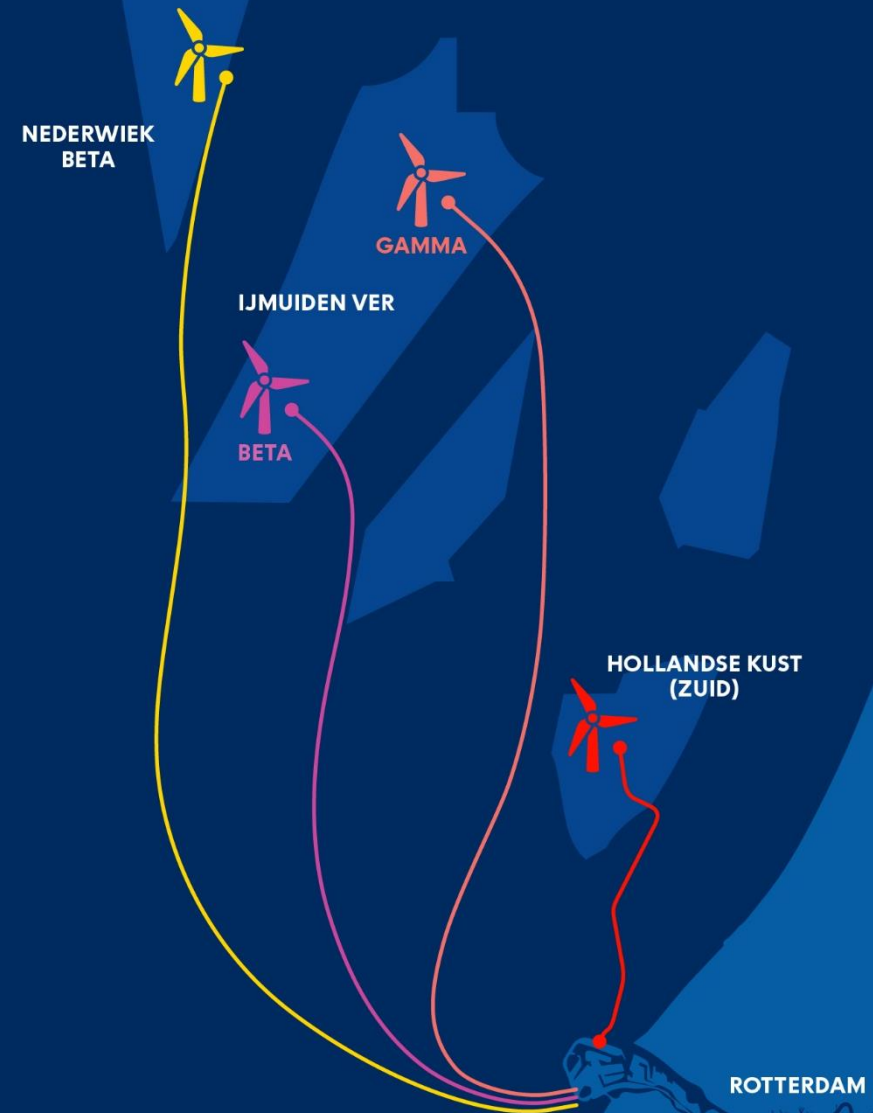
# 7.4 GW WINDFARMS NORTH SEA CONNECTED TO ROTTERDAM

7.4 GW = 35% of all windpower projects in the Dutch part of the North Sea.

These projects are to be realized before 2030.

Consultation with the government about projects after 2030 has started.

WINDFARMS		CAPACITY	OPERATIONAL
Hollandse Kust Zuid		1,4 GW	2023
IJmuiden Ver Beta		2 GW	2029
IJmuiden Ver Gamma		2 GW	No later than 2030
Nederwiek Beta		2 GW	No later than 2030
<b>Total</b>		<b>7,4 GW (H2: 2-2,5)</b>	





# A DEDICATED SITE FOR ELECTROLYSIS



## H-vision

Production of low-carbon hydrogen, mainly from refinery gases, combined with CCS, to decarbonize high temperature processes. First plant in 2027.



PROJECT/COMPANY	ELECTROLYSER CAPACITY	FID	OPERATIONAL
A. H2-Fifty (bp & HyCC)	250 MW	2023	2026
B. Holland Hydrogen 1 (Shell)	200 MW	YES	2025
C. Air Liquide	200 MW	2023	2026
D. X	200 MW	2024	2026
Uniper	100-500 MW	2023	2026-2030

