PIANC

The World Association for Waterborne Transport Infrastructure

PIANC - IAPH EnviCom WG150

"Sustainable Ports, A Guide for Port Authorities"

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Scope of the report

1. Definition of the Sustainable (Green) Port Philosophy
2. Argues the necessity of Sustainable Ports -> sustainable development as an economic driver
3. Guidance on need and implementation of Sustainable Port philosophy
4. Best practices from existing ports (effectiveness and economic potential)
5. Links with Corporate Social Responsibility concept
6. Encourages and guides port re-construction and transformation phases (“just do it”)

Target Audience

- Port Authorities and Port Operators

but also:

- Public Authorities
- Contractors and Consultants
- Financiers
- Non-Governmental Organizations (NGO)

WG Members and Support

- Ports: Amsterdam, Antwerp, Bremen, Ghent, HaminaKotka, Los Angeles, Lagos, Rotterdam
- Representatives: PIANC EnviCom & MarCom, IAPH, ESPO, CEDA, USACE, WWF
- Other: Terminal operators, research institutes, universities, consultants, contractors
- Countries: Australia, Belgium, China, Finland, Germany, Italy, Japan, the Netherlands, Nigeria, Spain, UK, USA

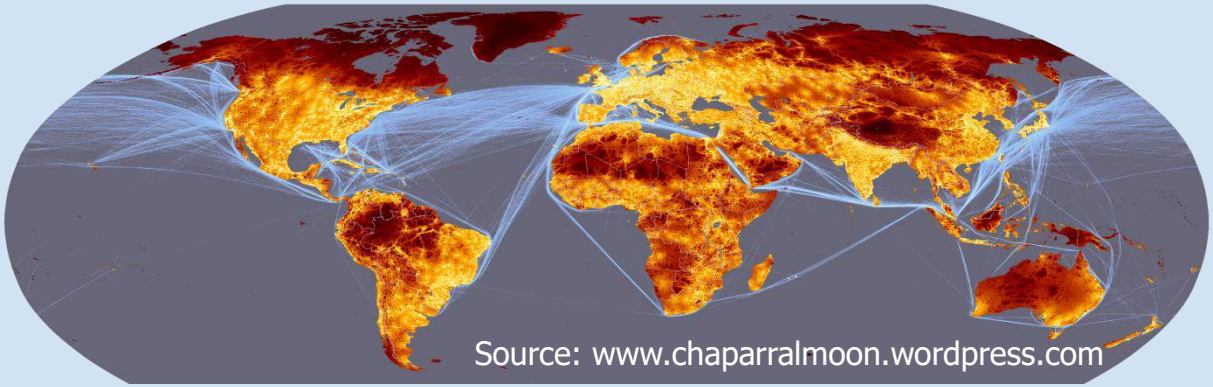
Towards Green Growth

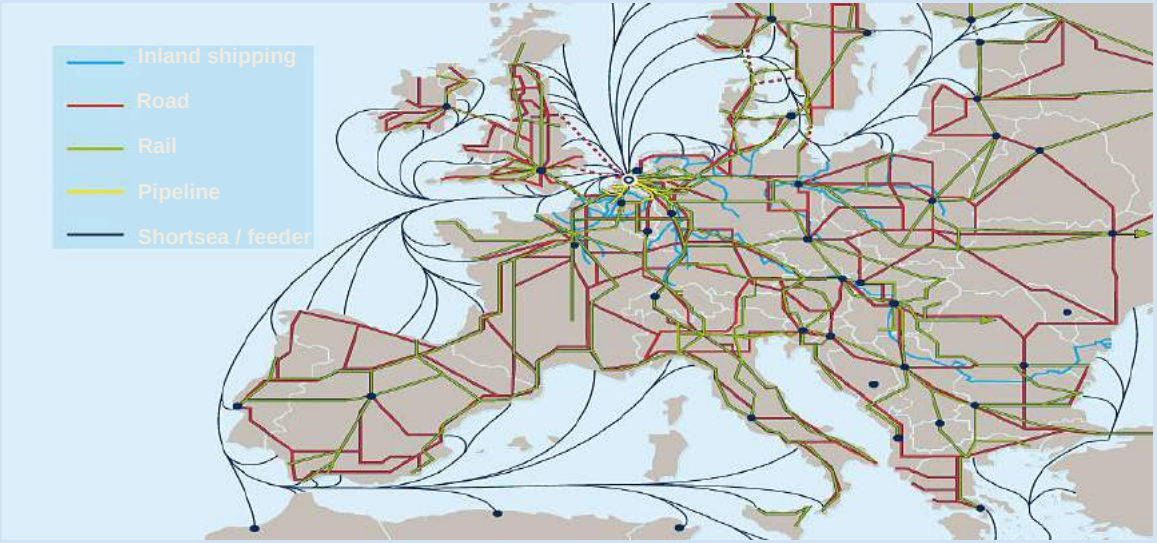
OECD
BETTER POLICIES FOR BETTER LIVES

May 2011

Source: www.oecd.org

Transport chains





Definition of a Sustainable Port

"A sustainable port is one in which the port authority ***together*** *with port users,* ***proactively*** *and* ***responsibly*** *develops and operates, based on an* ***economic green growth strategy****, on the* ***working with nature*** *philosophy and on stakeholder participation, starting from a* ***long term vision*** *on the area in which it is located and from its privileged position within the* ***logistic chain****, thus assuring development that* ***anticipates*** *on the needs of* ***future generations****, for their own benefit and the* ***prosperity of the region*** *that it serves."*

