

# DECARBONISATION AND THE PORT OF ROTTERDAM: CHALLENGES & OPPORTUNITIES

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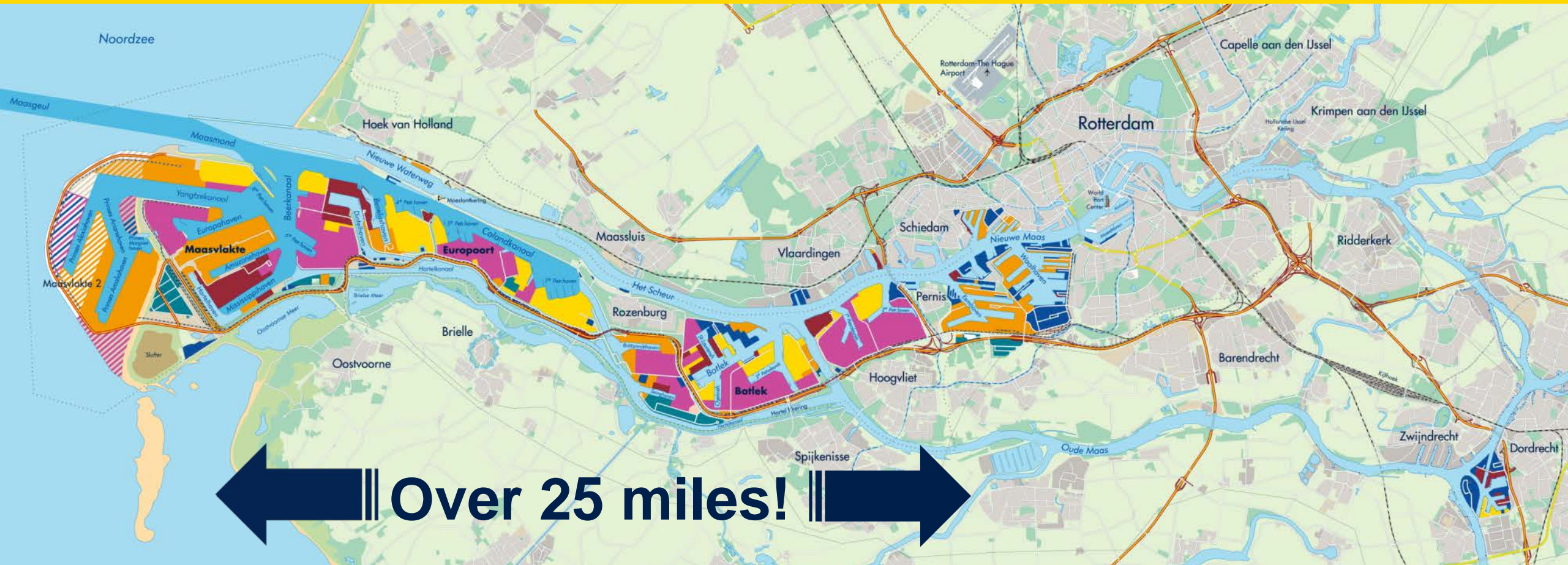
**Caroline Kroes – Port of Rotterdam**

INTERNATIONAL RESEARCH NETWORK FOR LOW CARBON SOCIETIES – Wuppertal, September 7  
2016