## CONVERSION PARK



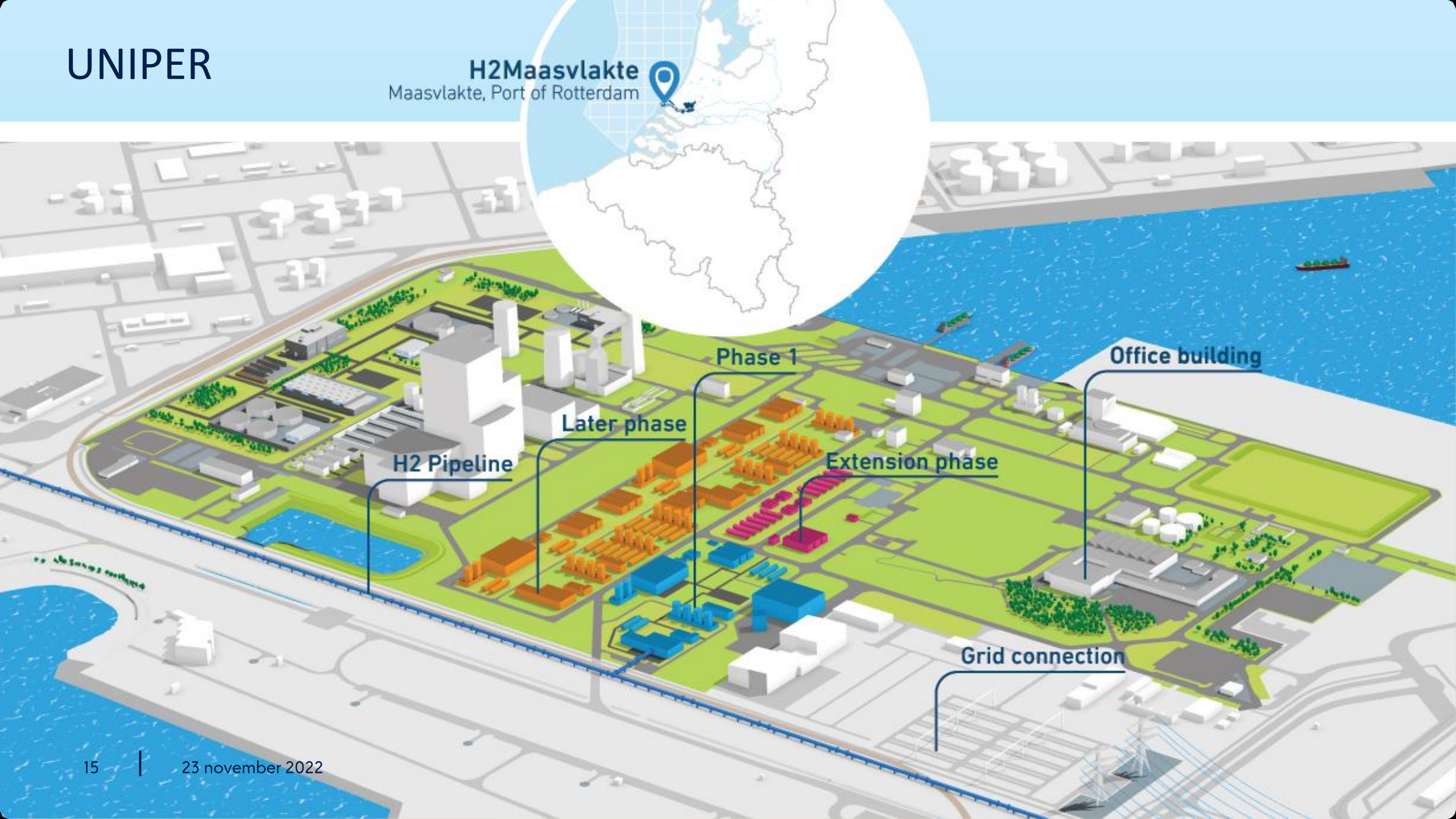






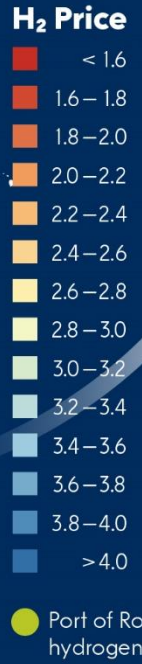
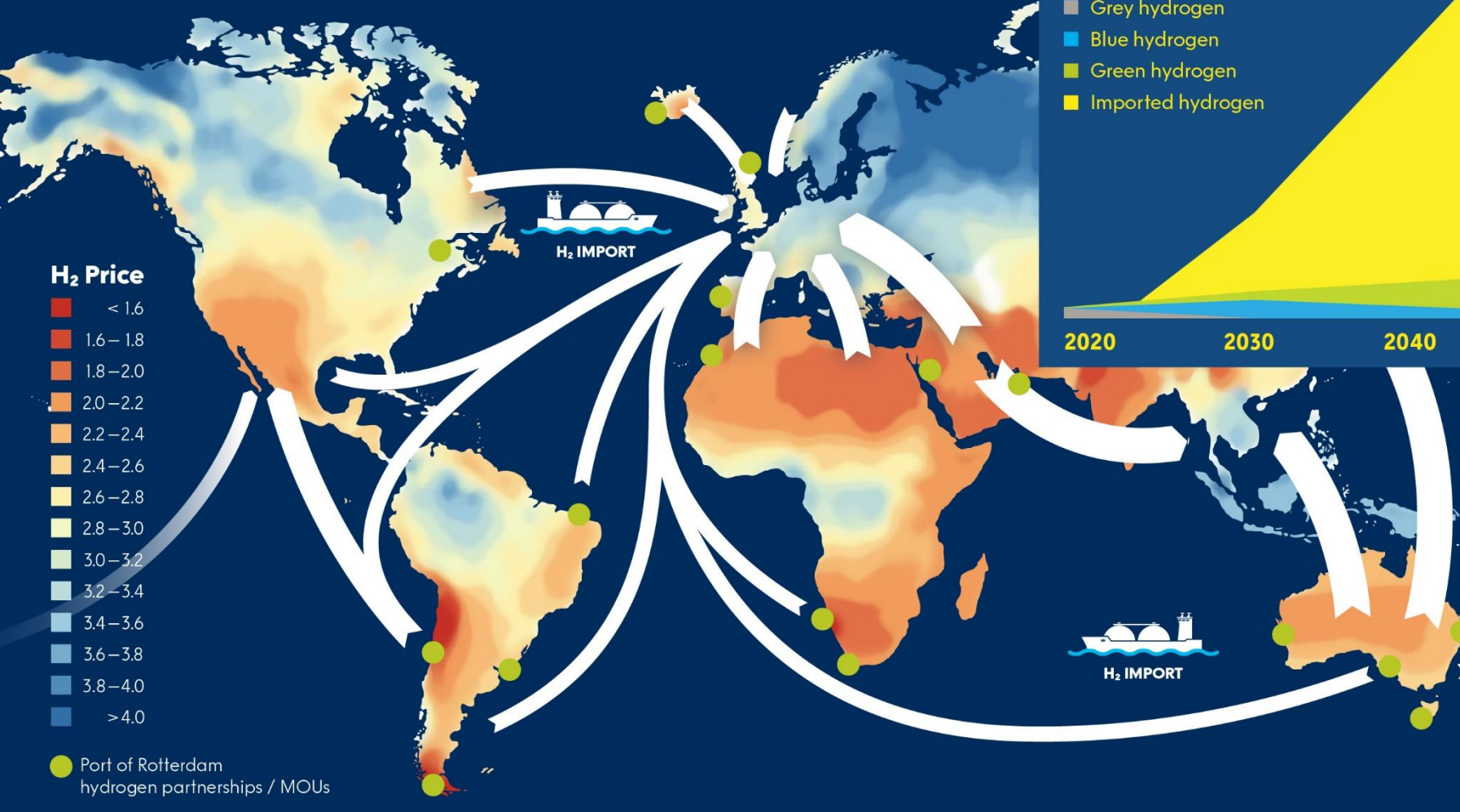
# UNIPER

