CLIMATE CHANGE PROGRAMME @ PORT OF ROTTERDAM

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SFSLD Conference, November 19th 2025

Port of Rotterdam

PORT OF ROTTERDAM

3.000 companies

91.000 barges

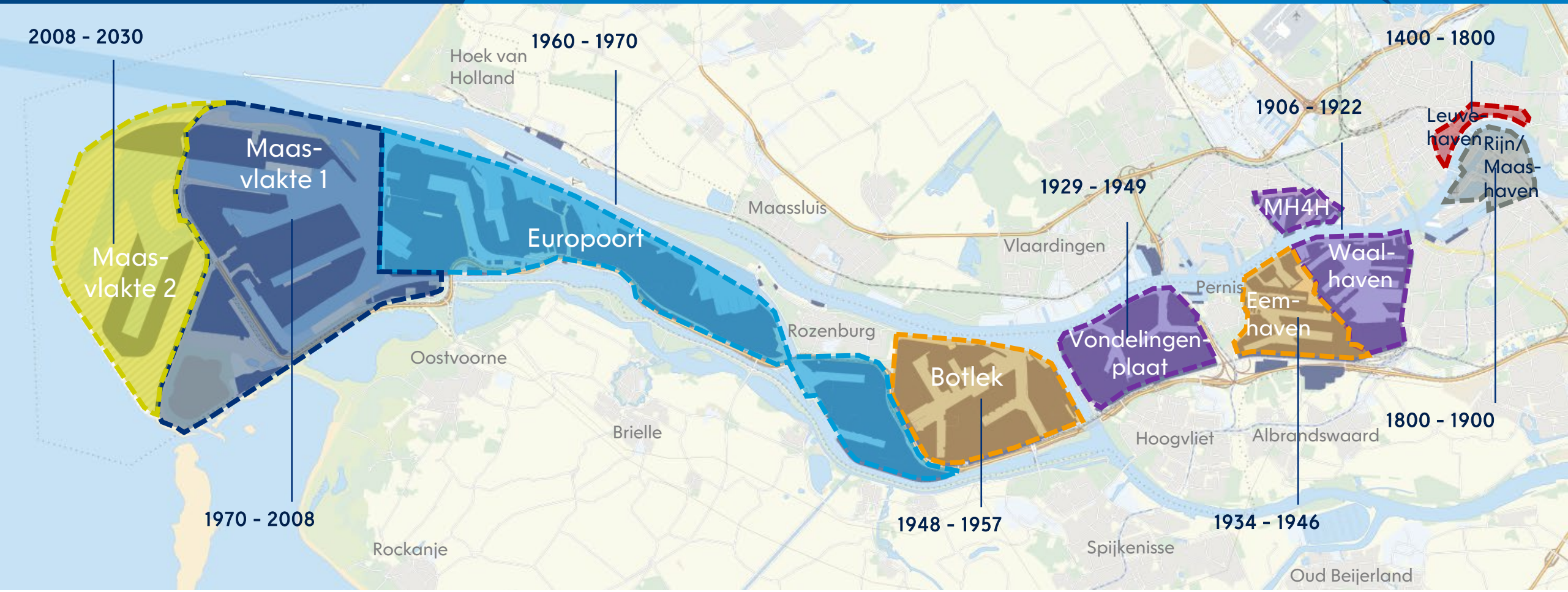
28.000 sea going vessels

2,9% of GDP

192.000 direct & indirect jobs

Port area 12.500 ha

DEVELOPMENT OF THE PORT OF ROTTERDAM



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CHALLENGES IN THE SUPPLY CHAIN

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CLIMATE ACTION ENERGY TRANSITION

- EFFICIENCY AND INFRA-STRUCTURE
- A NEW ENERGY SYSTEM
- A NEW RAW MATERIALS AND FUEL SYSTEM
- SUSTAINABLE TRANSPORT

-55% CO_2 IN 2030
[COMPARED TO 1990]

CO_2-NEUTRAL IN 2050

CLIMATE MITIGATION

- SEA-LEVEL RISE
- EXTREME WEATHER
- FLOODING
- SALT INTRUSION
- DROUGHT
- RAINFALL
- HEAT
- WIND

26 ISSUES

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CLIMATE CHANGE IMPACT ON PORT OF ROTTERDAM

1. River discharge

2. Freshwater supply

3. Flood risk management

Extreme rainfall

Safe navigation

Safe mooring

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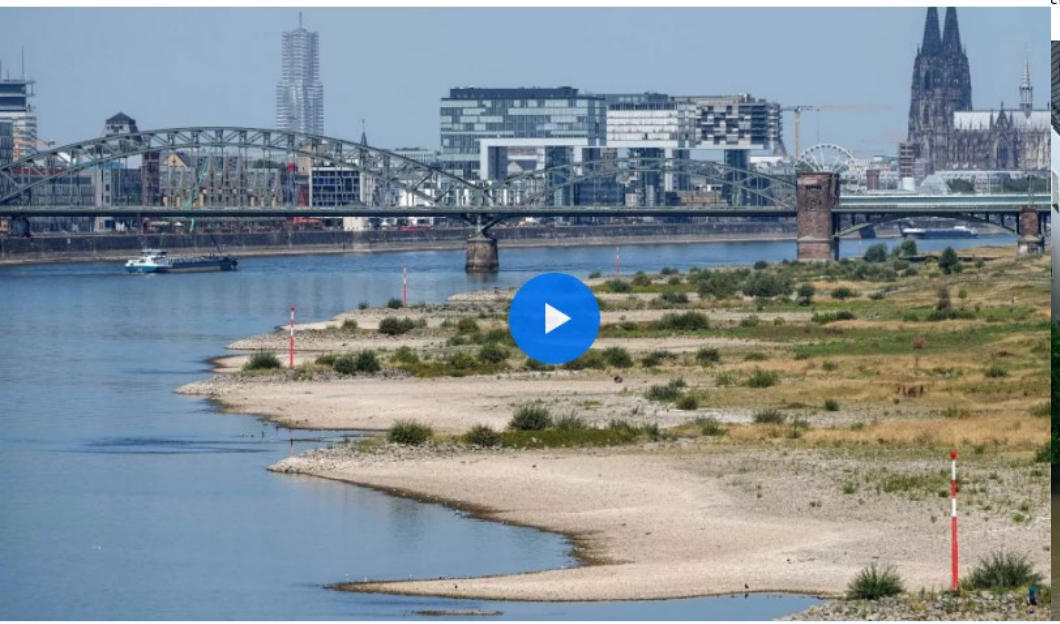
1. RIVER DISCHARGE: EXTREME WEATHER AND INLAND NAVIGATION

