EuDA 2016 Annual Conference

Tu 15/11/2016, Brussels

GLOBAL CO_2 EMISSIONS:

Possible Solutions from the European Dredgers

Paris SANSOGLOU

Secretary General
European Dredging Association

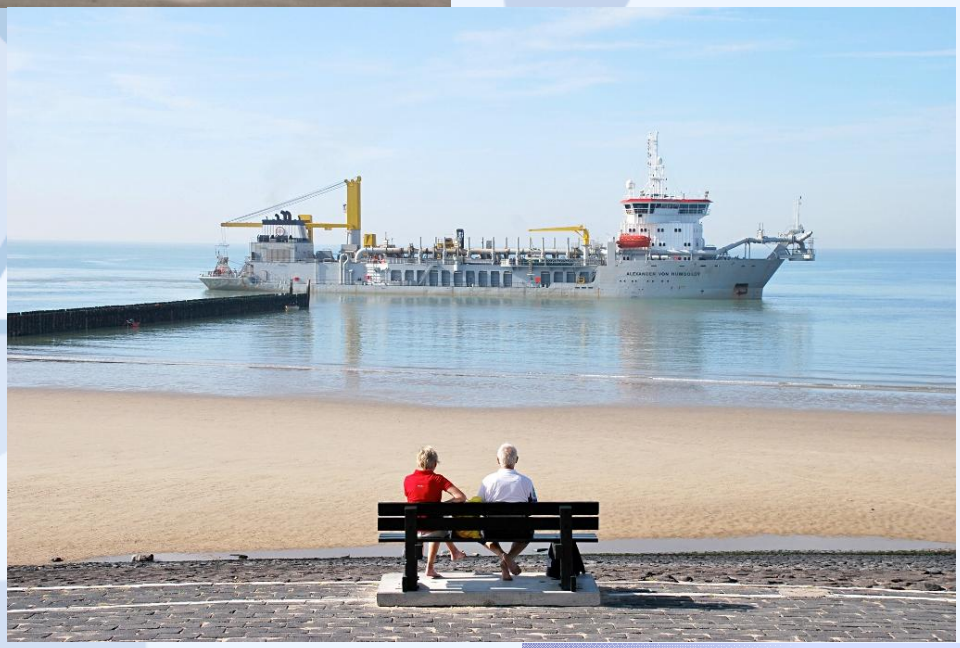
Presentation's Objectives

Demonstrate that:

- ⇨ Dredging is not a problem
  … it is part of the solution !
- ⇨ Building with Nature provides a frame to design and implement innovative approaches for waterborne infrastructures including pro-active carbon management.
- ⇨ Blue Carbon should be part of sustainable strategies for carbon management in coastal zones !

Provide food for thought on the role of the dredging sector in global and local carbon management strategies.

Dredging is part of the Solution



Dredging is not a problem … it is part of the solution !

Dredging is essential to support waterborne Transport Infrastructures

"Around 80% of the largest population centres in the world are found in coastal areas"
R. Waterman

- Port expansion in densely populated and urbanised areas
  - *"Reclaim land on the sea"*

- Ports' access for bigger ships:
  - *"Access channel deepening"*

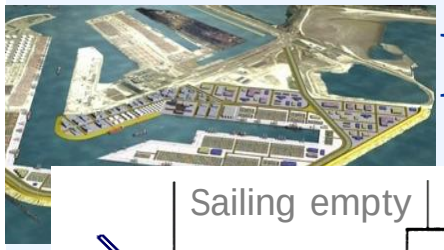
- Guaranteed navigational depth:
  - *"Maintenance dredging"*
- Contaminated sediments on seabed or riverbeds:
  - *"Environmental dredging"*

Dredging is not a problem … it is part of the solution !