**H2Maasvlakte**  
Maasvlakte, Port of Rotterdam

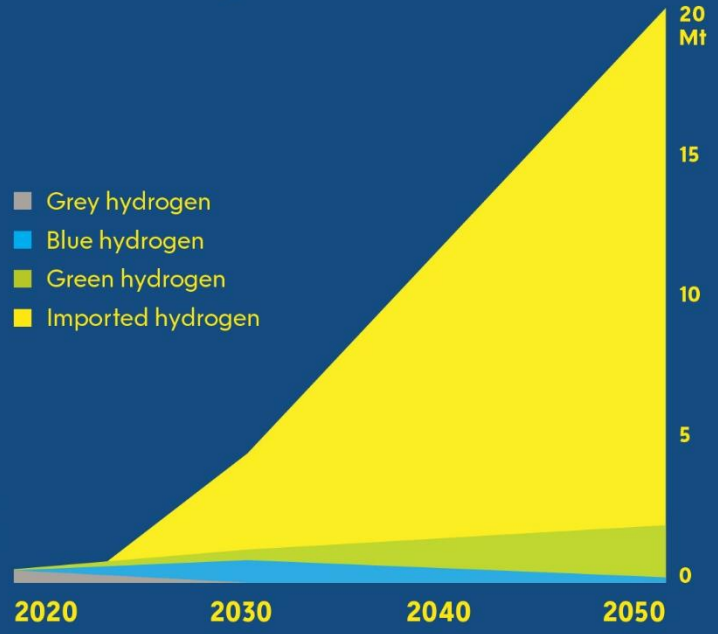




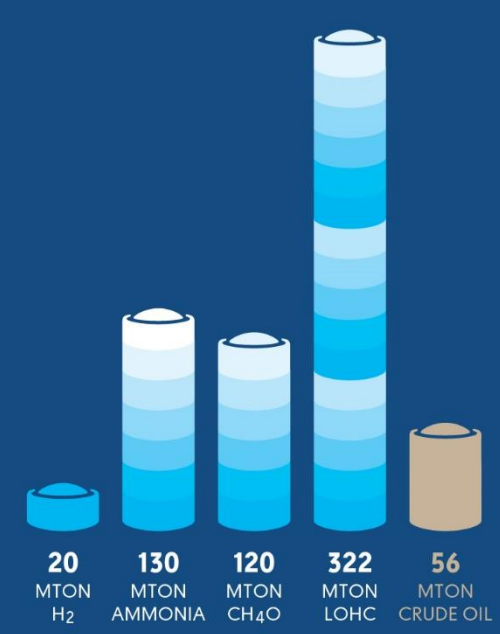
# EUROPE USES MORE ENERGY THAN IT CAN PRODUCE, SO IMPORTS REMAIN ESSENTIAL



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



## WEIGHT



Imports are expected to start around 2025 in Rotterdam.

Hydrogen will come in a range of forms, with different weights and volumes.



# 'ACE' NH3 IMPORT TERMINAL





# NEW INFRASTRUCTURE IS CRUCIAL TO SUPPLY INDUSTRIES WITH HYDROGEN

Right now, Rotterdam supplies a large part of NW-Europe's industries, including North Rhine-Westphalia, with fossil fuels and feedstock.

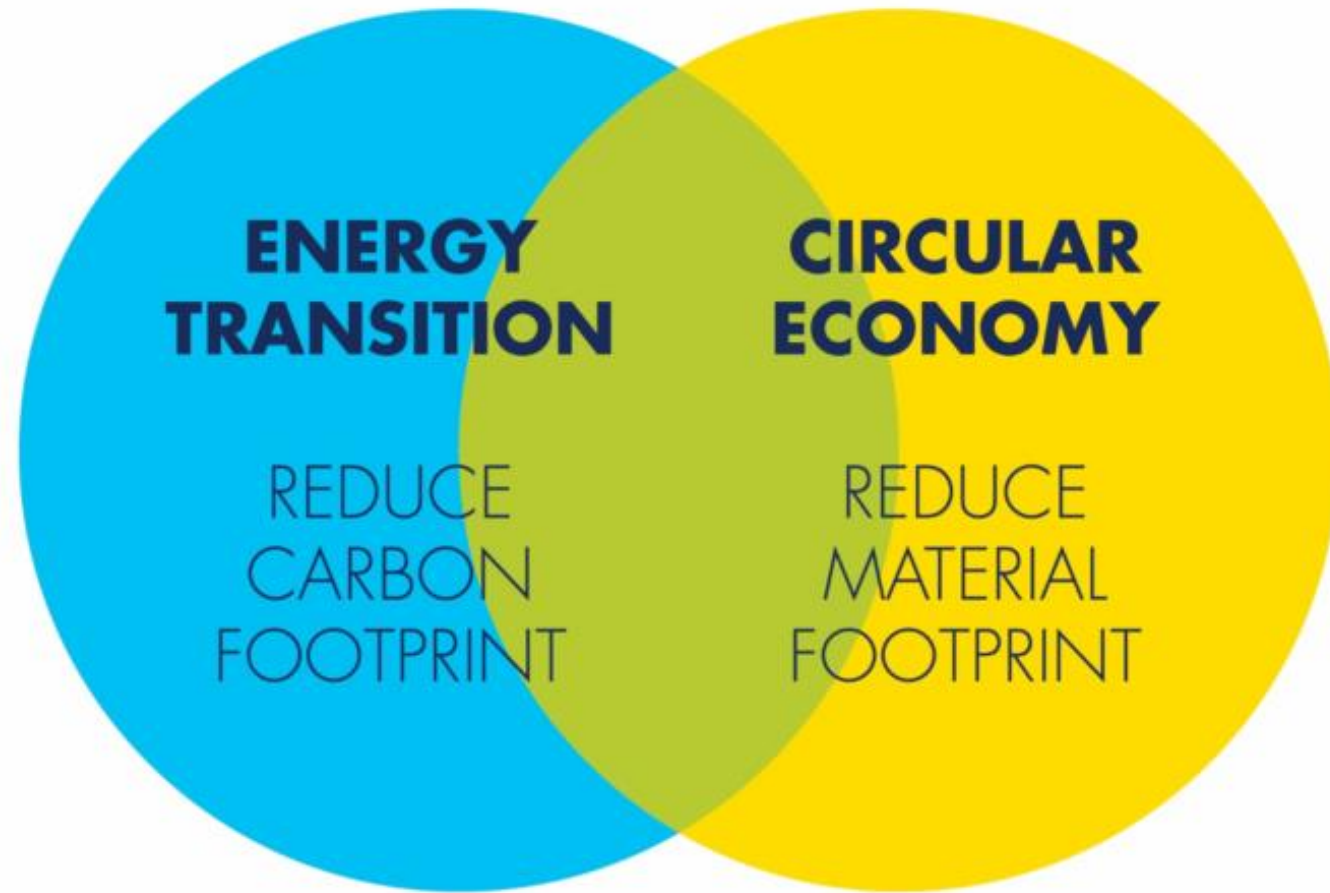
To supply these with the vast quantities of sustainable energy and feedstock needed to decarbonize, new infrastructure like the Delta Corridor has to be developed.

## LEGEND

- Delta Corridor (LPG/propene, butane, CO<sub>2</sub> en H<sub>2</sub>)
- Possible extension Delta Corridor
- HyTransPort.RTM (connected to the Delta Corridor & the Dutch national H<sub>2</sub>-grid)
- Dutch national H<sub>2</sub>-grid (HyWay27)







# 2030 ambition

20% of all fuels and (base) chemicals produced in Rotterdam are based on renewable feedstocks.

Collecting and recycling 2-4 MT pre-sorted plastics to naphta, chemicals and products.