Extremes require more resilient logistics & climate change adaptive infrastructure (dredging, bridge heights)

Drought in Europe: Shipping threatened in Germany as Rhine water levels continue to drop



Rhine remains closed to ship traffic due to high water levels

The transport of goods on the Rhine is suspended in southern Germany, where the water is so high that ships cannot pass under the bridges.

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1. LOW RIVER DISCHARGES

- Rotterdam perfectly linked to European inland waterways
- Rhine River faces dry summers and wet winters more often
- Lower river discharges will decrease cargo capacity
- Recent events in 2018 and 2022 caused disruption of inland shipping.
- Economic costs in 2018 > €2.8 billion, mainly due to production losses in industries along the Rhine
- Our approach:
  - Improving predictions of low river discharges
  - Timely informing the inland shipping cargo chain
  - Development of a long-term strategy for maintaining waterways → required at international/EU level.
  - Development of alternative transport options

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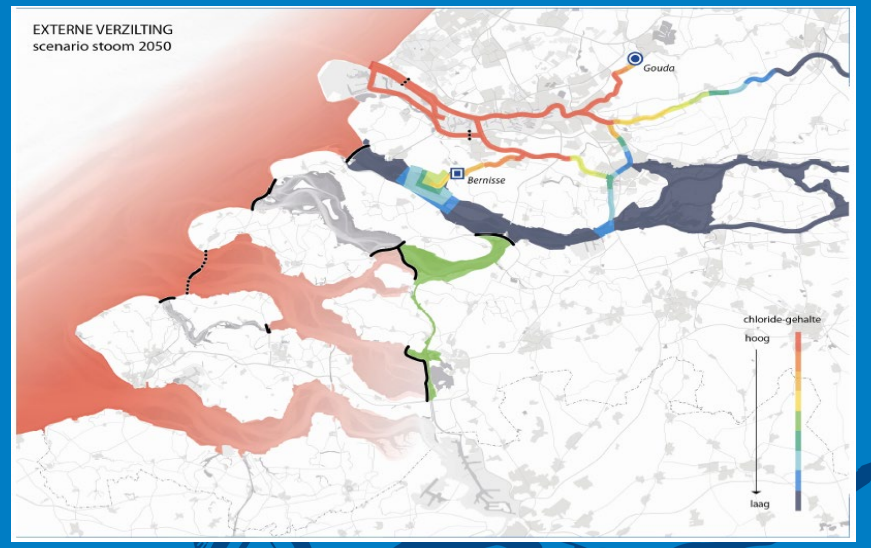
2. FRESH WATER SUPPLY

- Fresh water = key asset for port industry (43 port companies). The energy transition will increase this number
- Main intake from lake: Brielse Meer, also agricultural and residential use
- Under pressure due to penetration of salt water from sea due to SLR and low river discharges
- Optimizing water management: improved monitoring system and additional water inlet
- Together with Water Boards and Evides Industrial Water we lobby for upstream measures



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3. FLOOD RISK MANAGEMENT

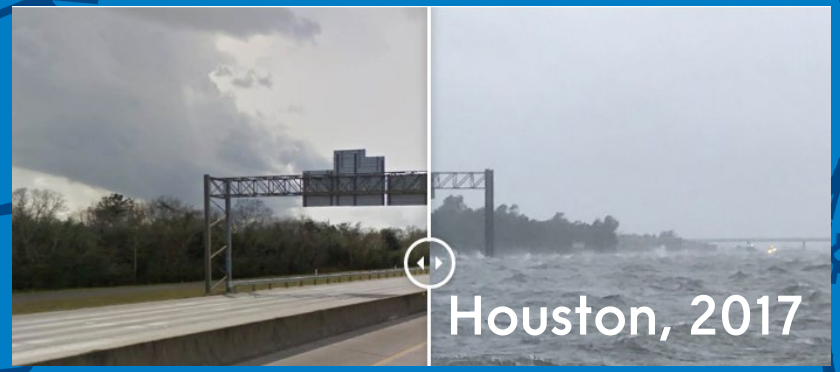
A. Flood Risk Adaptation Strategies (presented at 1st and 2nd SFSLD Conference)