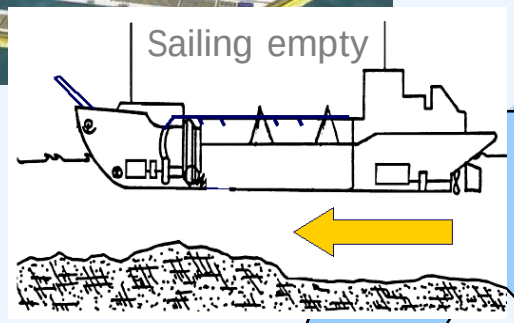
Dredging also facilitates and protects other coastal activities worldwide

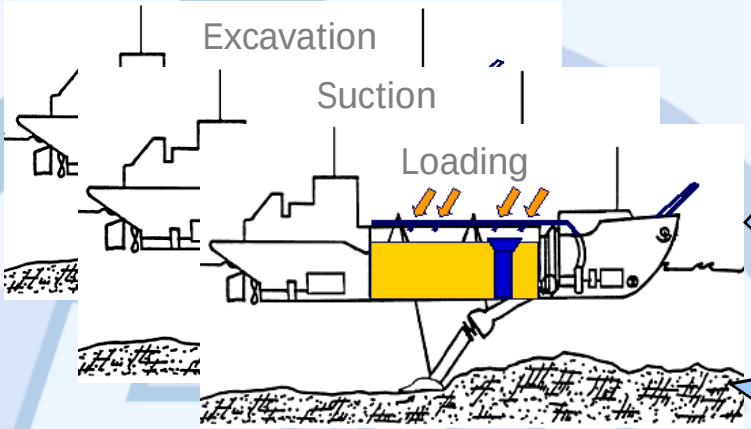
(Coastal) Cities need

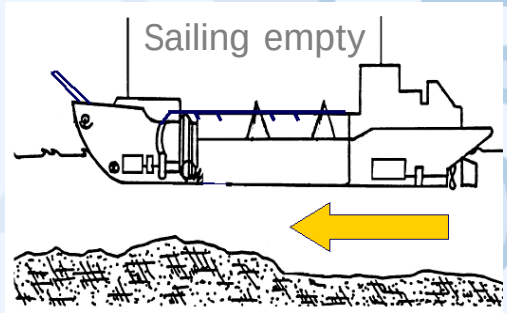
- Energy and resources:
  - *"Offshore Oil & Gas installations"*
  - *"Offshore Wind Farms"*
  - *"Aggregate Mining"*
- Protection from water
  - *"Coastal and flood protection"*
- Recreation
  - *"Leisure infrastructures"*