# Waste-to-jet





# CONCRETE PROJECTEN

SHELL



TES



UPM



XYCLE

Xycle bouwt in Rotterdam fabriek voor plasticerecycling



NESTE



WASTE 2 JET



GIDARA

GIDARA kiest Rotterdam voor bouw tweede biomethanolfabriek

PRYME



FID = Final Investment Decision



# OPPORTUNITIES TO CREATE SUSTAINABLE SUPPLY CHAINS

## EFFICIENCY

Lower fuel consumption

## FUEL SHIFT

Sustainable fuels

## MODAL SHIFT

Most sustainable transport mode

## THE CHALLENGE



**DEEPSEA SHIPPING**  
87%

PORT  
3%

HINTERLAND  
10%

HIGHER LOAD FACTOR

SAILING SPEED OPTIMIZATION

PORT CALL OPTIMIZATION

SUSTAINABLE FUELS

HULL CLEANING

SHORE POWER

EFFICIENT SHIP HANDLING

SUSTAINABLE FUELS

COMBINING CARGO

PLANNING OPTIMIZATION

SUSTAINABLE FUELS & PROPULSION

CHOOSING MOST SUSTAINABLE MEANS OF TRANSPORT

HIGHER LOAD FACTOR

GOAL 2050

**A CO<sub>2</sub> NEUTRAL SUPPLY CHAIN**

# OPPORTUNITIES TO CREATE SUSTAINABLE SUPPLY CHAINS

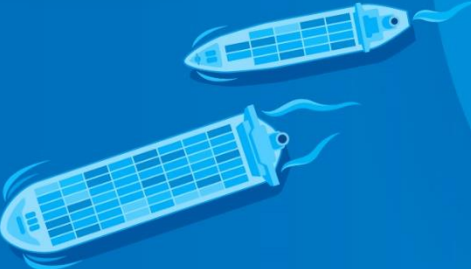