Sustainable Port themes en goals

- **Land and Water Area Uses**
  - Sustainable management of port and tenant wishes and demands
  - Long term Master Planning
- **Modalities and Connectivity**
  - Accommodate increased future transport volume while minimizing or eliminating its environmental footprint
- **Air Quality**
  - Accommodate port operations and developments while meeting short and long term air quality goals
- **Surface Water and Sediment Quality**
  - Support attainable beneficial uses of resources without degrading environment
- **Soil and Groundwater Quality**
  - Manage historic legacies of soil and groundwater pollution while enhancing new port development without compromising environmental quality
- **Sustainable Resource Management**
  - Manage material resources to reduce waste flows and encourage recycling to contribute to the development of a greener port industry

Sustainable Port themes en goals

- **Dredging Impacts**
  - Promote sustainable dredging to keep port's nautical access open, clean and safe
- **Sound Impacts**
  - Manage sound (noise) to reduce public health hazards and ecological hazards
- **Energy and Climate Change Mitigation**
  - Reduce greenhouse gases (GHG) linked to global warming
- **Climate Adaptation**
  - Prepare ports for sea level rise and increased storm surges due to climate changes
- **Habitat and Species Management Health**
  - Adapt "Working with Nature" in port design and development philosophies
- **Ship Related Waste Management**
  - Reduce discharges into the sea of ship-generated waste and cargo residues
- **Landscape Management and Quality of Life**
  - Minimize impacts on landscapes to correct and improve port aesthetics

Role of the Port Authority

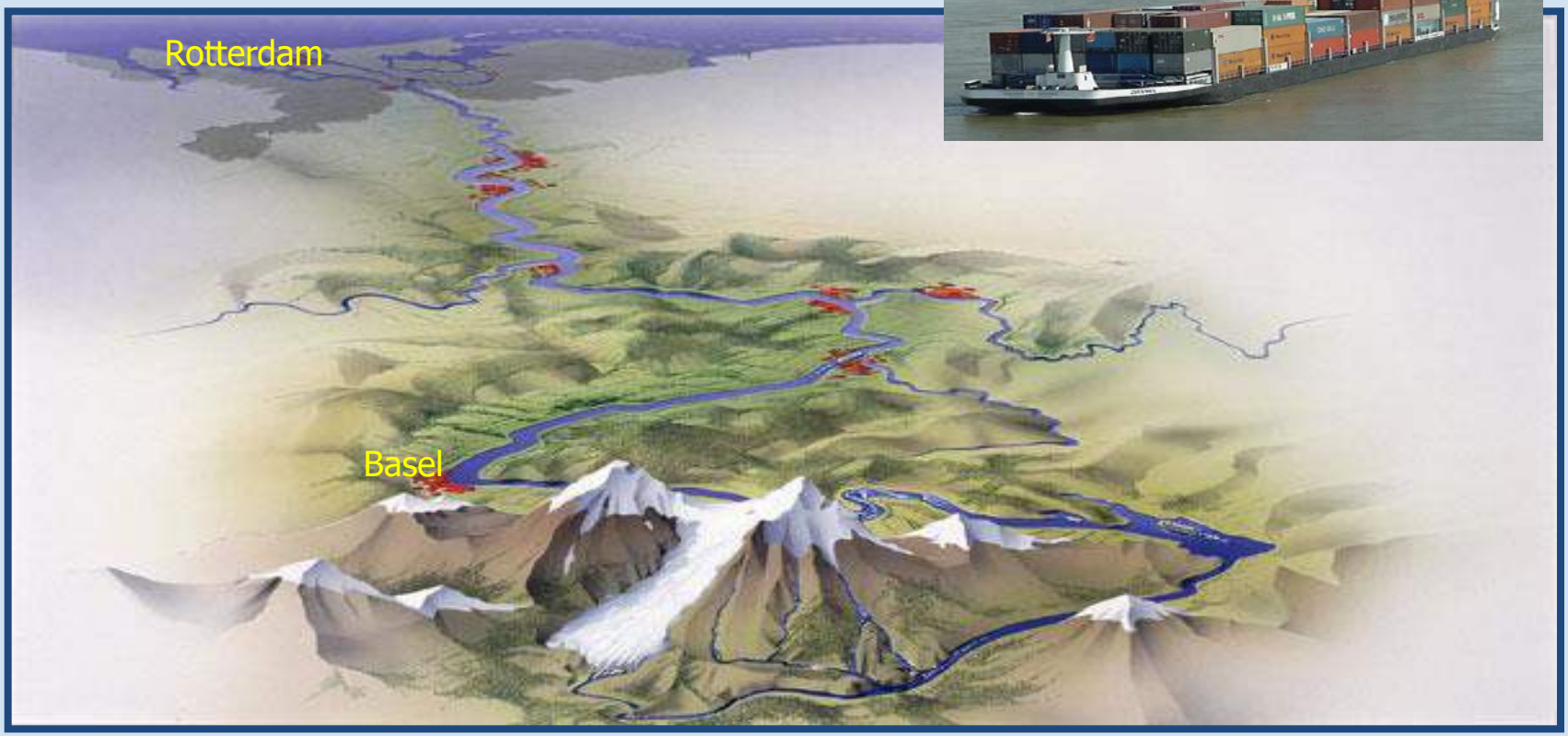
Port Authority as:

- Manager of Port Areas
- Estate Owner
- Economic Developer
- Facilitator of / Key Player in the Logistics Chain
- Administrator
- Regulator and Enforcing Agent
- Developer and Manager of Infrastructure
- Operator
- Nodal Point of Knowledge on Ports and Environments
- Facilitator for Innovation
- Partner in the Community

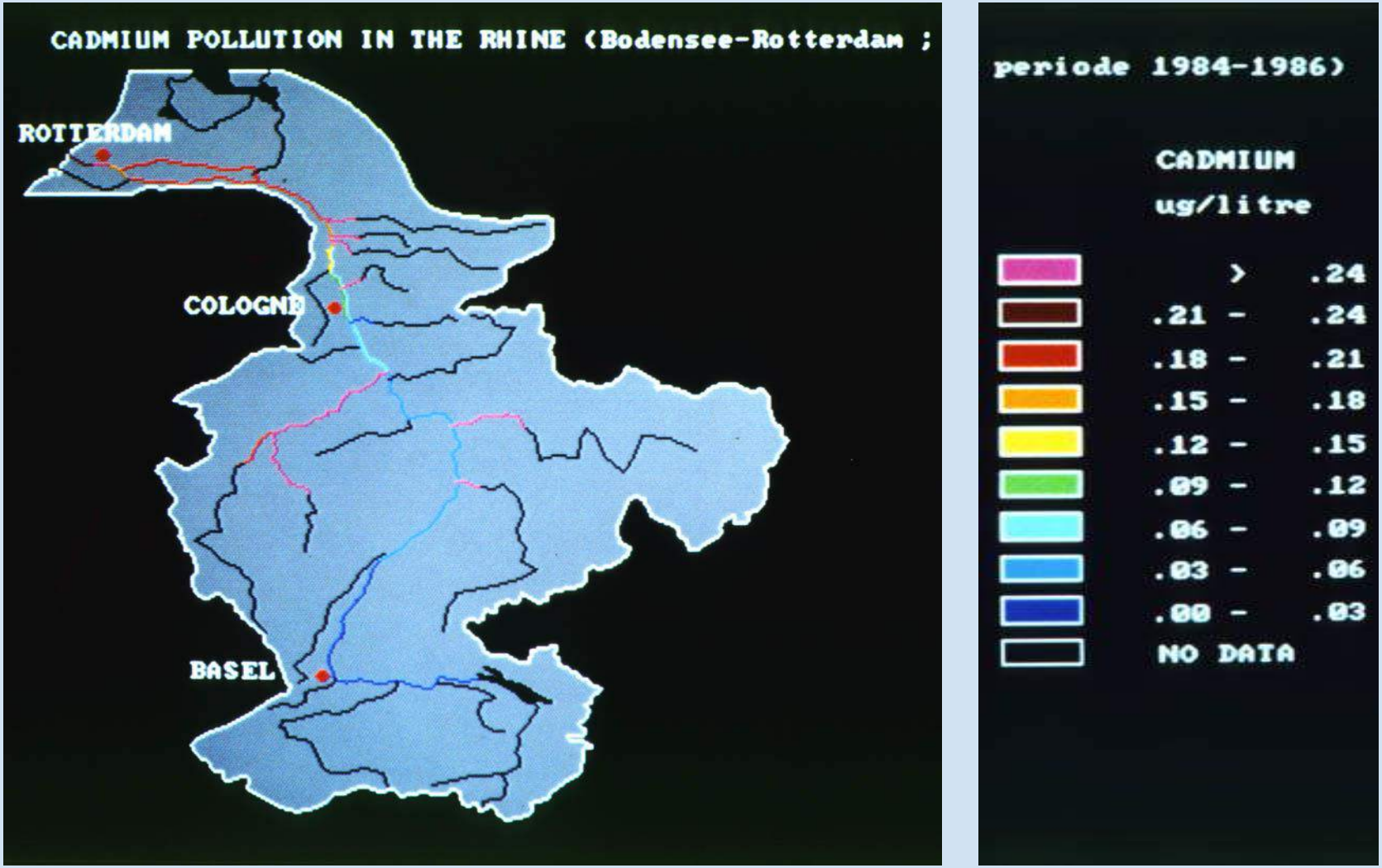
Inspiring examples

- Rhine sediment management source control program
- Rotterdam port expansion Maasvlakte 2
- Environmental Ship Index of the World Ports Climate Initiative
- Clean Air Action Plan Port of Los Angeles