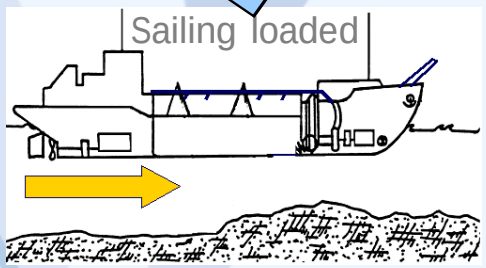


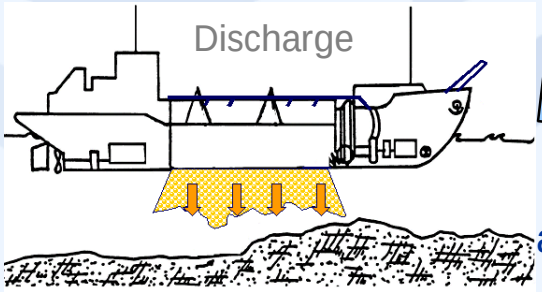
Dredging means transporting











- Sand
- Rock
- Gravel
- Silt

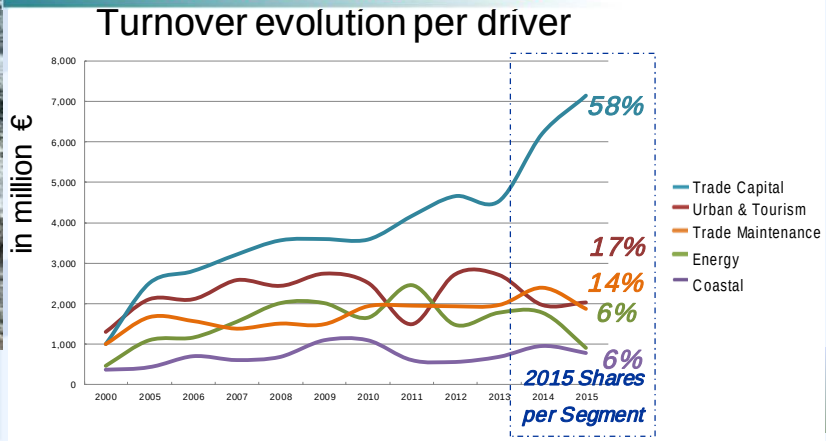
European Dredgers'Business Model
Dredging Plus

Dredging Plus: focus on dredgers' technology + focus on other sciences !

Paradox: Focus + No Focus ??

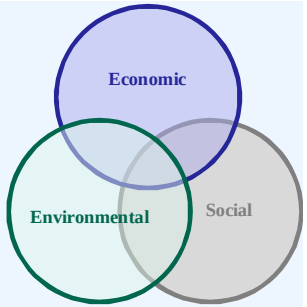
Results:

- ☞ high added value and capital intensive
- ☞ acyclical and diversified (geography & activities)
- ☞ innovative & creating new job opportunities



Issues with Waterborne Infrastructures

Any Problems ?
Large-scale Dredging Projects



- Development of large-scale projects characterised by
  - Complex environmental legislation (Directives ⇨ National Laws ⇨ Interpretation?).
  - Long-lasting procedures
  - Extensive environmental requirements
  - Uncertainties on project impacts

⇨ **Delays** (leading sometimes to cancellation).

Main Types of Obstacles to Building Waterborne Infrastructures

Mainly Legislative, Market & Governance Obstacles translating into:

- ⇨ Environmental legislation: multilayered & complex.
- ⇨ Costs Horizons: Life Cycle vs Project ?
- ⇨ Lack of Knowledge: go vs no go ?

Multilayered and complex Legislative Landscape

Design & Implementation Costs

Eco-dynamic Design

An ecodynamic design of a sand nourishment is characterized by:

- Design serves integral objectives: Guarantee coastal safety, create space for nature development and recreation
- Implementation of a large sand volume (10-20 mln m3 or more)
- Envisaged life span 20 years
- Incidental disturbance of ecosystem
- Use natural processes for distribution of sand. Gradual evolution, ecosystem capable of following morphological changes.