**EFFICIENCY**  
Lower fuel consumption

**FUEL SWITCH**  
Sustainable fuels

## Deepsea Shipping



- Hull cleaning
- Port call optimization
- Green Corridors



## Port of Rotterdam

- HESP
- Shore power
- Bunkering & supply

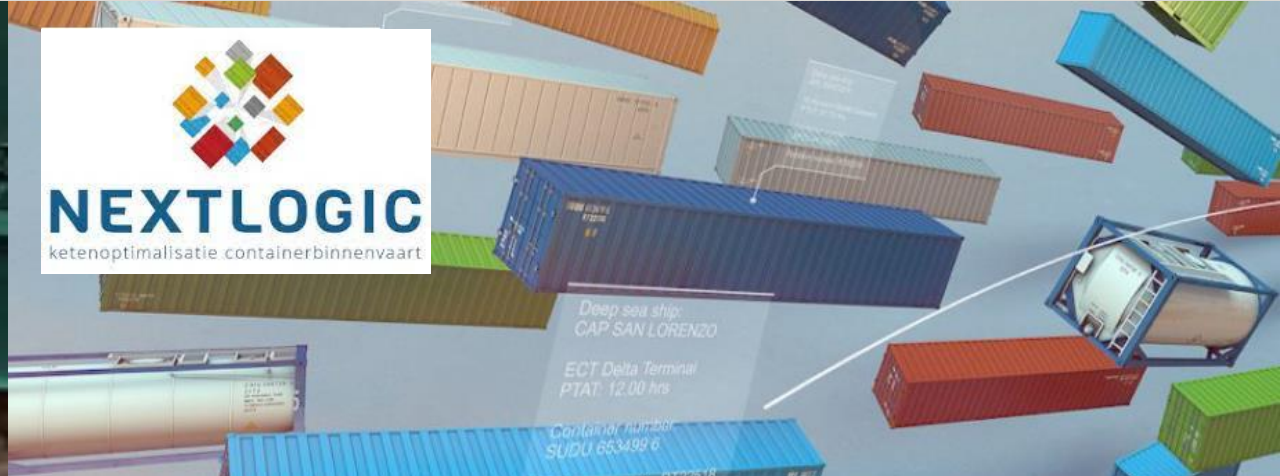
## Hinterland

- Hytrucks
- ZES
- RH2INE


**CO<sub>2</sub>-NEUTRAL IN 2050**



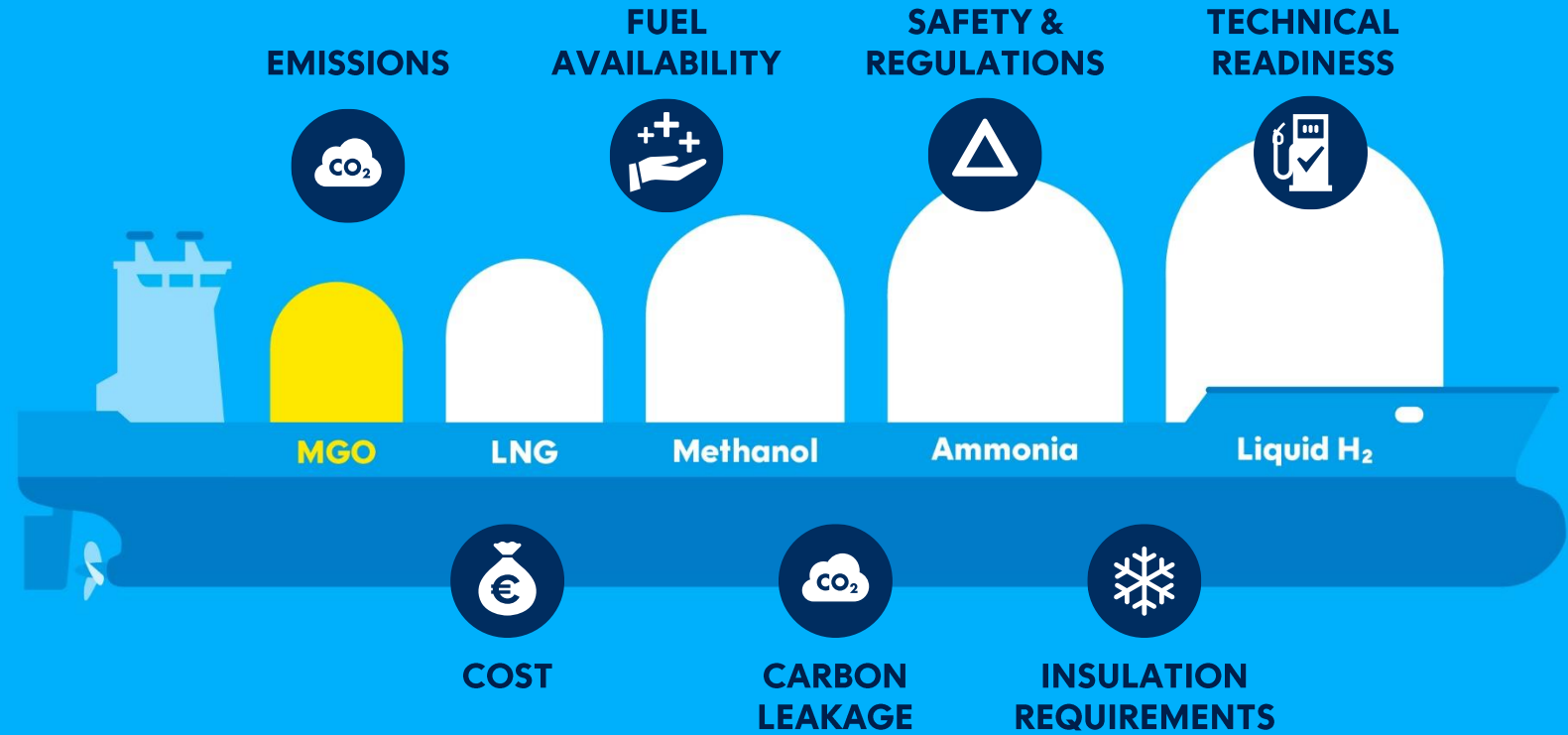
# DIGITIZATION IS KEY TO MAKE MODES OF TRANSPORT MORE EFFICIENT



# The challenges of switching fuels in the supply chain

  
Import & production

  
Bunkering



Volumetric energy density of different fuels



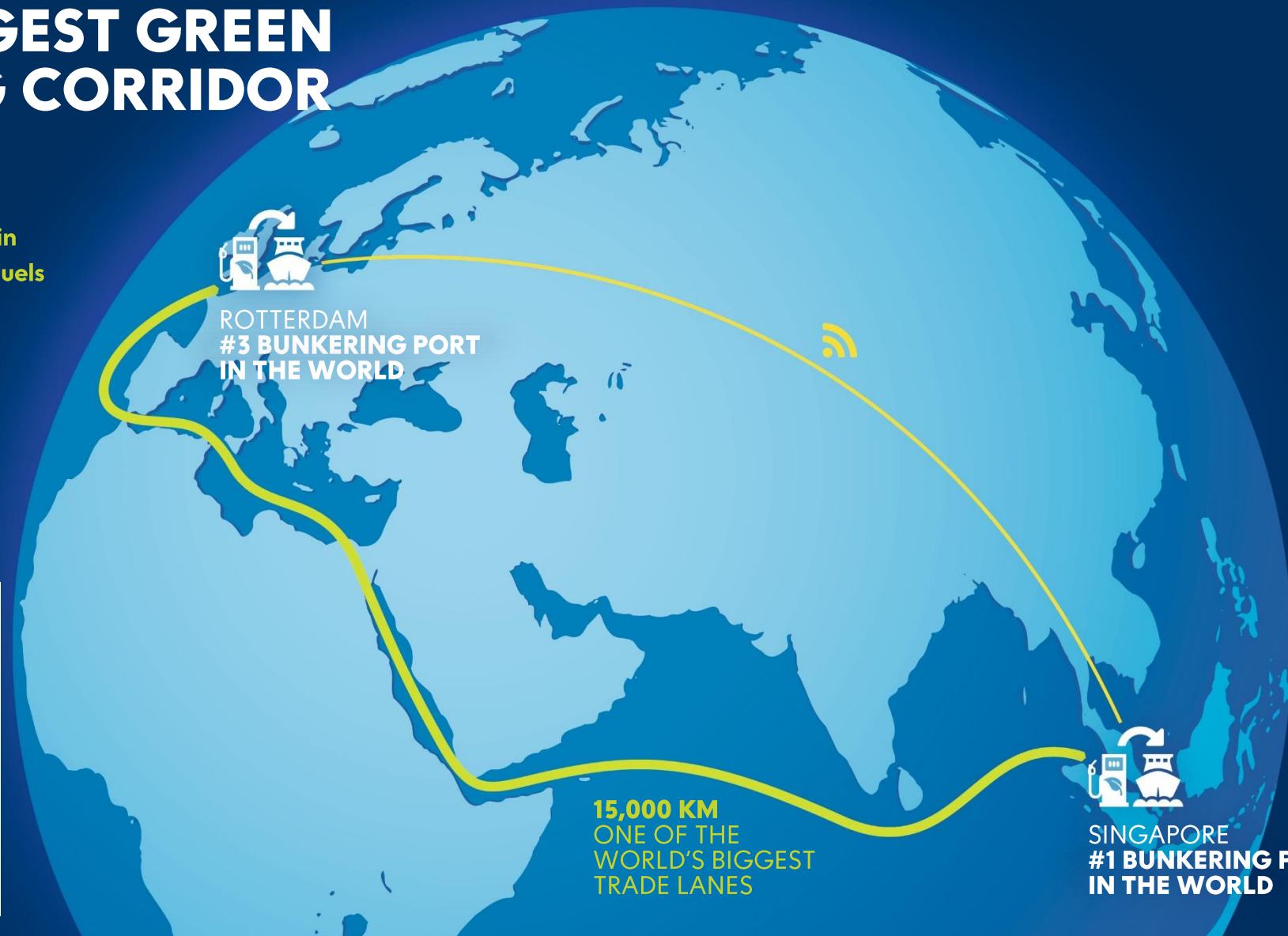
# THE WORLD'S LONGEST GREEN & DIGITAL SHIPPING CORRIDOR

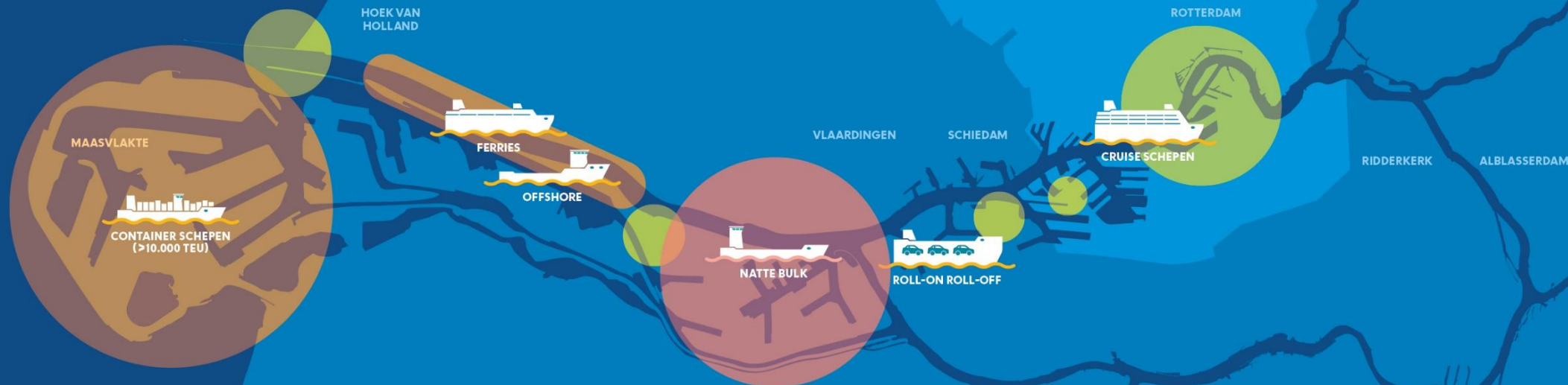
## GREEN CORRIDOR

- Broad coalition of partners across the supply chain
- Joint pilots for bunkering and use of sustainable fuels
- Enabling low & zero carbon shipping