The Rhine river and Port of Rotterdam



Contamination Cadmium Rhine river 1984-1986

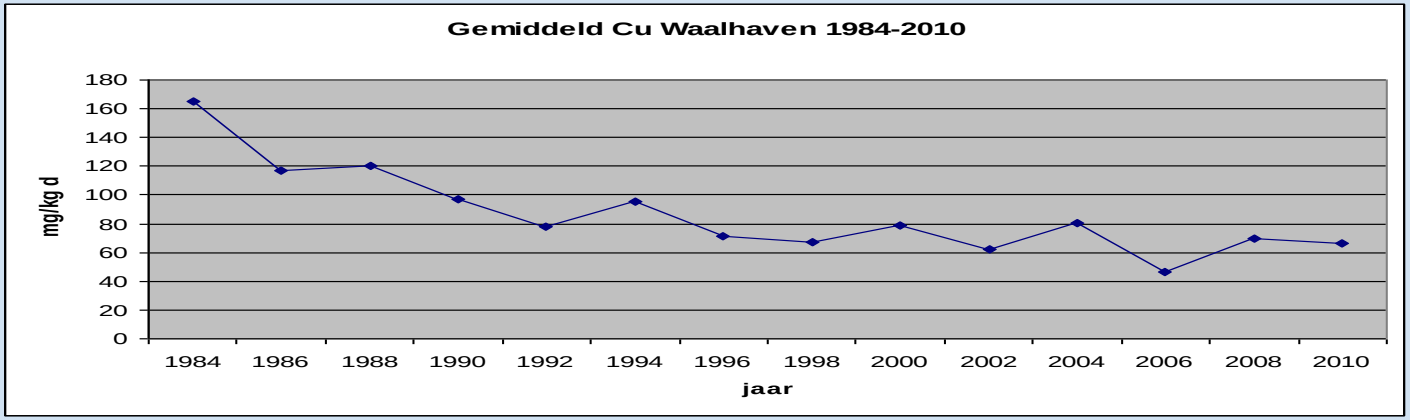


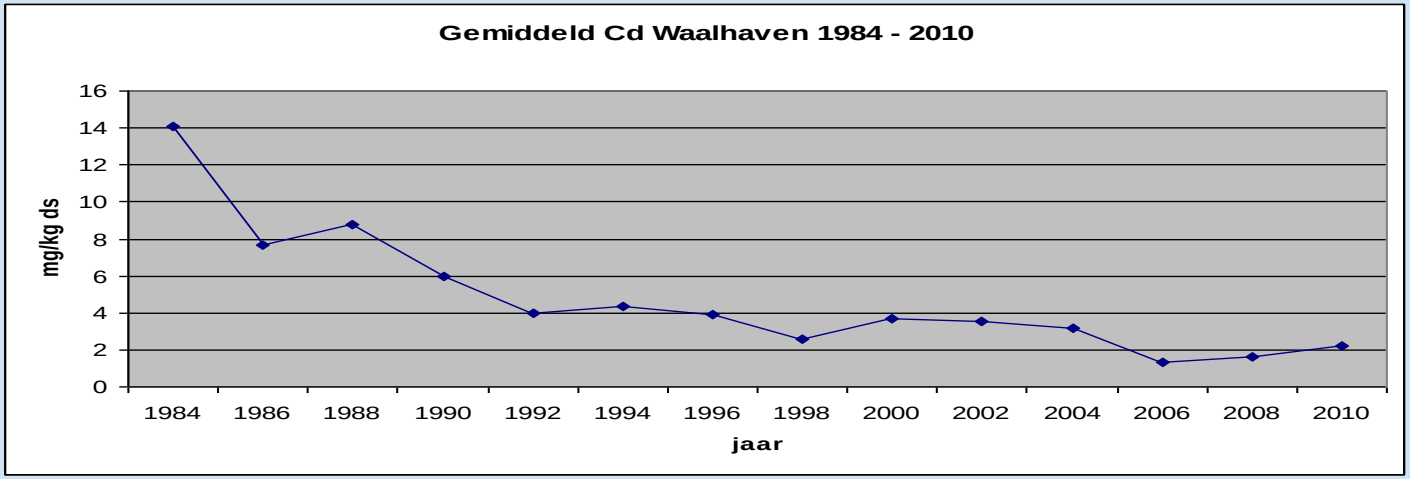
Results agreement VCI - Rotterdam

Compound	Discharges 1984 (t)	2000	2005*	Red.% '84-'05
Zinc	450	100	65	86%
Chromium	150	20	10	93%
Copper	80	25	16	80%
Cadmium	1.2	0.5	0.15	88%
Mercury	0.6	0.14	0.10	83%
AOX	1500	300	150	90%