B. Recent projects

C. Regional Strategy → impact on Port of Rotterdam

D. Adaptability of our strategies for 2 m sea level rise

E. Future challenges & current activities



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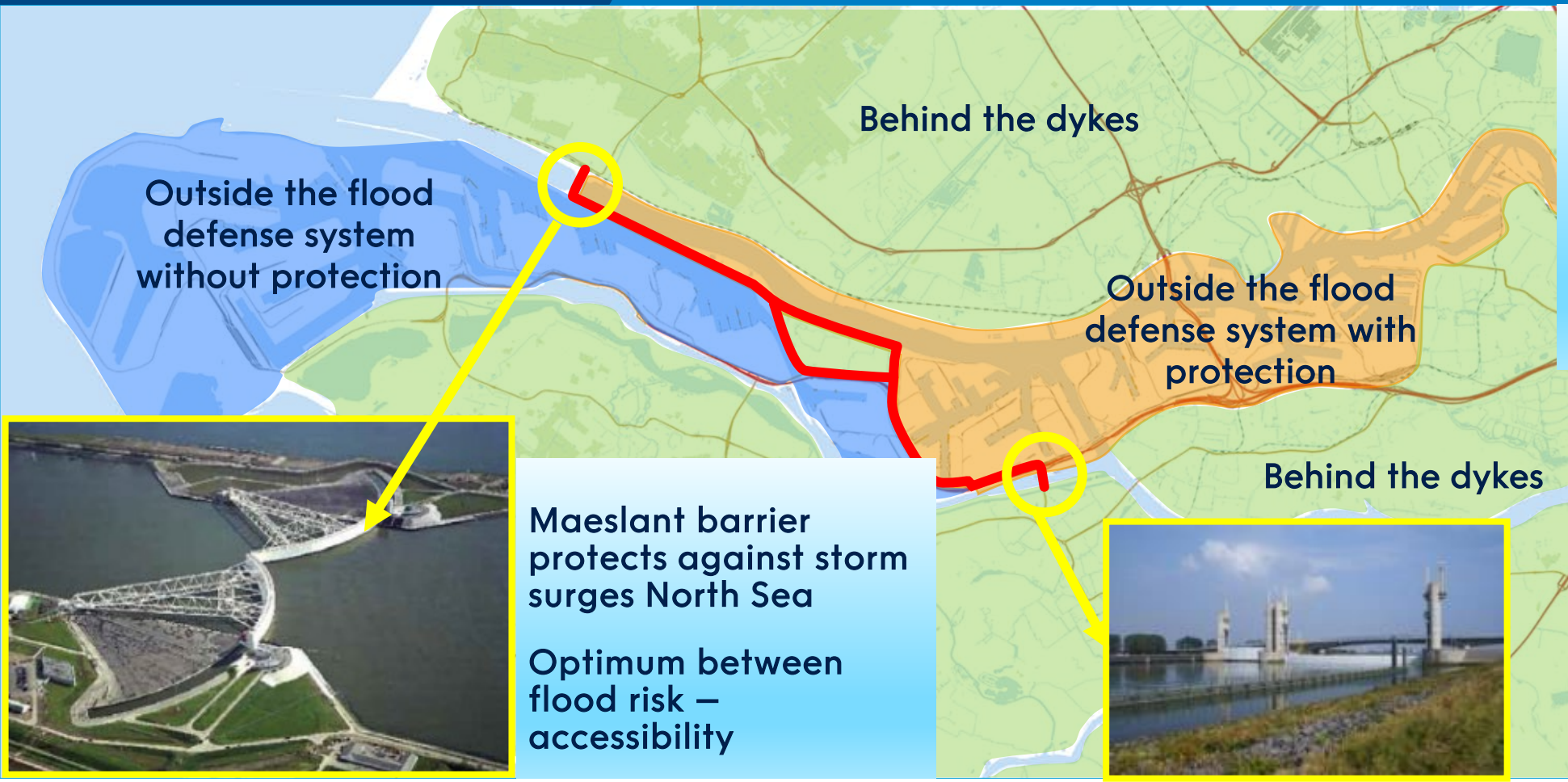
3A. CURRENT SITUATION



Port above sea level:

Maasvlakte	± 5,0 m
Europoort	± 5,5 m
Botlek	± 4,5 m
Vondelingenplaat	± 3,4 m
Waal- / Eemhaven	± 3,3 m