Traditional Design

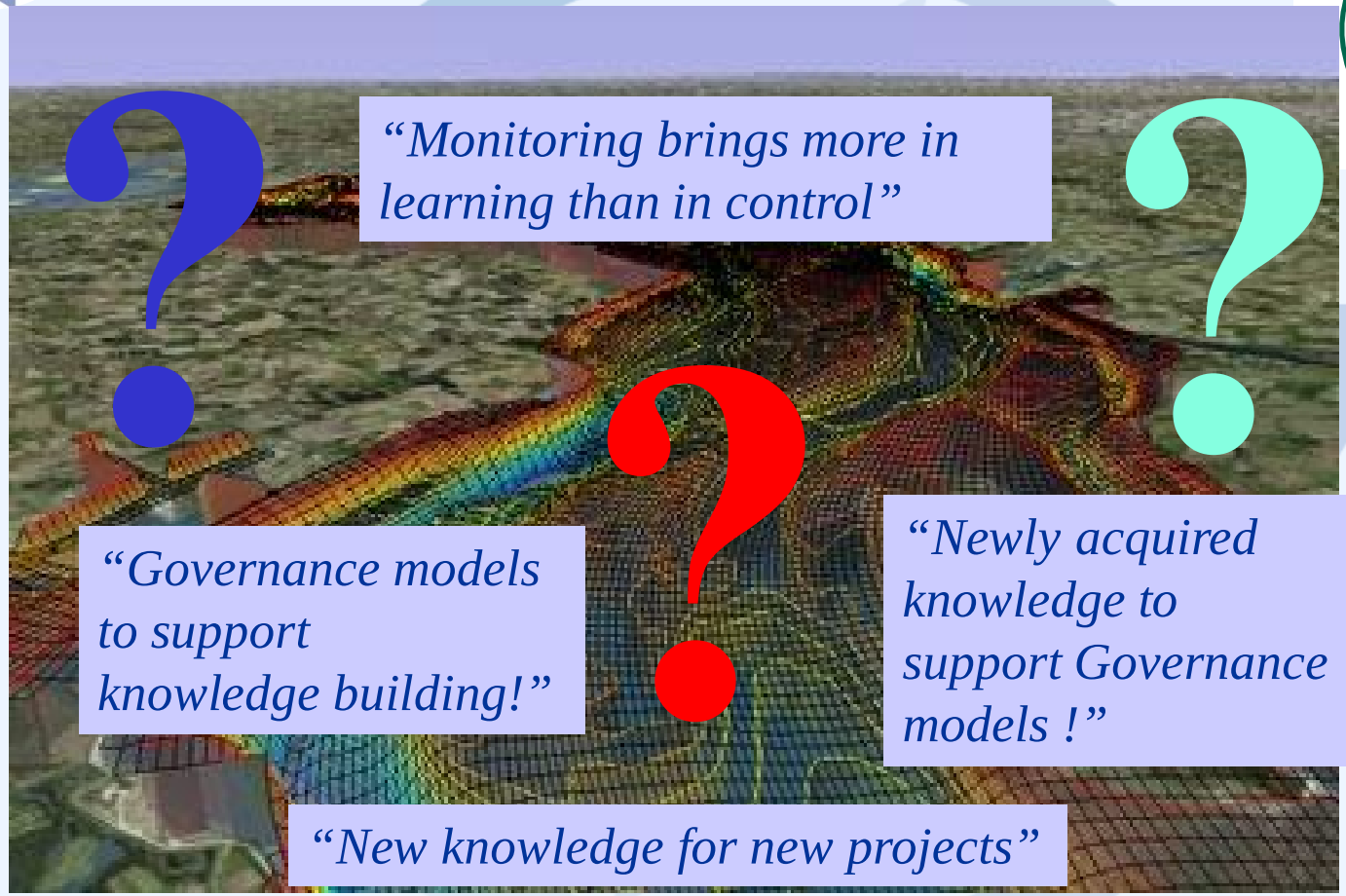
A traditional design of a sand nourisment is characterized by:

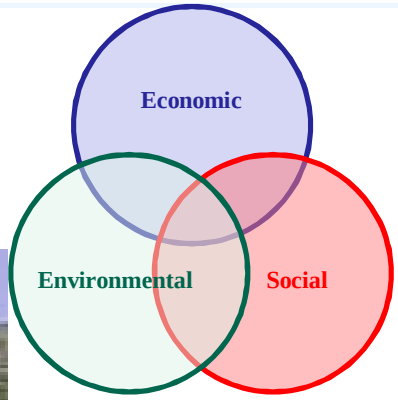
- Primary objective: Shoreline maintenace. Other objectives of secondary importance
- Implementation of a medium sand volume (2-5 mln m3)
- Envisaged life span 5 years
- Frequent disturbance of ecosystem.

- Cheaper in the long term
- Minimise Disturbance/Compensation

- Cheaper in the short term
- Frequent Disturbance
- Compensation can be significant

Lack of Knowledge
(≠ lack of decision/action)