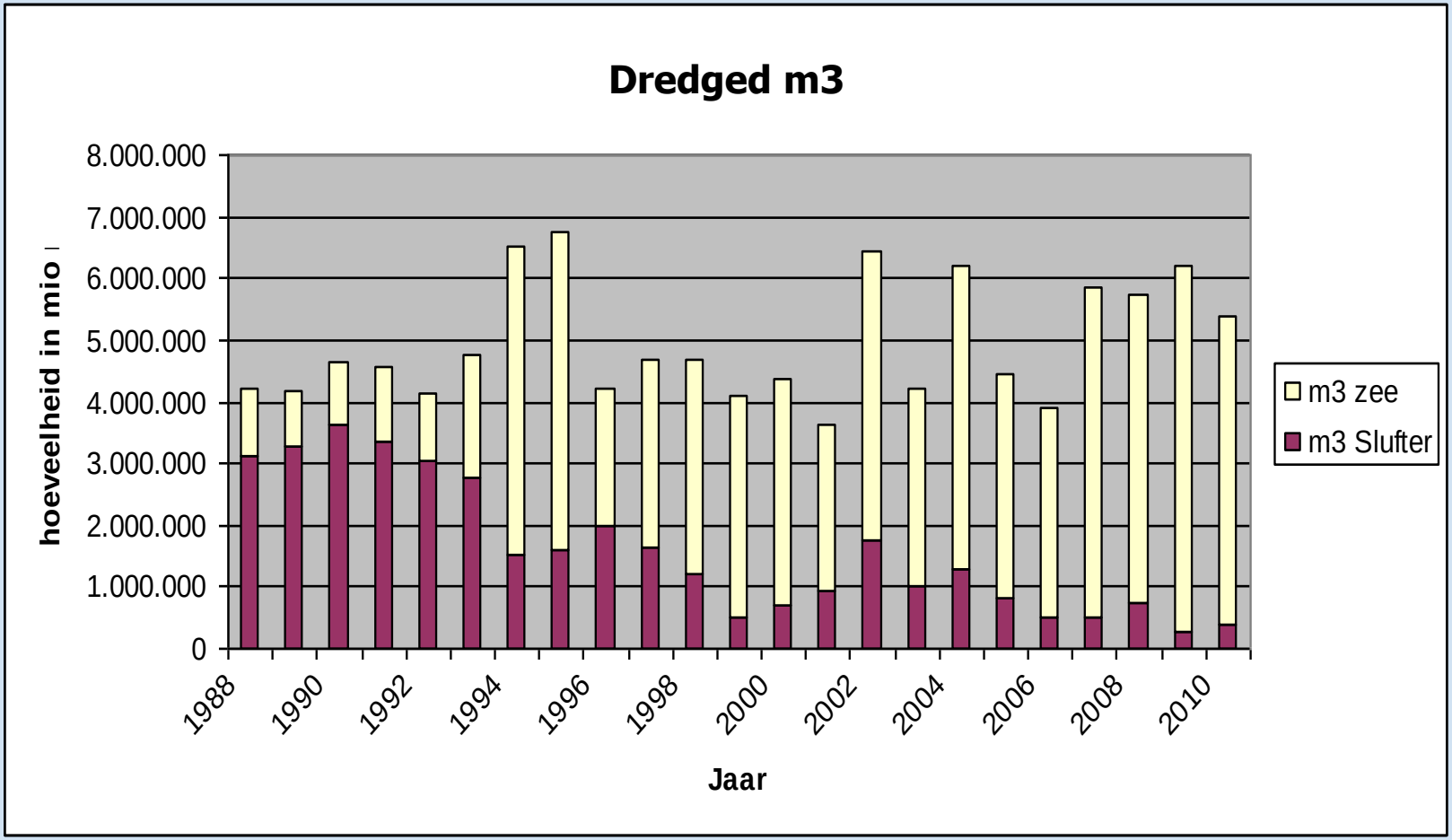
* in 2006 agreement extended until 2027

Dredged material quality improvement 1984 - 2010

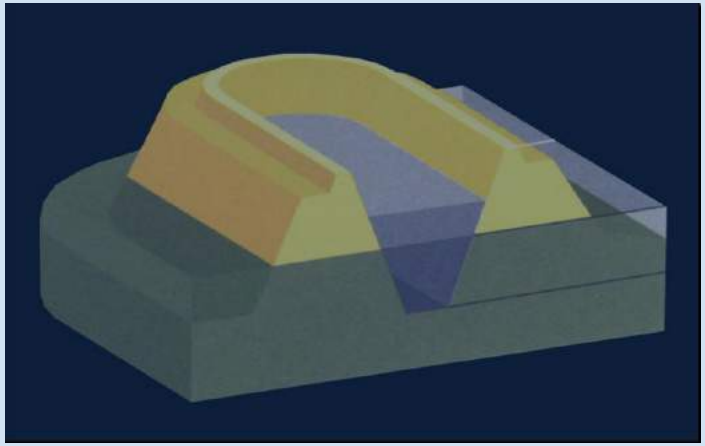




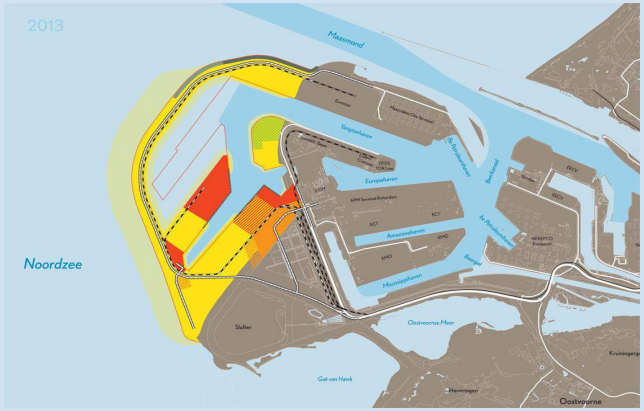
Reduction dredged material disposal in Slufter