# Port and industrial area





# Port areas



Maasvlakte 1



Botlek



Europoort



Maasvlakte 2

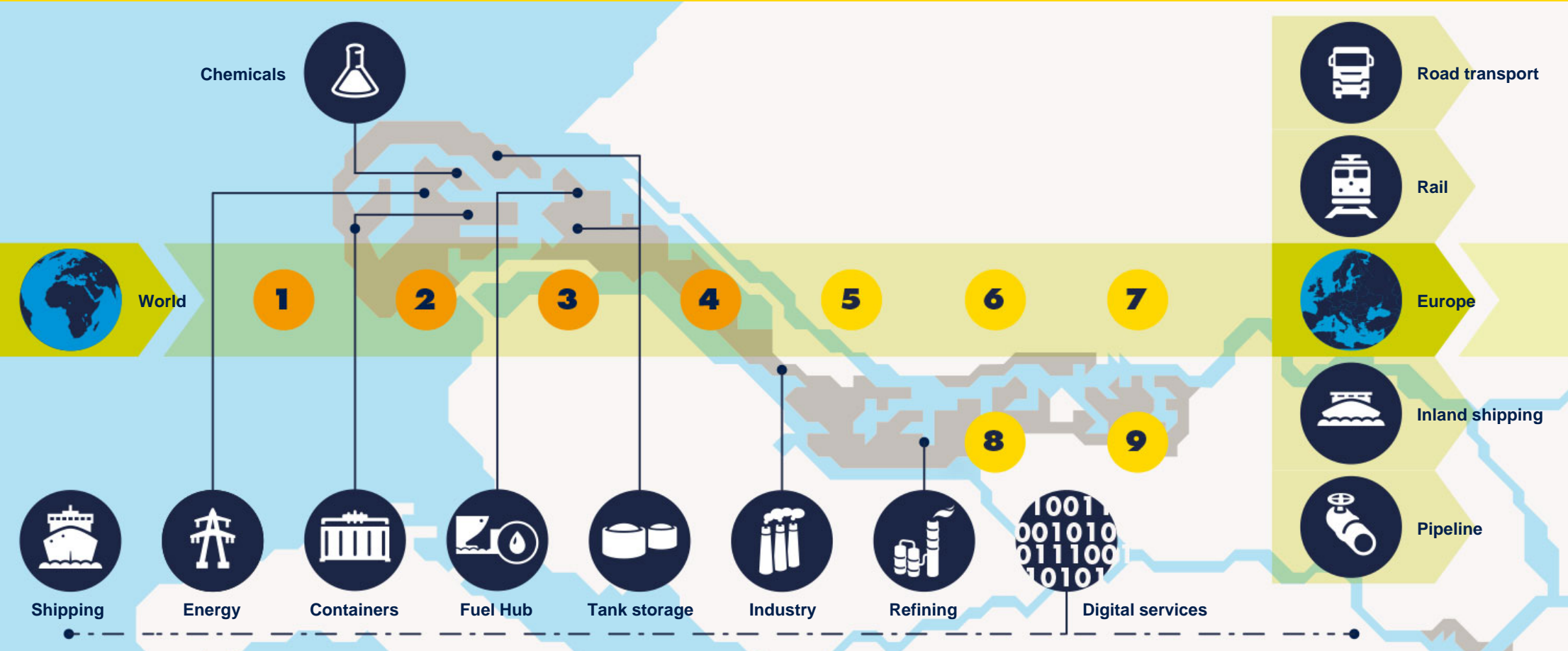




## Mission:

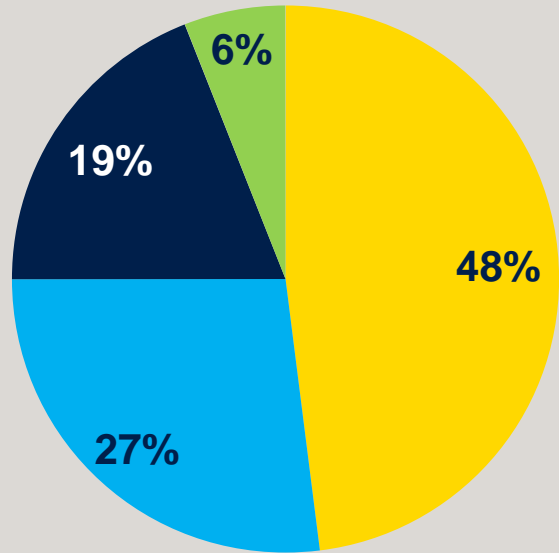
The Port of Rotterdam Authority creates **economic and social value** by working together with clients and stakeholders on the realisation of **sustainable growth** in Rotterdam's world-class port.