Maeslant barrier protects against storm surges North Sea

Optimum between flood risk – accessibility

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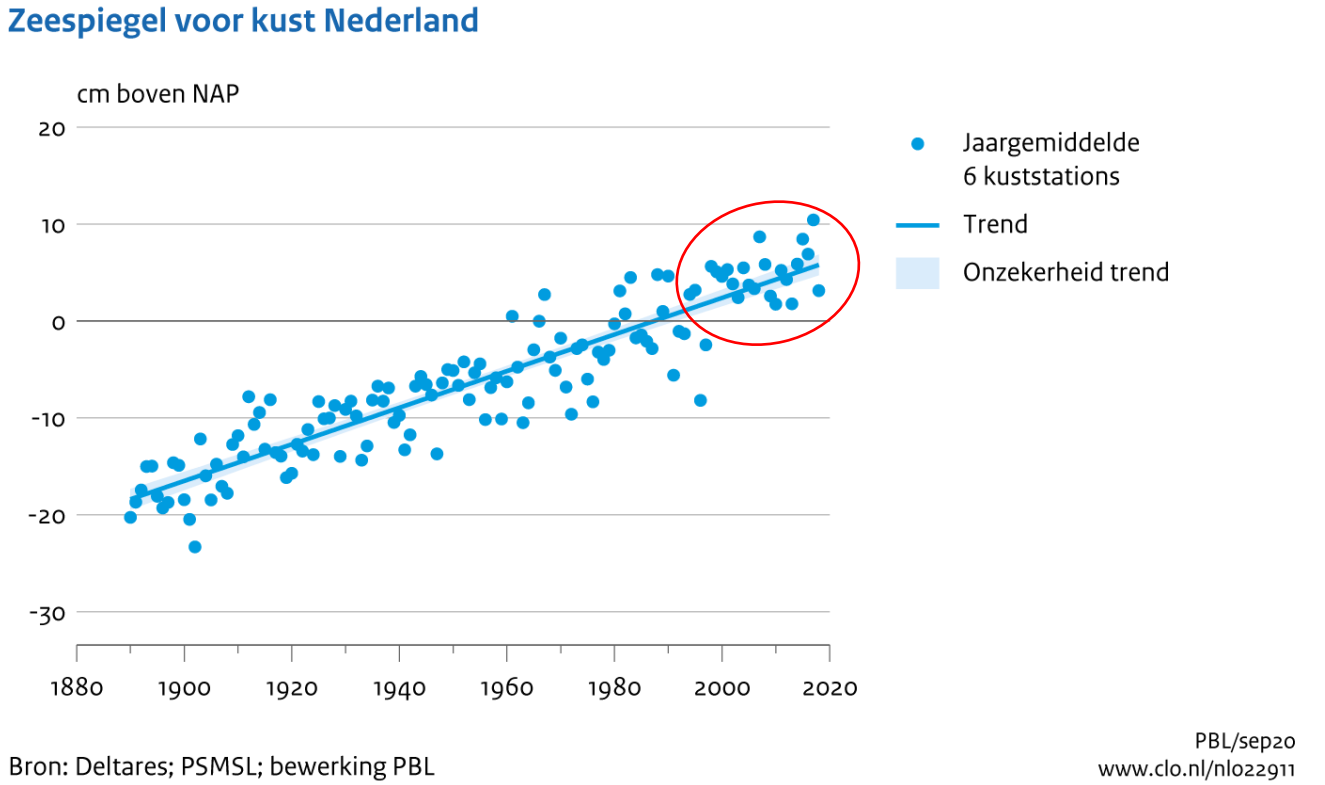
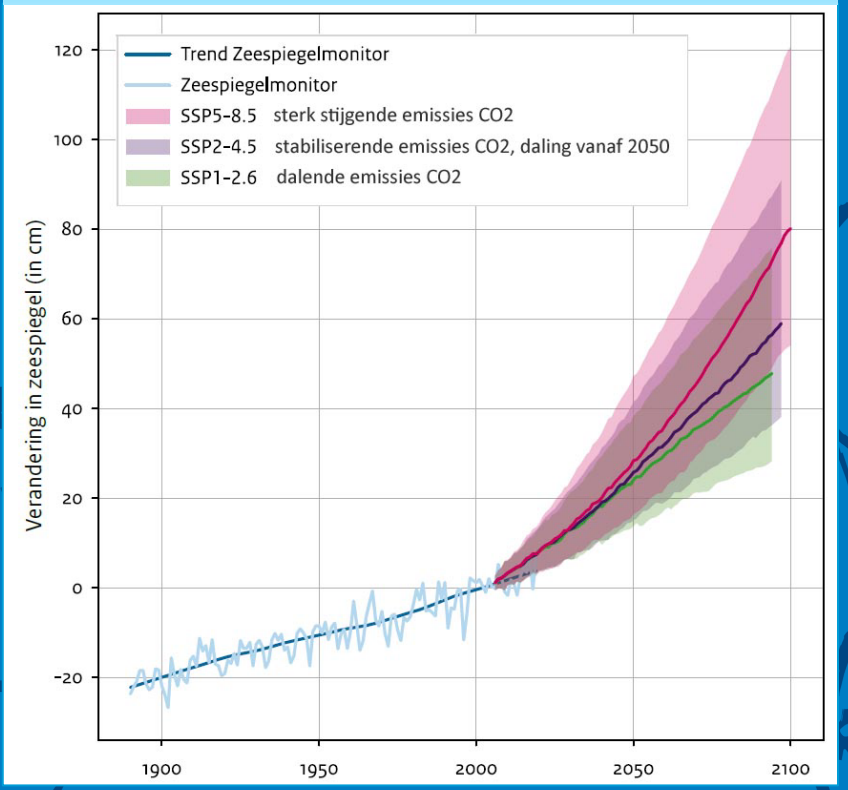
3A. SEA LEVEL RISE (KNMI, PBL, DELTARES)



1990-2020 = 6 cm (2 mm/year)

Predictions 2023:

2100 between 26 - 124 cm



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3A. FLOOD RISK ADAPTATION STRATEGIES

- Approach:
  - Creating awareness
  - Information sharing + visualisation
  - Joint Fact Finding
  - Create common language and commitment!

- Steps:
  - Flood risk analysis
  - Impact assessments on (deadly) casualties, economical damage (direct and indirect) and environmental pollution via air, water, soil
  - Risk boundary framework
  - Definition of measures
  - Flood risk adaptation strategy

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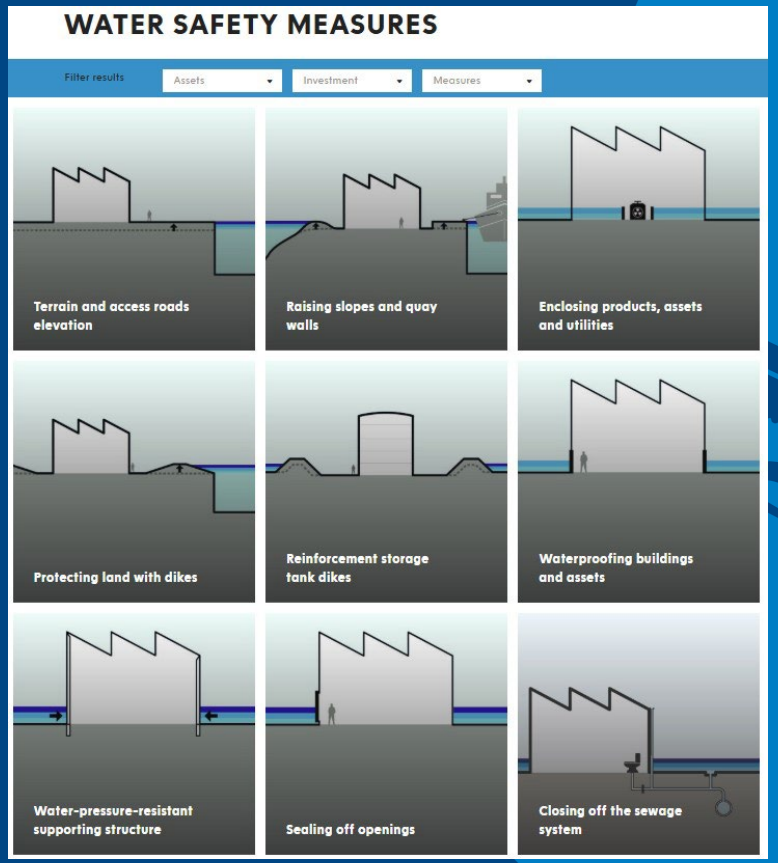
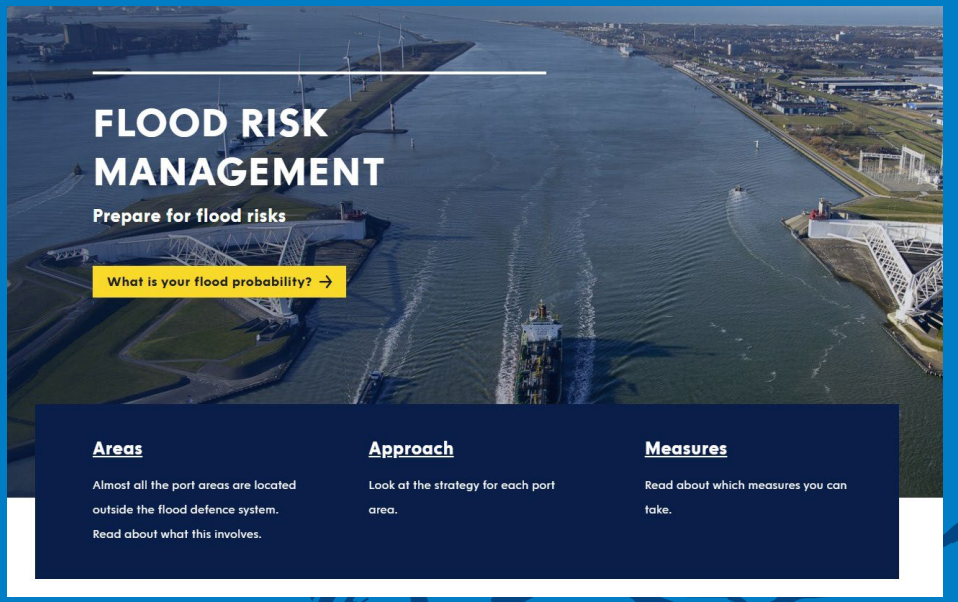
3A. MORE INFORMATION