CO_2 Emissions
European Dredgers' Strategy

CO_2 Strategy
Overview

Main objective: UNDERSTAND CO_2 emissions from dredgers

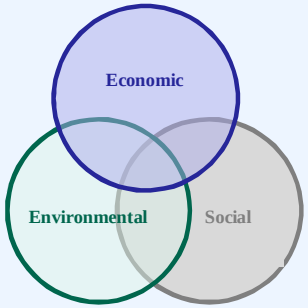
Establishment: 2009

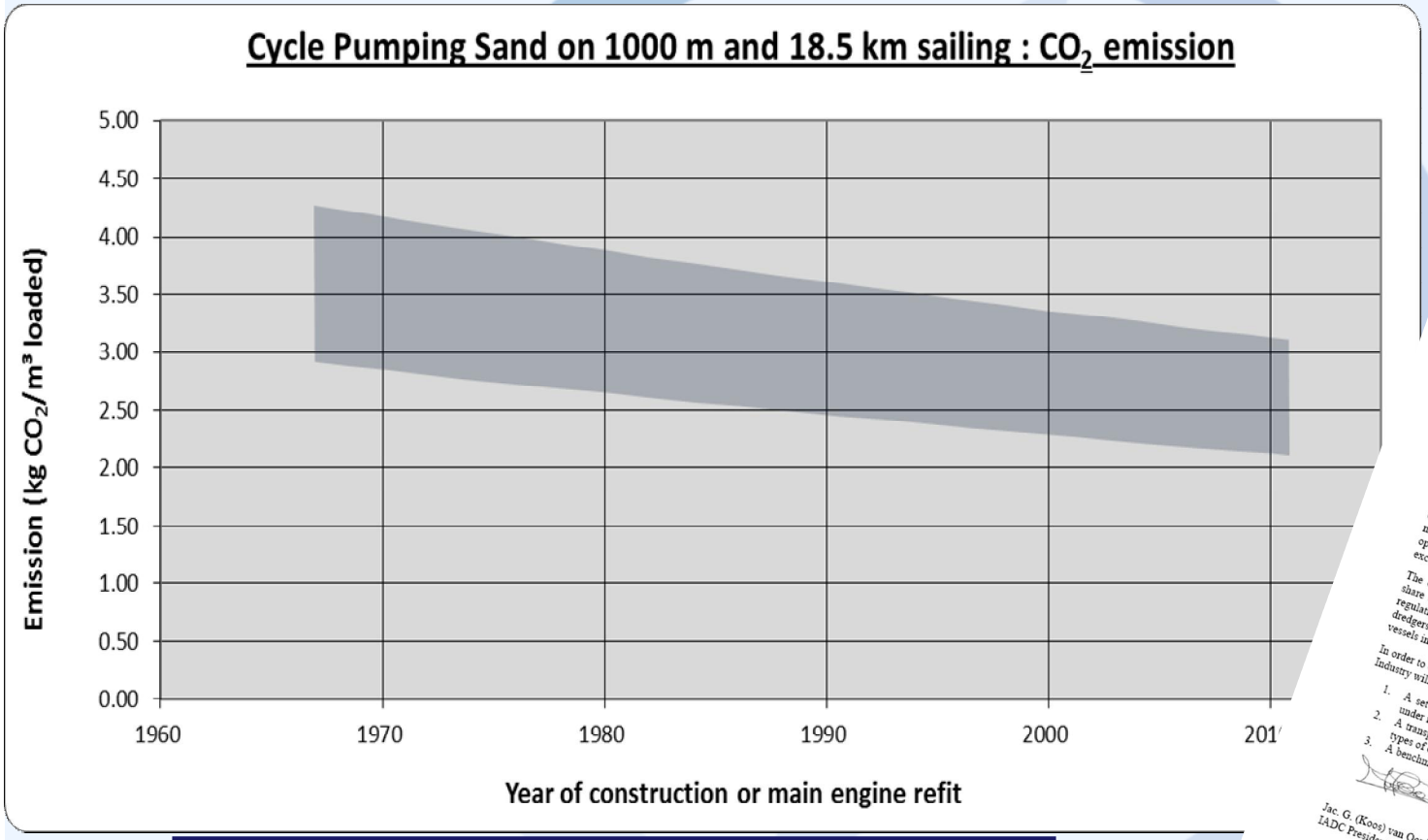
Approach: procedure and methodology for raw data collection;
collect fact based emission figures from dredgers;
establish transparent industry-backed methodology;
cooperation & information with IMO/EU/Member States;
develop dredgers' alternative to EEDI.