# Core tasks of the Port of Rotterdam Authority





# Dominated by fossil fuels and logistics

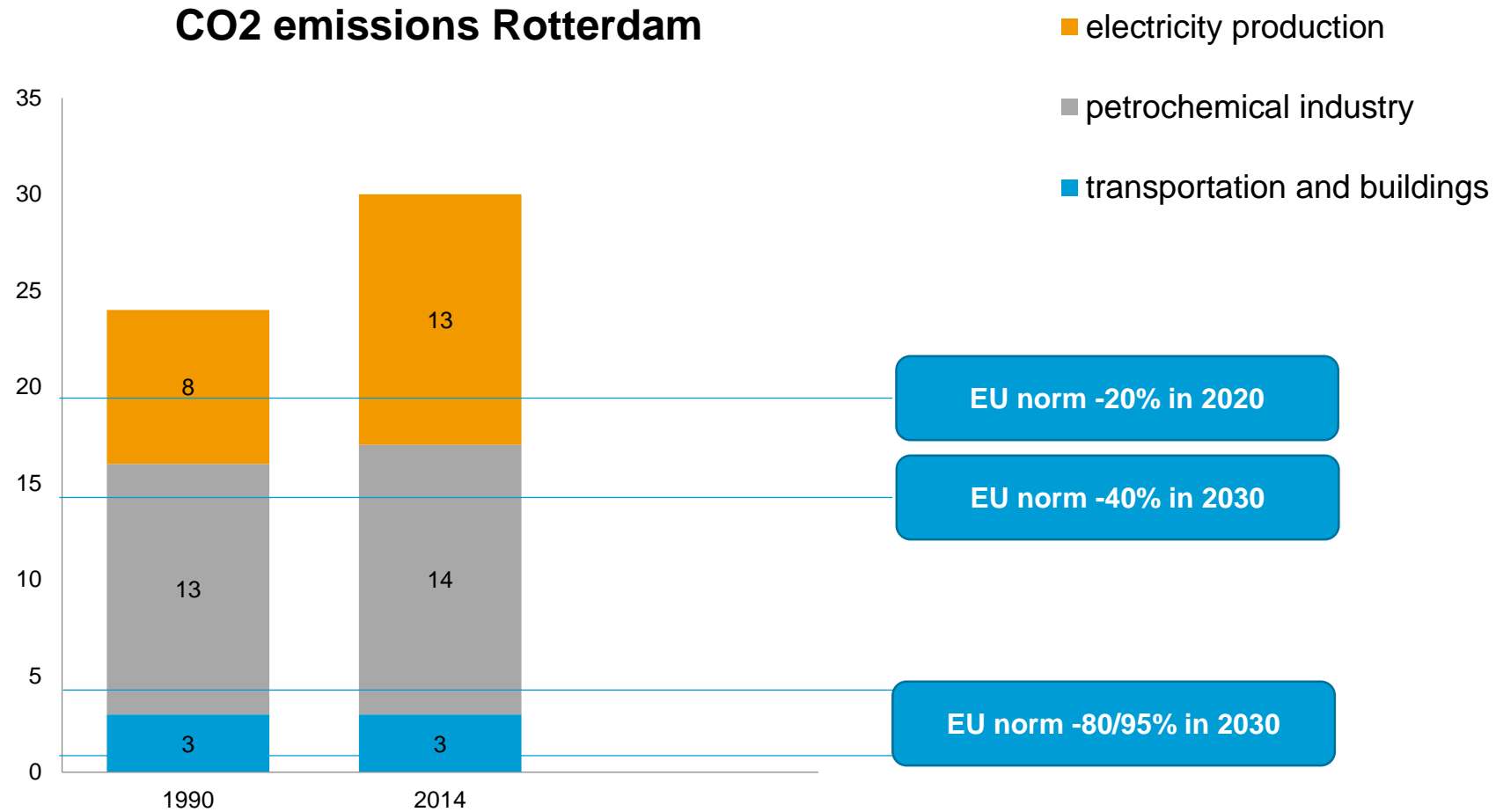


- Liquid bulk
- Containers
- Dry bulk
- Breakbulk

Cargo ratios in 2015



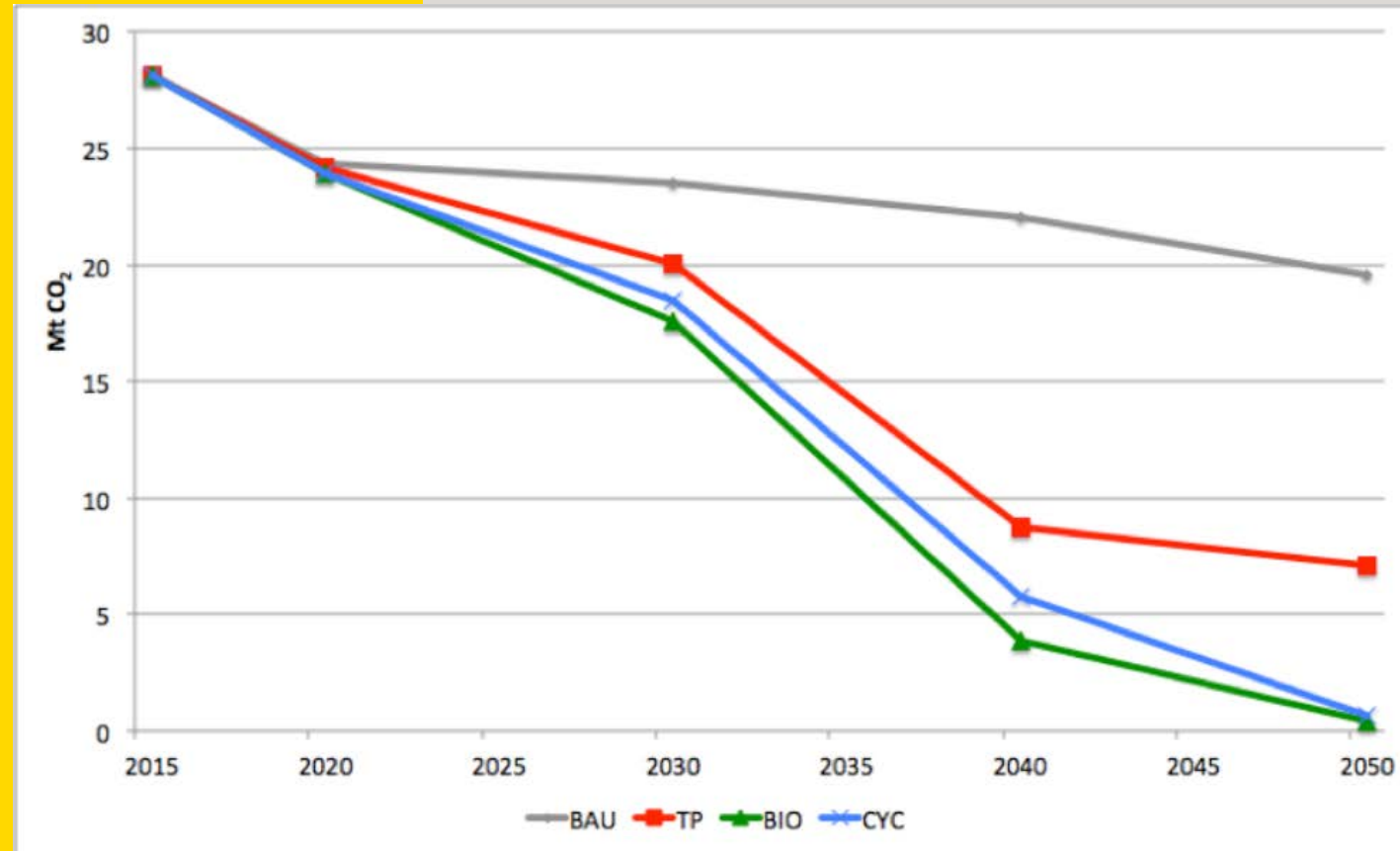
# In Rotterdam 19% of the Dutch CO2 is emitted (17% in the port)



# The Wuppertal Institute designed pathways to 'deep decarbonization'

## Wuppertal report:

- **3 Pathways towards a CO2 neutral port (at least 80-95% CO2 reduction)**
- **No de-industrialization scenarios**
- **The challenge is enormous, but there are various opportunities to decarbonize the port**
- **Business opportunities that result in a 'low-carbon port'**
  - 'Clean fossil'
  - Renewables
- **Next steps: looking for 'coalitions of the willing', position Rotterdam as flagship decarbonization region**