## DIGITAL CORRIDOR

- Create seamless digital tradelane
- Optimize just-in-time sailing
- Improve efficiency, safety and speed





## WALSTROOM

### PIJLER 1

#### KWALITEIT LEEFOMGEVING CENTRAAL

Doel is om in 2030 de publieke kades in stedelijk gebied van walstroom te voorzien met een gebruikspercentage van min. 90%. Ook wordt gekeken naar versnelde invoering van walstroom voor private kades.

### PIJLER 2

#### GROTE STAPPEN WAAR HET KAN

Doel is om in 2030 minimaal 90% van de bezoeken van roll-on roll-off, offshore, ferries en cruiseschepen walstroom te laten gebruiken. Voor de grootste containerschepen (ULCS) ligt het doel op 50%.

### PIJLER 3

#### INNOVATIES EN STANDAARDISATIE STIMULEREN WAAR HET MOET

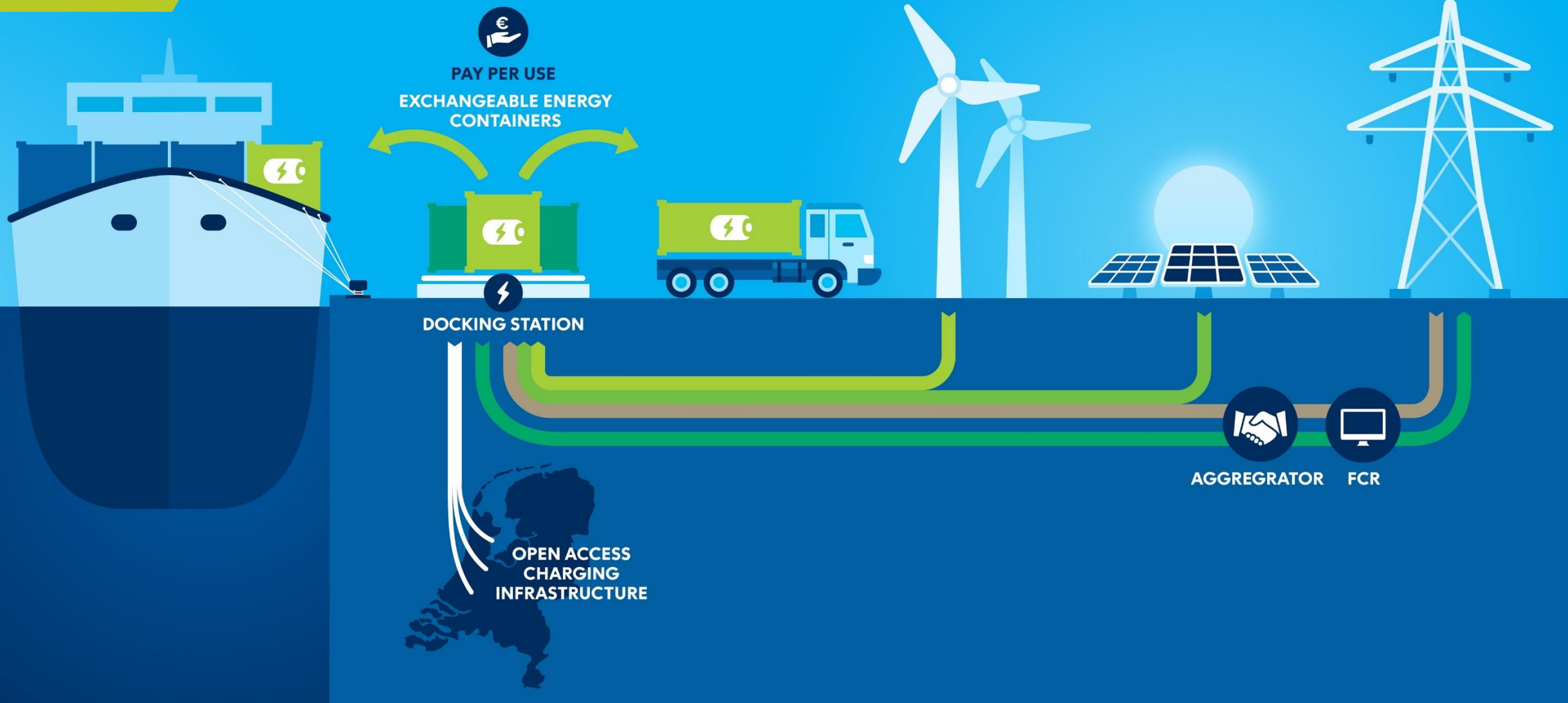
Stimulering van innovatie binnen de meer complexe scheepsegmenten, zoals natte bulk en droge overslag, om walstroom technisch mogelijk te maken.