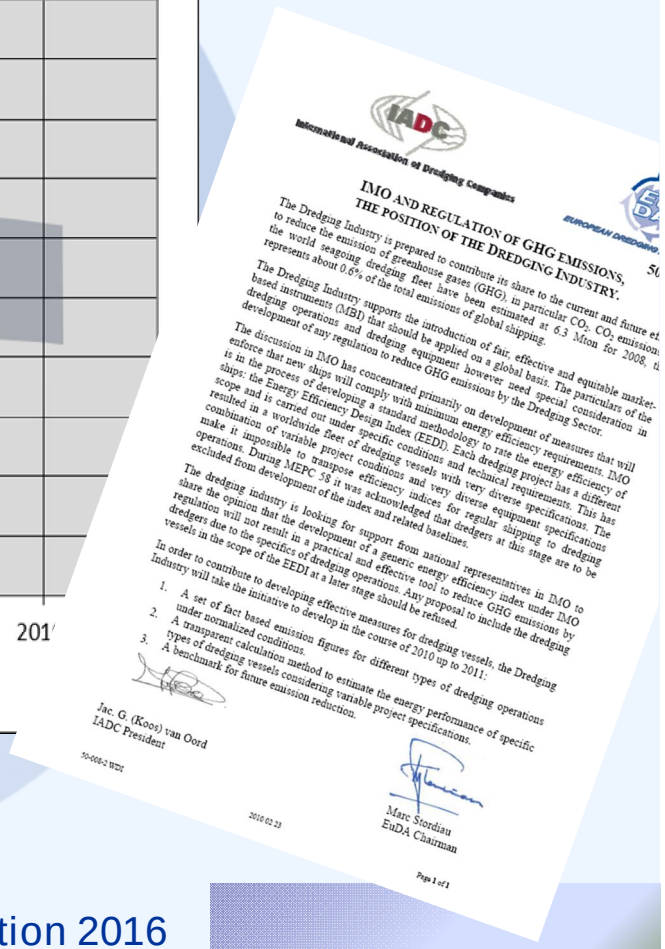
Implementation:

- information gathering;
- EuDA/IADC joint Statement in 2010;
- internal knowledge building; and
- specific message formulation to selective communication;
- information of IMO, European Commission & Member States.

Sustainable waterborne Transport
Dredgers' Commitment to CO_2







IMO AND REGULATION OF GHG EMISSIONS,
THE POSITION OF THE DREDGING INDUSTRY.

The Dredging Industry is prepared to contribute its share to the current and future ef... to reduce the emission of greenhouse gases (GHG), in particular CO_2. CO_2 emission... the world seagoing dredging fleet have been estimated at 6.3 Mton for 2008. t... represents about 0.6% of the total emissions of global shipping.

The Dredging Industry supports the introduction of fair, effective and equitable market-based instruments (MBI) that should be applied on a global basis. The particulars of the dredging operations and dredging equipment however need special consideration in development of any regulation to reduce GHG emissions by the Dredging Sector.

The discussion in IMO has concentrated primarily on development of measures that will enforce that new ships will comply with minimum energy efficiency requirements. IMO is in the process of developing a standard methodology to rate the energy efficiency of ships: the Energy Efficiency Design Index (EEDI). Each dredging project has a different scope and is carried out under specific conditions and technical requirements. This has resulted in a worldwide fleet of dredging vessels with very diverse equipment specifications. The combination of variable project conditions and very diverse specifications make it impossible to transpose efficiency indices for regular shipping to dredging operations. During MEPC 58 it was acknowledged that dredgers at this stage are to be excluded from development of the index and related baselines.

The dredging industry is looking for support from national representatives in IMO to share the opinion that the development of a generic energy efficiency index under IMO regulation will not result in a practical and effective tool to reduce GHG emissions by dredgers due to the specifics of dredging operations. Any proposal to include the dredging vessels in the scope of the EEDI at a later stage should be refused.