# Overview decarbonization scenarios

Scenario	Reduction	Key Mitigation strategies	Strategy for the cluster	Key changes in market environment by 2050
BAU	-30%	<ul style="list-style-type: none"> <li>• (slow) adoption of BaT</li> </ul>	<ul style="list-style-type: none"> <li>• Efforts focus on keeping cluster in current form</li> </ul>	<ul style="list-style-type: none"> <li>• Decrease in demand for oil refining products</li> </ul>
TP	-75%	<ul style="list-style-type: none"> <li>• Rapid adoption BaT</li> <li>• Some P2H</li> <li>• Coal CCS</li> </ul>	<ul style="list-style-type: none"> <li>• Efforts focus on keeping cluster in current form</li> </ul>	<ul style="list-style-type: none"> <li>• Strong decrease in demand for fossil transport fuels</li> <li>• Phase out of unabated coal</li> </ul>
BIO	-98%	<ul style="list-style-type: none"> <li>• Rapid adoption BaT</li> <li>• P2H</li> <li>• Biomass CCS</li> </ul>	<ul style="list-style-type: none"> <li>• Oil as feedstock for chemicals</li> <li>• Power plants continue with biomass and CCS</li> </ul>	<ul style="list-style-type: none"> <li>• Demand for fossil fuels virtually zero</li> <li>• Phase out coal power generation</li> </ul>
CYC	-98%	<ul style="list-style-type: none"> <li>• Rapid adoption BaT</li> <li>• P2H</li> <li>• Recycled plastics for chemicals</li> </ul>	<ul style="list-style-type: none"> <li>• Recycled plastics are used as feedstock for chemicals</li> </ul>	<ul style="list-style-type: none"> <li>• BIO: large amounts sust. biomass available on world market</li> <li>• CYC: No biomass, but large amount of carbon-free power and/or H2 available</li> </ul>

# CHALLENGES AND OPPORTUNITIES

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# Energy 1: Reduce environmental impact of fossil energy

- Raise energy efficiency
  - Use residual heat (and CO<sub>2</sub>) of industry and coal-fired plants for greenhouse farming and district heating (Cluster West Heat Roundabout)
  - Use residual heat of industry for other industry (Botlek Steam Pipe)
- Carbon Capture & Storage pilot project / ROAD
- Co-firing of biomass in new coal-fired power stations



Botlek Steam Pipe

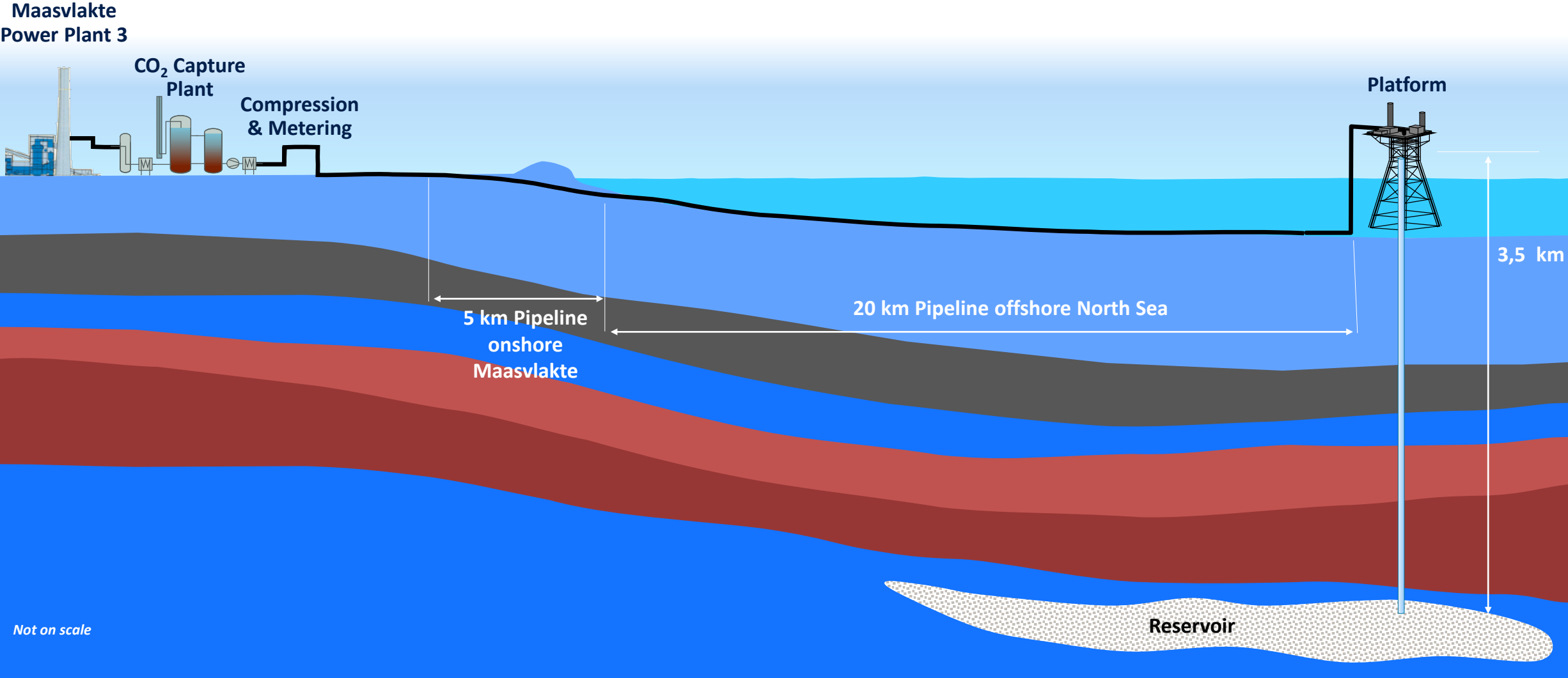
# Energy efficiency: Cluster West Heat Roundabout