# FUEL SHIFT

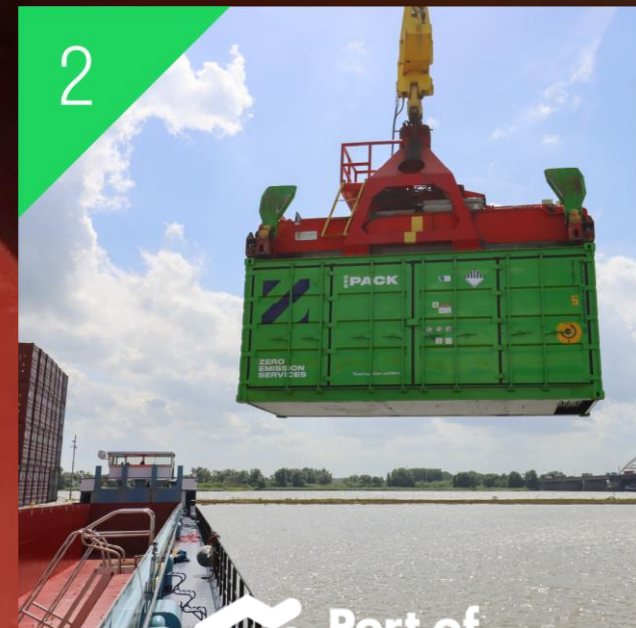
Hinterland

# ZERO EMISSION SERVICES



# ZERO EMISSION SERVICES

Eerste emissievrije  
binnenvaartschip op  
energiecontainers  
in de vaart







# HyTrucks

2025

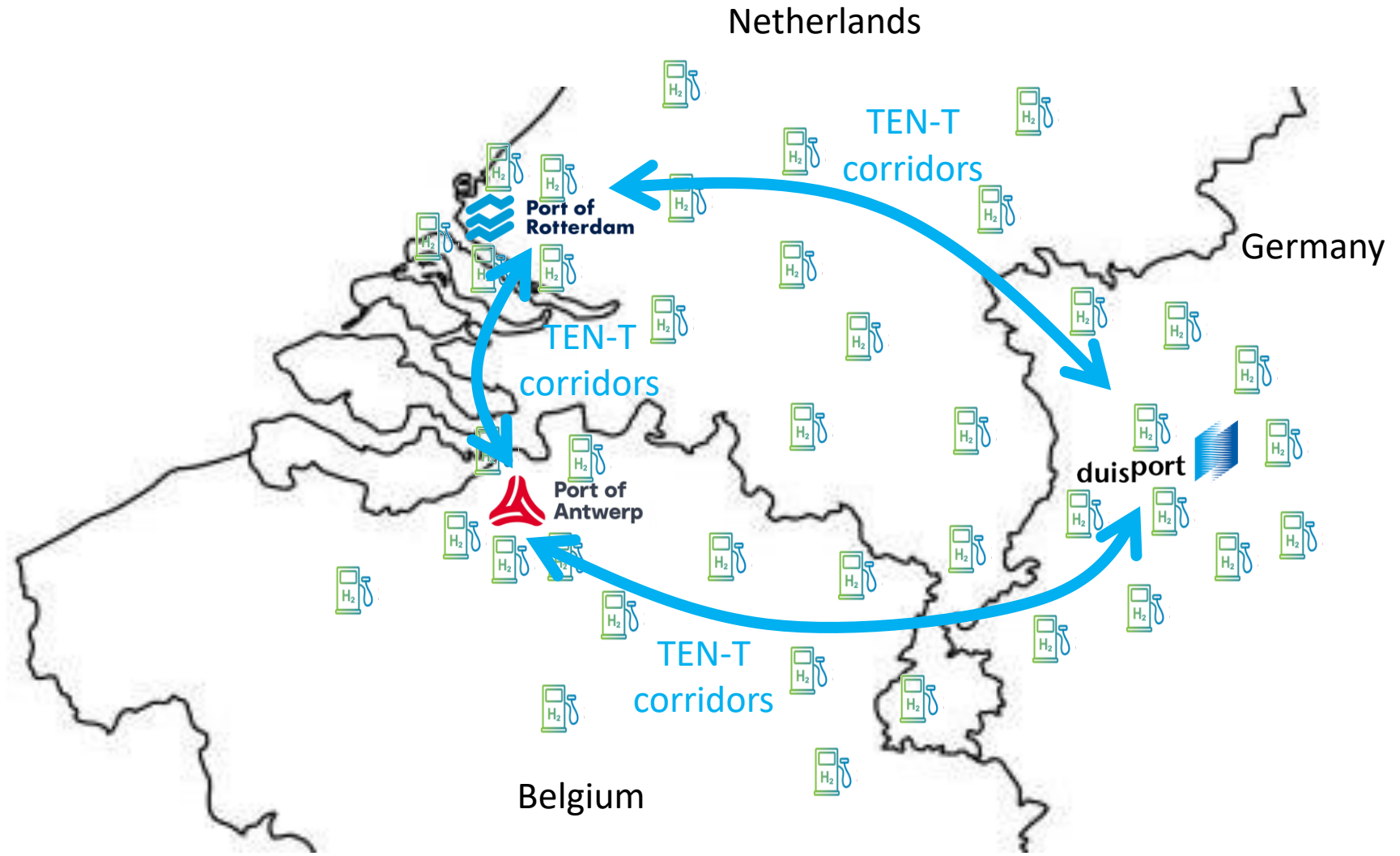
$\text{CO}_2$  - 120.000 ton

Truck icon 1000

$\text{H}_2$  20..25

$\text{H}_2$  40 ton/day

Wind and solar icons 75 MW



# E-TRUCKS AND LOCS



Netherlands' first 50-tonne electric truck

First zero-emission, full-electric shunting locomotives for Port of Rotterdam in production





# Finland's Neste to invest \$2 bln in renewable products refinery in Rotterdam

Reuters  
NEWS | June 16, 2022

Misión de empresas de Países Bajos busca impulsar proyectos de hidrógeno verde en Chile



Reinier Grim  
6 mnd · Bewe

## OCI to expand ammonia import terminal at Port of Rotterdam

## Shell takes FID to build Europe's largest green hydrogen plant

Great ambition of [Port of Rotterdam](#) to import 4.6 Mton #greenhydrogen (which equals 250TWh of green electricity!) by 2030. <https://lnkd.in/ei7sZbxQ>