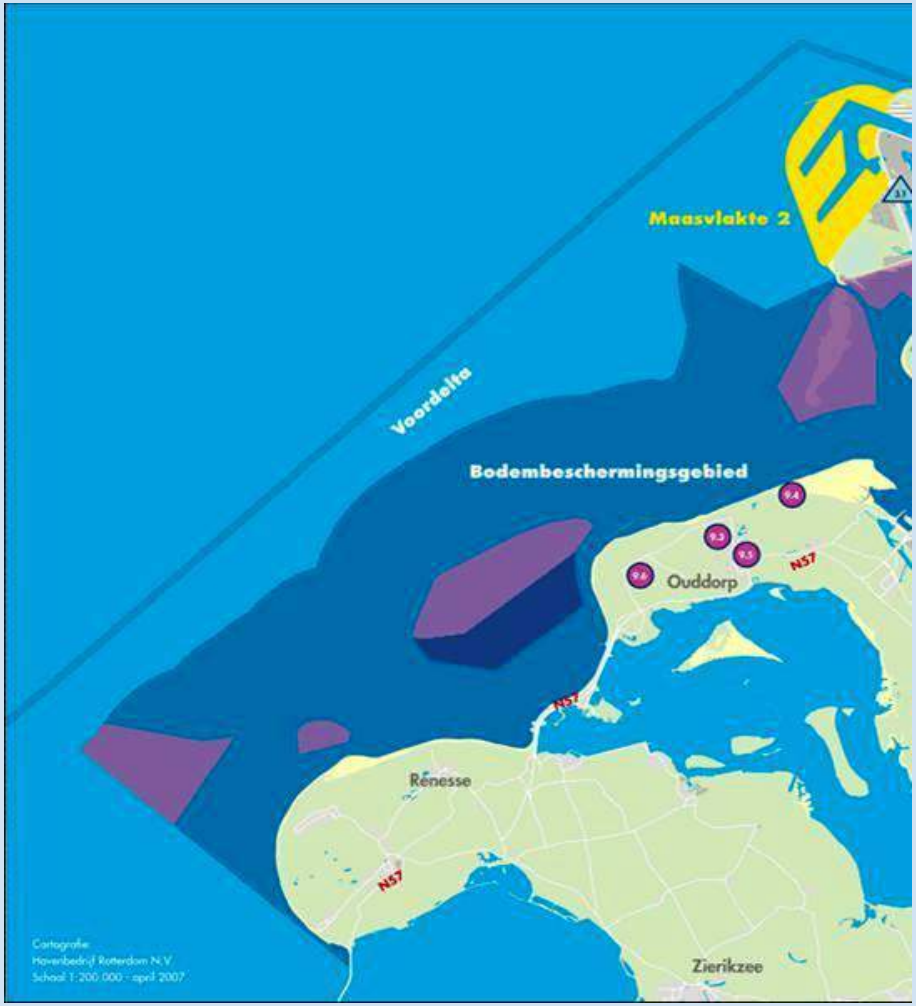
Slufter: a symbol of a successful policy



Construction port expansion Maasvlakte 2



Nature compensation construction Maasvlakte 2



Nature compensation use Maasvlakte 2

Environmental Zoning Maasvlakte 1 & 2

Rotterdam World Gateway & APMTerminals

The most sustainable terminals in the world

- Best performance in automation and efficiency: new generation AGV's,fully automated and remote controlled cranes
- On 100% renewable electric energy
- Modal split endsituation ≤ 35 % by road to the hinterland

Stakeholder agreements Maasvlakte 2

Sustainable Maasvlakte

- Parties: Friends of the Earth Netherlands and Rotterdam Port Authority
- Joint research towards 10 % less airquality pollutant emissions

Agreement with Fauna protection

- Parties: Fauna Protection Netherlands Association and Port of Rotterdam Authority
- Management plans for Lesser Black-backed Gull, Common Tern and Sandwich Tern, on Maasvlakte 1 and 2.

Press release FOE Netherlands 2008

Rotterdam AD

Milieudefensie wil megazaak tegen Maasvlakte

ROTTERDAM
Milieudefensie vraagt duizenden Rotterdammers mee te procederen tegen de aanleg van de Tweede Maasvlakte. Rotterdammers die dit steunen, moeten geld doneren aan de milieubeweging om de proceskosten te betalen.

FOE Netherlands wants mega courtcase against Maasvlakte 2

It asks thousands of Rotterdam citizens to join a legal procedure against the construction of the port expansion Maasvlakte 2 and asks them to donate money to FOE Netherlands to pay for the cost of the legal procedure