- Pipeline between the port - Westland - The Hague: distribution network for greenhouses
- Energy savings: 7.3 PJ per year;
- Reduction in CO<sub>2</sub> emissions: 450 ktons/year;
- Reduction in NO<sub>x</sub> emissions: 2 ktons/year





# Carbon Capture & Storage: ROAD-project



# LNG as a transport fuel





# Energy 2: Develop renewable energy sector

- Rotterdam already has the largest biobased cluster in the world and aims to maintain its position as front-runner

2 biochemical plants; 4 biofuel plants;  
4 palm oil refineries

- Neste to start building biopropane plant (strengthening the biobased cluster)
- Wind turbines and solar panels in the port
- Location of Sif Verbrugge



January 2016: Start of Slufter solar panel test project

# Biobased



Neste to build biopropane plant at Maasvlakte



# Offshore & Maritime Industry



Sif Verbrugge to produce pylons for wind turbines at Maasvlakte 2

# Sustainability: Scope and influence

## Port of Rotterdam Authority



**Influence: ++**  
**Effect: --**

## Port and industrial area



**Influence: +**  
**Effect: -**

## Chain



**Influence: +/-**  
**Effect: ++**



# Sustainability: Port of Rotterdam Authority

- Fleet using low-sulfur fuel
- Use of soot filters and catalytic converters on new vessels
- Three hybrid patrol boats (from 2016 on)
- 'Green' flights and green fleet of cars
- Climate neutral since 2011
- Active nature policy
- Clear assessment framework as basis for air-related measures and sustainability in allocation policy



Low-sulfur fleet

# Sustainability: Port and Industrial area

- Co-siting geared towards energy saving
- Shared use of steam
- ROAD pilot project in the capture and storage of CO<sub>2</sub>
- Residual heat from port used to heat homes and greenhouses in the region
- Voluntary agreement nautical service providers on use of low-sulfur fuel
- Shore-based power for inland shipping and StenaLine Hoek van Holland



Shared use of steam



# Sustainability: Chain

- Modal split demands terminal Maasvlakte 2
- Environmental zone Maasvlakte 2
- Discount for clean ships with Environmental Ship Index (ESI)
- Encouraging clean engines in inland shipping
- Green Award for inland shipping
- Promote use of LNG as a transport fuel
- International cooperation with other ports: World Ports Climate Initiative
- Container Transferium Alblasserdam



Clean engines in inland shipping

# QUESTIONS?

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