- Website: [Flood Risk Management | Port of Rotterdam]





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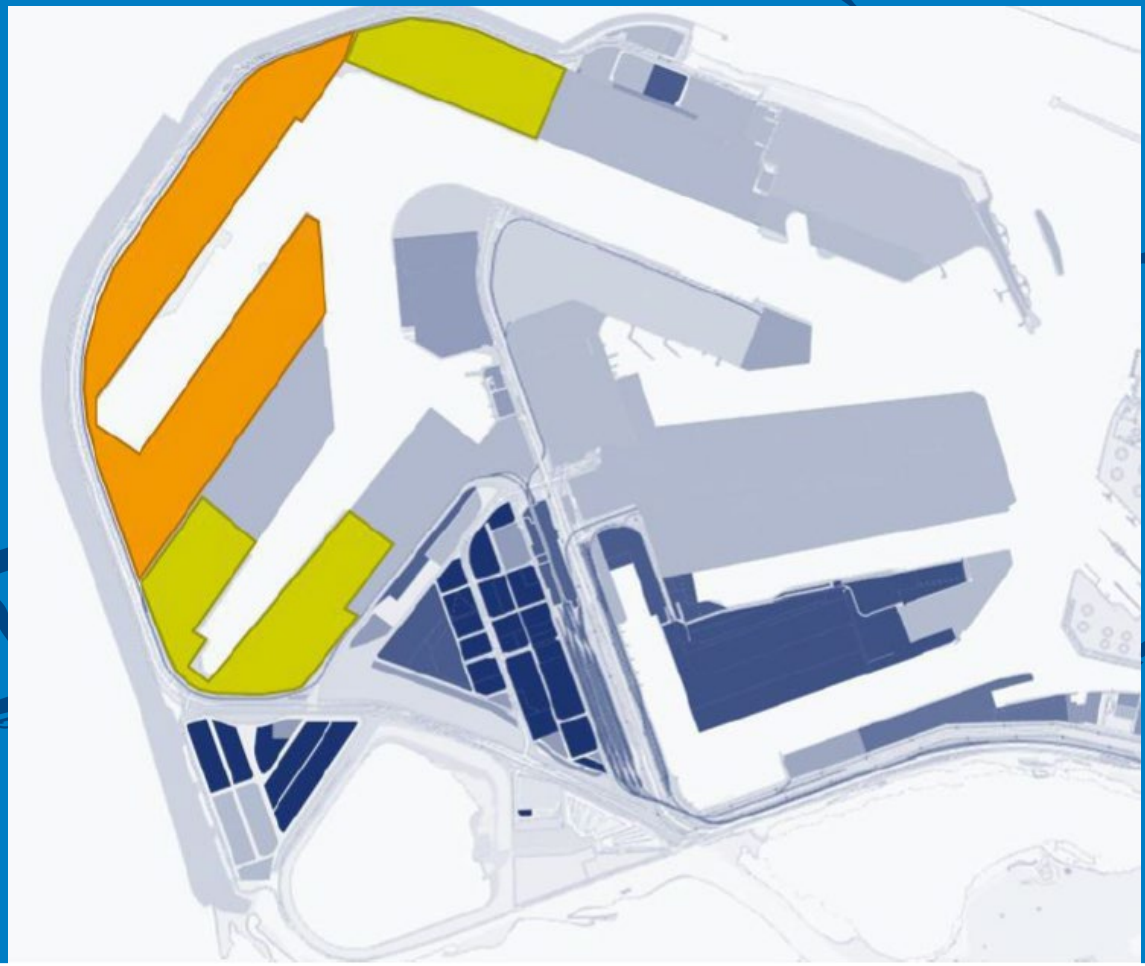
3B. PORT OF ROTTERDAM PROJECTS & CONTRACTS

- All Port Authority (maintenance) projects are assessed
- Over 150 projects
- Flood risk measures are taken if necessary
- Flood risk is a subject in all land lease contracts
- New land reclamation / land use at a higher elevation (orange and yellow areas)