The Environmental Ship Index

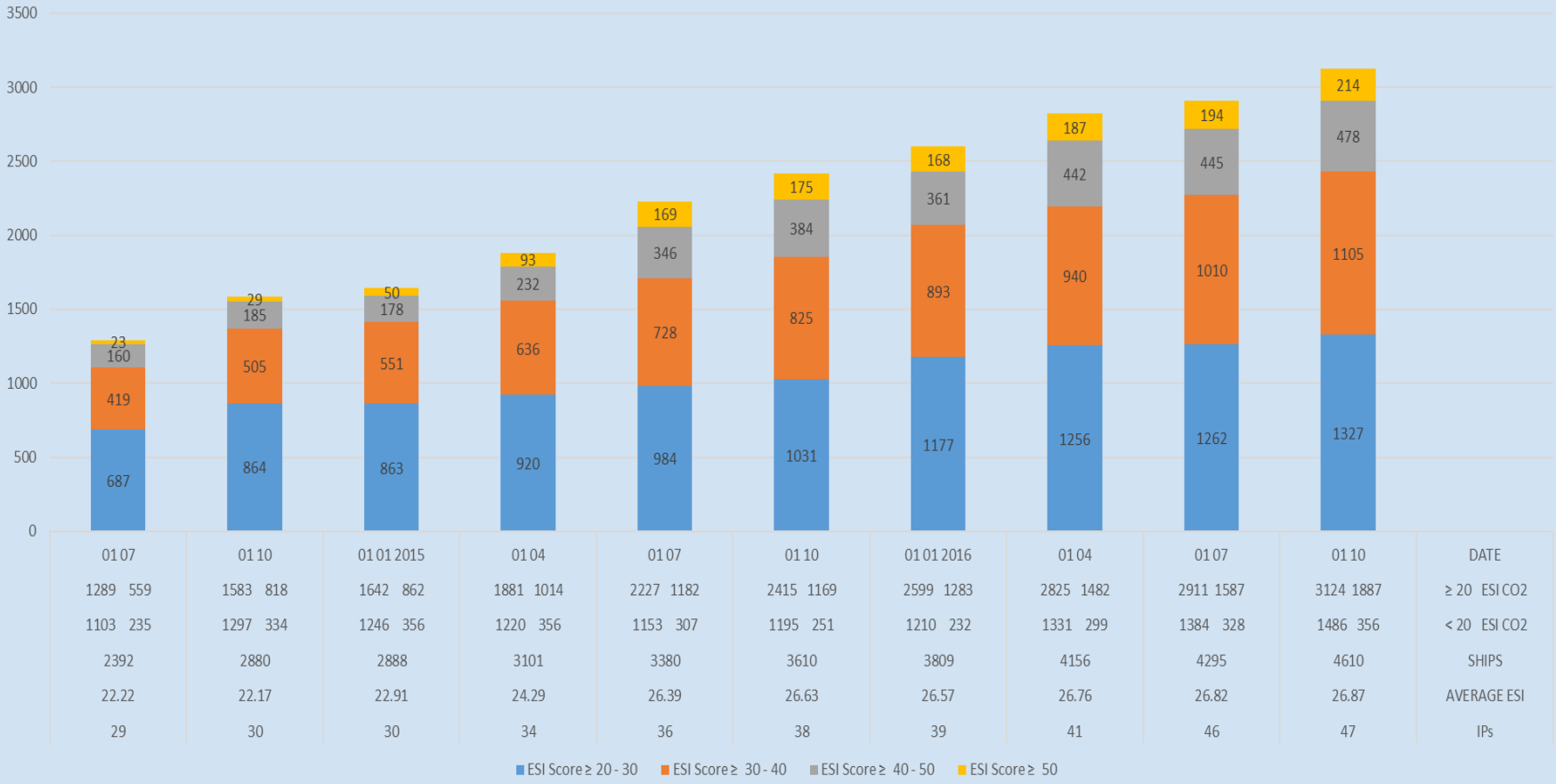
A worldwide mechanism that enables ports to promote clean shipping

"With regard to air emissions some ships have a better environmental performance then others. Ports want to be able to make the difference"

Environmental Ship Index

- Tool to accelerate the greening of ships (since 2011)
- Incenticizes behavioural change
- Priority with reducing airquality pollutant emissions
- Performance indicator developed in corporation internationally
- Credits can be scored for cleaner fuels and cleaner engines, fuel and miles reporting and on shore power supply
- 0 points when compliance to law, 100 point when zero-emissions and fuels and miles reporting
- Web-based, free for use and internationally applicable
- Facilitated by IAPH

Results ESI since its start in 2011



47 incentive providers in 2016: Antwerp, Busan, Hamburg, Los Angeles, New York, Rotterdam, Tokyo and 40 others (incl. Right Ship and Green Award)

Airpollution caused by navigation

Wake of a 3000 TEU Containership on the St. Lawrence river Canada

September 1 2011, 07:12 AM

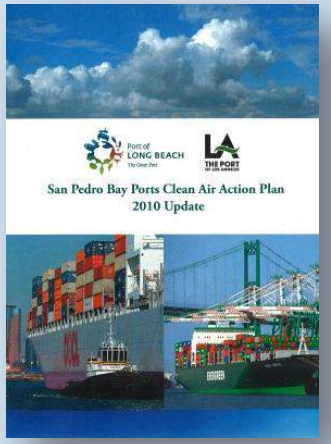
Reduce Impacts from Operations

Air Quality Program Port of Los Angeles

Clean Air Action Plan

Port of Los Angeles

- Goals
  - Minimize Health Risk from Port Operations
  - Contribute “fair share” to reducing regional mass emissions
  - Enable Port development
  - Set consistent source-specific standards
- Health Risk Reduction Standard
  - Reduce population-weighted cancer risk of port-related diesel particulate matter (DPM) by 85% by 2020 (compared to 2005 baseline)
- Emission Reductions Standard
  - Reduce NOx emissions by 22% by 2014 and 59% by 2023
  - Reduce SOx emissions by 93% by 2014 (and 2023)
  - Reduce DPM emissions by 72% by 2014 and 77% by 2023