MARINE

## Zero-emission freight ship uses swappable containers as its batteries

By Nick Lavars  
September 07, 2021



## ACE Terminal: importing ammonia to Rotterdam from 2026

By [Julian Atchison](#) on April 13, 2022

25. Jun. 2021 | 15:57 Uhr | von [Jona Göbelbecker](#)

Projekt Delta Corridor

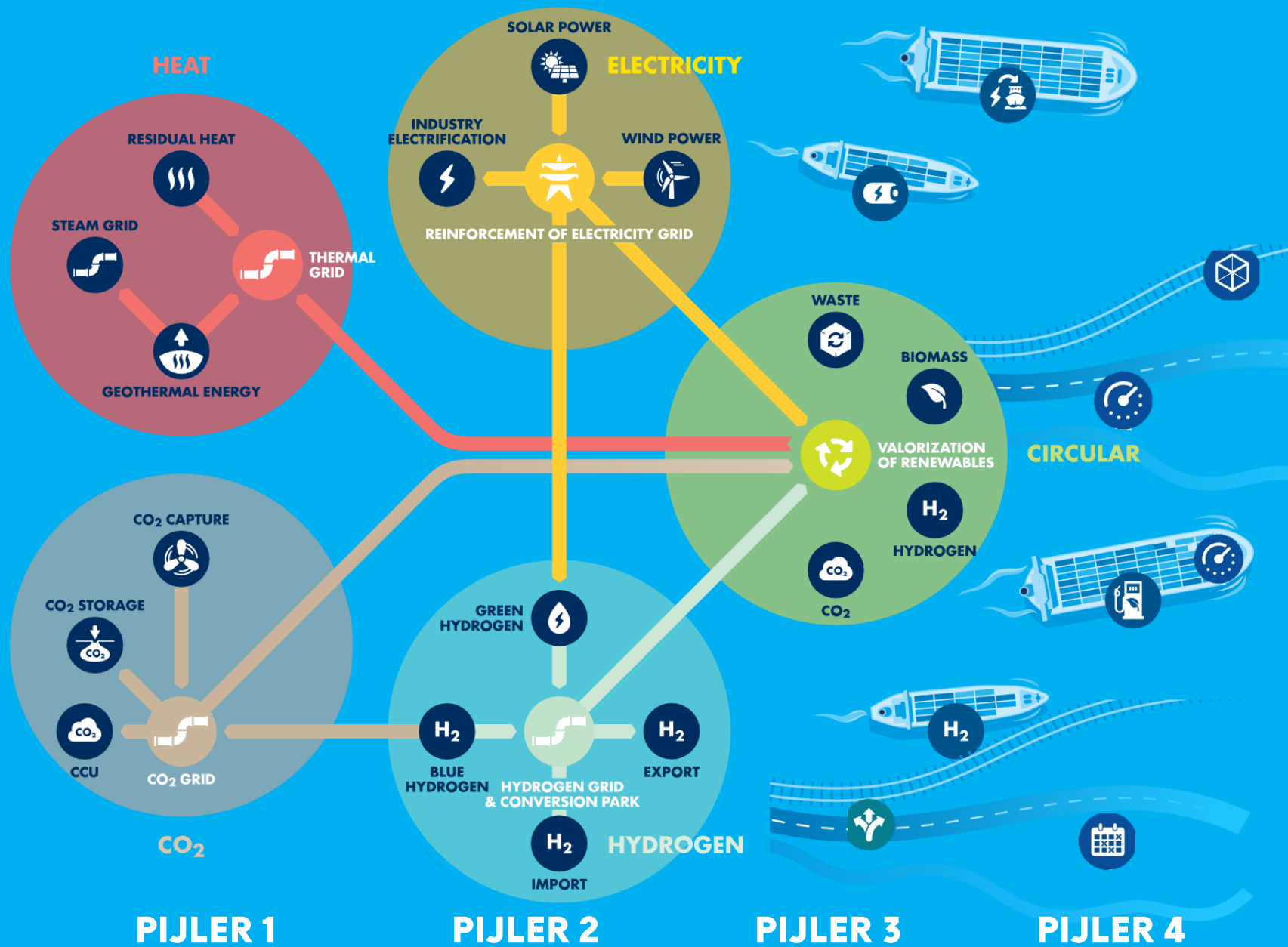
## Neue Wasserstoff-Pipeline von Rotterdam nach Deutschland





**THANK YOU !**





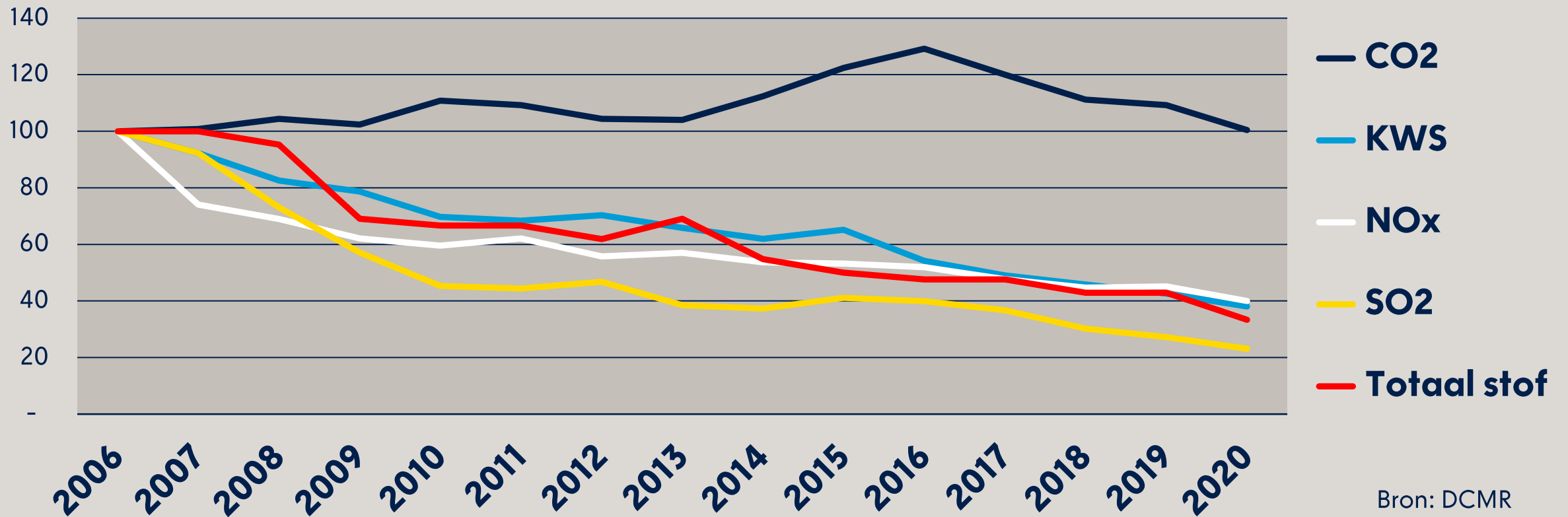
PIJLER 1

PIJLER 2

PIJLER 3

PIJLER 4

# UITSTOOT (FIJNSTOF, SO<sub>2</sub>, NO<sub>x</sub>, KWS) INDUSTRIE 60% GEDAALD IN 15 JAAR



Bron: DCMR

2006 basisjaar



# LOPENDE PROJECTEN TELLEN OP TOT 23 MTON

= 35% VAN HET TOTALE NL CO<sub>2</sub>-DOEL 2030 (65 Mton);  
IMPORT H<sub>2</sub> HEEFT ENORM POTENTIEEL

Pijler	Reductie <u>in</u> de haven	Mton CO <sub>2</sub>	Reductie <u>buiten</u> de haven	Mton CO <sub>2</sub>	Reductie door import waterstof	Mton CO <sub>2</sub>
<b>1</b> EFFICIENCY EN INFRASTRUCTUUR	Energie-efficiency	0,5				
	CCS: Porthos	2,5	Warmteling	0,18		
	CCS: vervolgprojecten	1,5				
<b>2</b> EEN NIEUW ENERGIESYSTEEM	H-vision	1,3				
	Elektrificatie industrie	1,5	Productie groene waterstof	1,3	Import 1-2 Mton waterstof	10-20
	Uitfaseren kolen	4,0				
<b>3</b> EEN NIEUW GRONDSTOFFEN- EN BRANDSTOFFENSYSTEEM	CCU	0,5	Productie hernieuwbare brandstoffen	8,9		
<b>4</b> DUURZAAM TRANSPORT	Walstroom	0,3	ZES (elektrische binnenvaart)	0,36		
	<b>Totaal</b>	<b>12,1</b>		<b>10,74</b>		<b>10-20</b>