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3B. FLOOD RISK MEASURES IN PORT DEVELOPMENT PROJECTS

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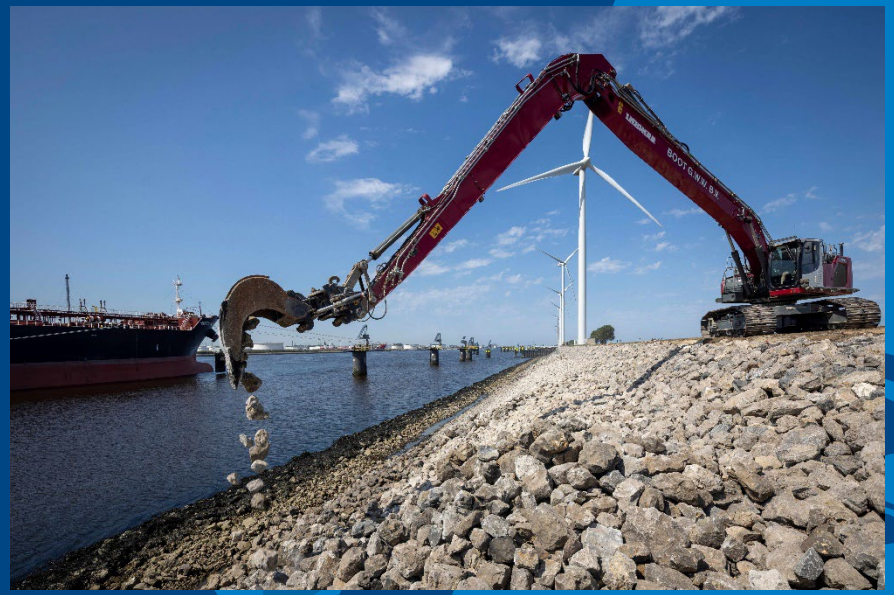

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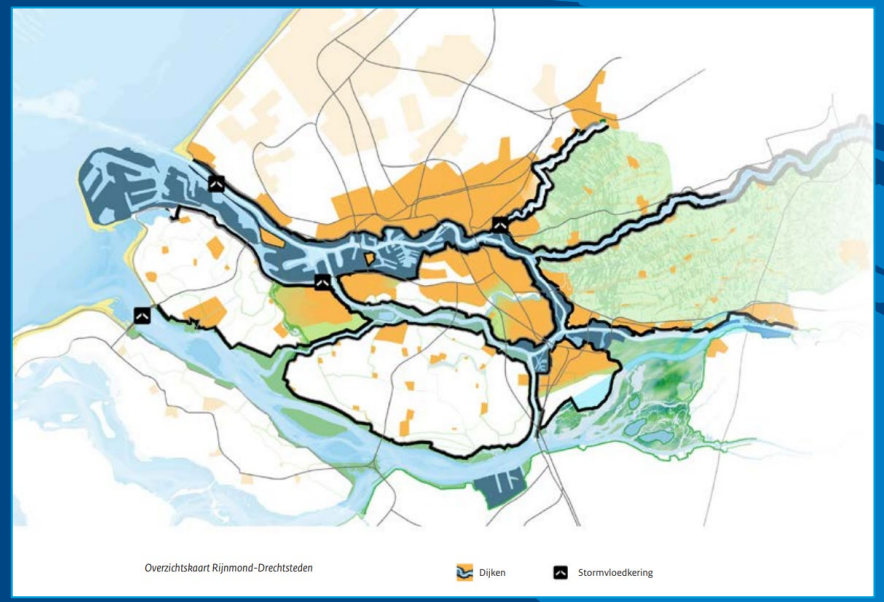
3C. REGIONAL STRATEGY (DELTAPROGRAMMA)

- Nieuwe Waterweg stays open with closable flood barrier (Maeslantkering) till at least 2070, even in extreme SLR scenarios
- Optimal balance between flood risk and accessibility of our port
- Research topic: limits of this strategy (part of knowledge programme sea level rise)