Clean Air Action Plan

Port of Los Angeles

- Source Categories
  - Heavy Duty Vehicles
    - Clean Truck Program
  - Ocean-Going Vessels
    - Vessel Speed Reduction to 20nm and 40 nm
    - Shore Power
    - Low Sulfur Fuels
    - Incentivize Clean Ships/Environmental Ship Index Program
    - Incentivize New Technology Development
  - Locomotives, Cargo Handling Equipment, Harbor Craft
    - Set standards

- Technology Advancement Program
  - Port funds 1.5 M/year to help developing emerging technologies
- Tracking
  - Air Quality Monitoring
  - Emissions Inventory
  - Updates

WG 150 Conclusions & Recommendations

1. The role of Port Authorities changes from **re-active landlord to pro-active partner** in the development of the region and of the logistic chain;
2. **Co-operation with stakeholders** in port development & -operation;
3. A Sustainable Port develops in **harmony with its environment** to match limited and decreasing environmental space and resources;
4. Sustainable ports follow a new growth paradigm that is truly sustainable with **green growth as an economic driver;**

WG 150 Conclusions & Recommendations

5. Ports take up **technological and societal developments** to facilitate the transition towards green growth;
6. Ports are in a **unique and privileged position in the global logistic chain;**
   to capture and evolve their roles to initiate and consolidate the needed change, for their own benefit and the prosperity of the region that it serves;
7. Sustainable port development is based on a **long term proactive vision** irrespective of actual regulations.

Follow-up with IAPH-PIANC WG 174 Sustainability Reporting for Ports

Objectives of the Working Group

- Give an overview of the trends driving sustainability reporting and the benefits of reporting for ports
- Develop guidance for the process to define objectives and goals for sustainability reporting for ports
- Develop guidance for the stakeholder process that should be fulfilled to be able to address all relevant issues for the specific port
- Define port specific indicators to report on corporate social responsible performance for ports

Follow-up with IAPH-PIANC WG 174 Sustainability Reporting for Ports

Organisation of the Working Group

- Chairman from IAPH (Kris de Craene – Port of Antwerp)
- Co-chairman and PIANC EnviCom mentor (Tiedo Vellinga)
- Members from IAPH and PIANC
- Report available in 2017

Key features and innovations Maasvlakte 2

- Working/building with respect for nature
- Stakeholder inclusive & co-creation of values
- Integrated adaptive design
- New knowledge
- Green growth

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Ports of the Future

Port of the Future co-creation

The Port of the Future takes the natural system into account through an ecosystem based approach with the aim to optimize economic, environmental and social aspects of the ports' location, design and operations. This requires a co-creation between engineering, ecological and socio-economic perspectives and actors, to be able to serve ports with expanding needs and/or building plans.

Creating ports serving economic, environmental and social needs, requires the combination of different disciplines such as coastal morphology, high end dredging techniques, civil engineering, profound knowledge of the physical environment of the location, socio-economics, ecology and governance. When these different disciplines are interlinked and being integrated, they have the potential to mutual strengthening in smart design, technical and working with nature solutions and effective governance, to develop a Port of the Future. The Dutch companies Boskalis, Port of Rotterdam and Royal Haskoning-DHV, the knowledge institutes Deltares, WUR-IMARES, IVM Institute for Environmental Studies, Delft University of Technology and the World Wide Fund for Nature (WWF-NL) combined their specific fields of expertise to develop the Ports of the Future concept.

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Source: Boskalis

Source Deltares May 2015

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Source Deltares May 2015

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Source Deltares May 2015

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Integrated and Sustainable Ports in Ghana in an African context a Dutch NWO funded port reseach project

Project features

- Balance between morphological, economic, ecological and social processes
- Interdisciplinary co-creation with African stakeholders
- Bottom-up approach from practical cases into tools and a generic framework

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Overcrowded fishery port
Existing port
Area new port development
Eroded and stone protected beaches
Lagoon under pressure

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Workshop in Accra-Tema Ghana, Juli 2015

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Integrated and Sustainable Ports in Ghana in an African context

Project partners

- TU Delft
- University of Ghana
- UNESCO-IHE Delft
- WUR / Imares
- VU - Amsterdam
- Deltares
- WWF
- NABC (Netherlands African Business Council)*

Budget 700.000 euro (4 postdocs (0.5), and researcher from Ghana, 3 years)
Proposal approved start project May 2016.

* Boskalis, Van Oord, IHC, Damen Shipyards, Port of Amsterdam, Deep BV, STC, FMO, CWT Sitos

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Project outcomes

- Framework
  - Best practice guidelines for implementing integrated and sustainable port development in Africa
  - Scientific papers
- Tools
  - Quick design tools using remote sensing data and integrating ecological data
  - Tried and tested methods for stakeholder-inclusive port planning, which can include the Ports of the Future serious game
- Green Ports Africa Network
  - A community of researchers, private sector practitioners and port-related stakeholders

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Thank you for your attention !

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