Frequency of closure Maeslantkering: 3 x per year if 1 meter sea level rise

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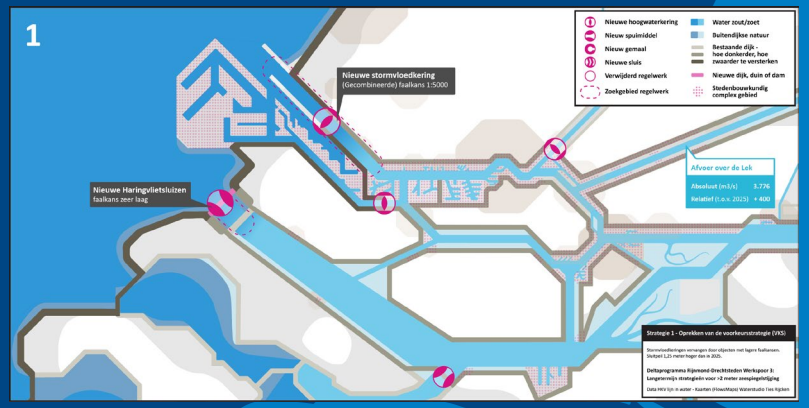
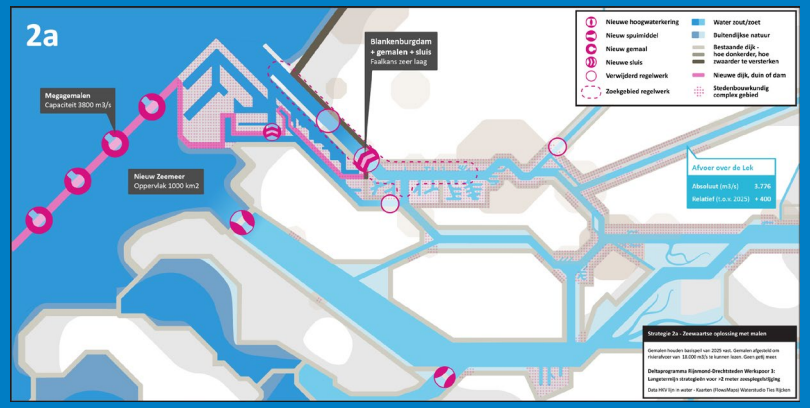
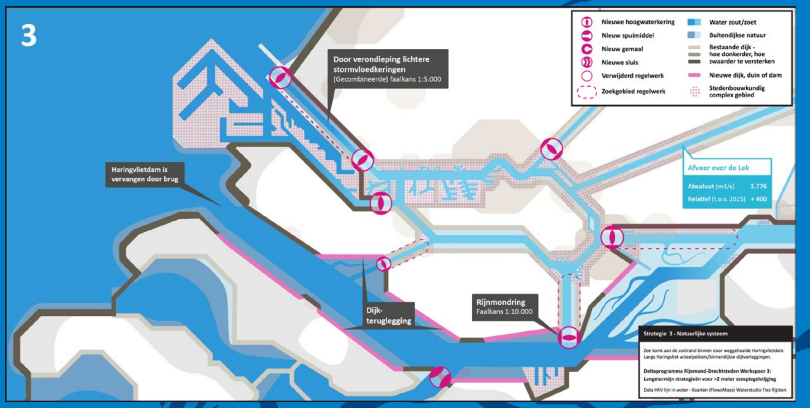
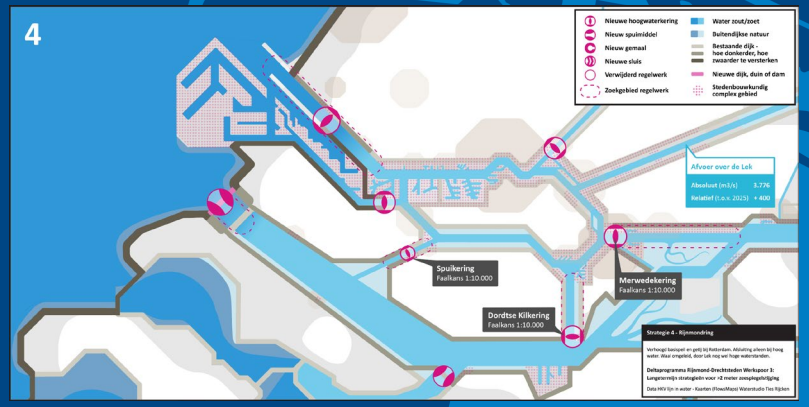
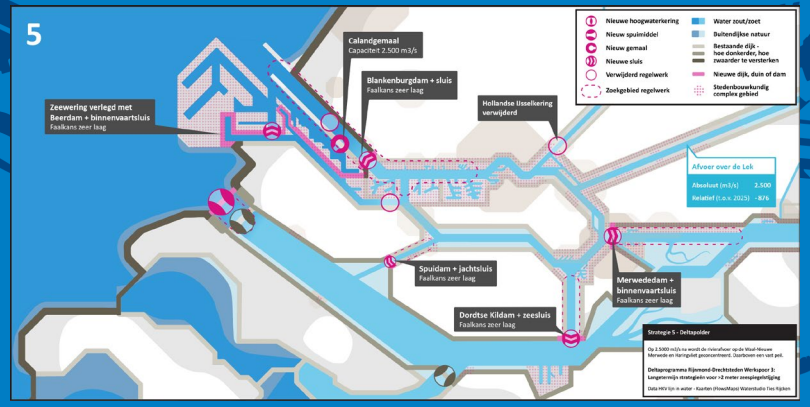
3C. LONG TERM STRATEGIES (2 M SEA LEVEL RISE)











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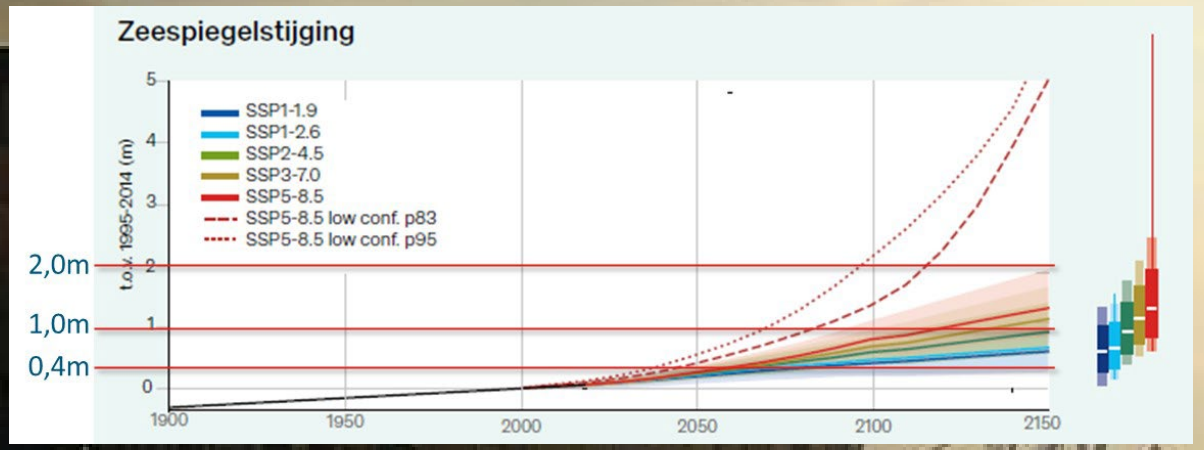
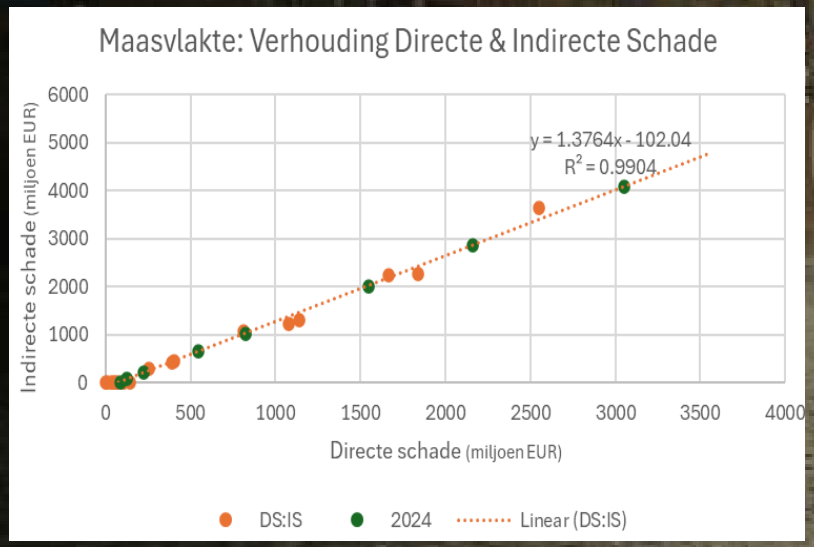
Accessibility shipping routes
Nature preservation & recovery
Sea level rise
Water quality
Increasing salinity
Fresh water availibility
River discharge
Transition of the port
Inland shipping accessibility

3D. ADAPTATION OF POR STRATEGIES TO 2 M SLR



Zeespiegelstijging (cm)	0	35	50	85	100	200
Havengebied						
Botlek	✓	X	X	X	X	X
Vondelingenplaat	✓	✓	✓	=	X	X
Europoort	✓	✓	✓	X	X	X
Maasvlakte	✓	✓	=	X	X	X
Waal-Eemhaven	✓	✓	✓	X	X	X
Merwe-Vierhavens (transitie sappen & maakindustrie)	✓	=	X	X	X	X
Dordrecht	✓	✓	✓	✓	=	X
Overige gebieden	Geen overkoepelende risicoafweging					



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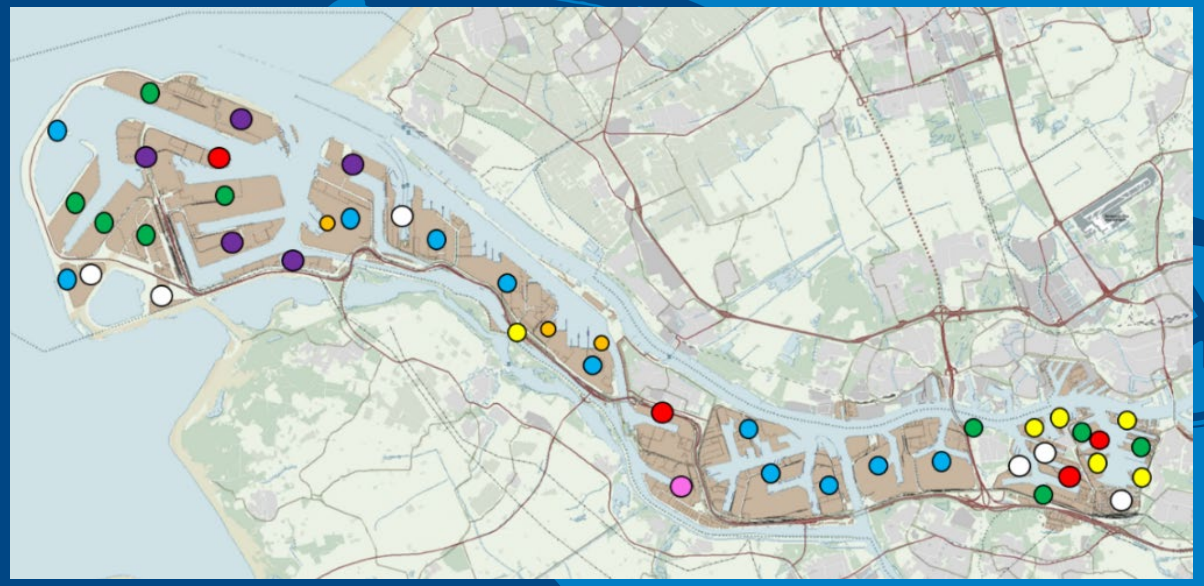
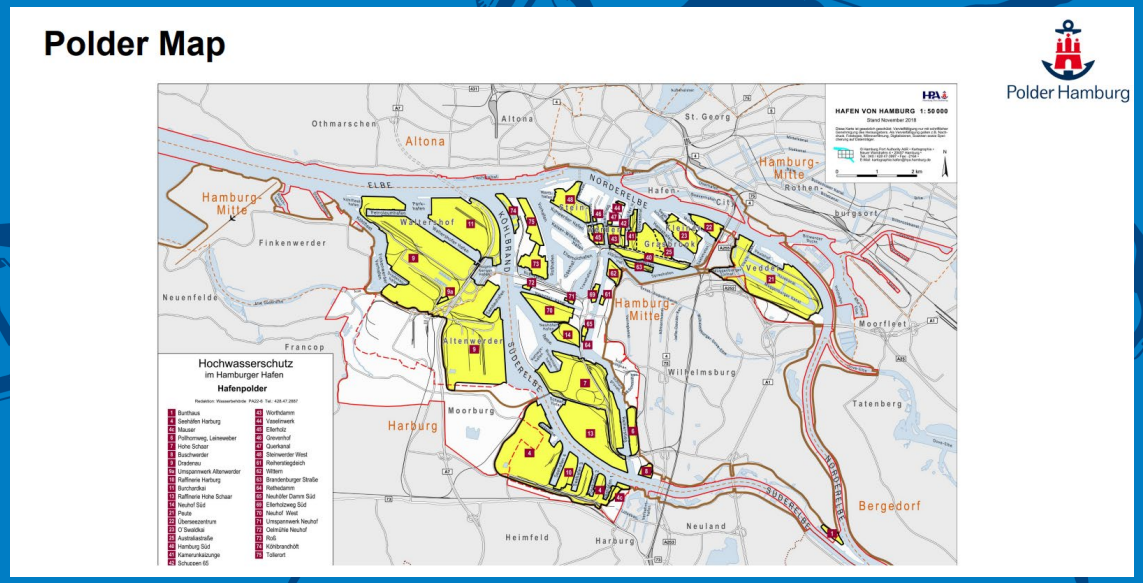
3E. FUTURE CHALLENGES & CURRENT ACTIVITIES

- Our goal is for every asset owner to consider flood risk management as a prerequisite for new developments and investments
- Adaptation strategies fully integrated in policies & working procedures, perhaps in legislation?
- Further organization of water safety in the long term





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A SAFE PORT, NOW AND IN THE FUTURE!