In order to contribute to developing effective measures for dredging vessels, the Dredging Industry will take the initiative to develop in the course of 2010 up to 2011:

1. A set of fact based emission figures for different types of dredging operations under normalized conditions.
2. A transparent calculation method to estimate the energy performance of specific types of dredging vessels considering variable project specifications.
3. A benchmark for future emission reduction.

Jac. G. (Koos) van Oord
IADC President

Marc Stordiau
EuDA Chairman

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2. A transparent calculation method to estimate the energy performance of specific types of dredging vessels considering variable project specifications.
3. A benchmark for future emission reduction.

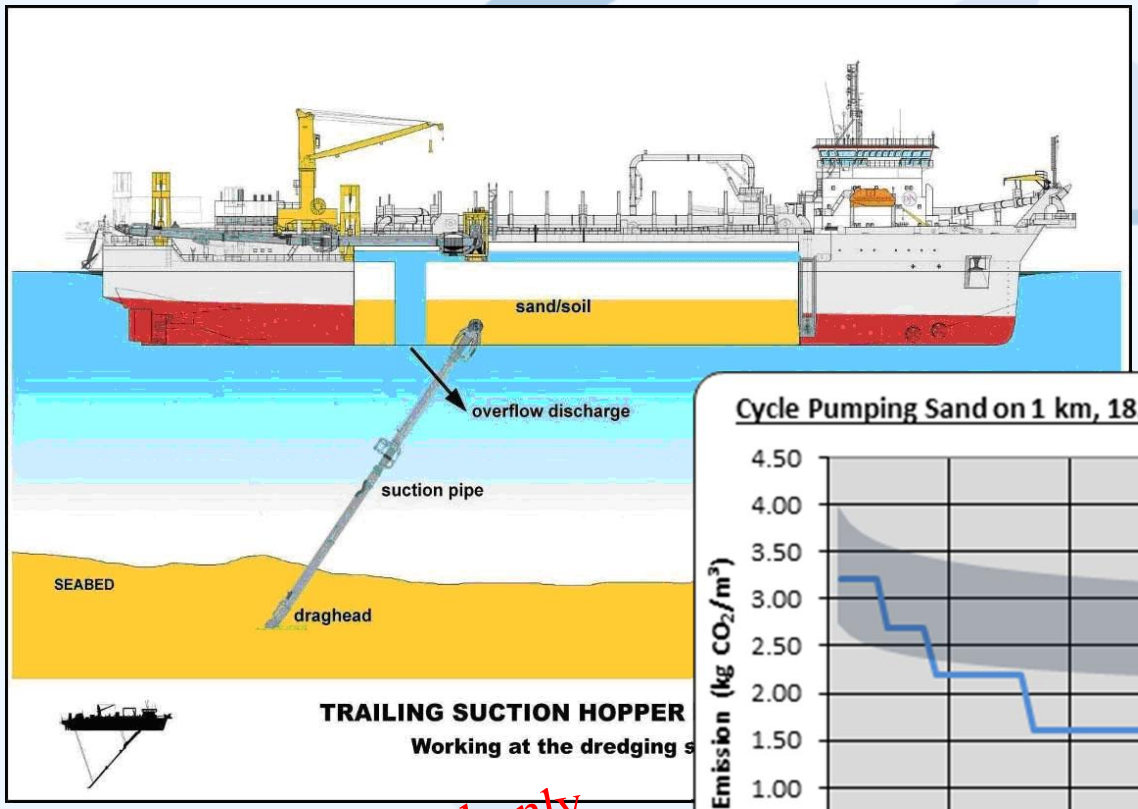
EEDI for Dredgers?

EEDI not suitable for reducing dredging emissions because dredgers **use energy to both sail and work**.

Emissions of a dredger are depending on the specific project conditions such as:

- ⇨ Soil conditions
- ⇨ Depth
- ⇨ Space for manoeuvring
- ⇨ Loading and unloading requirements

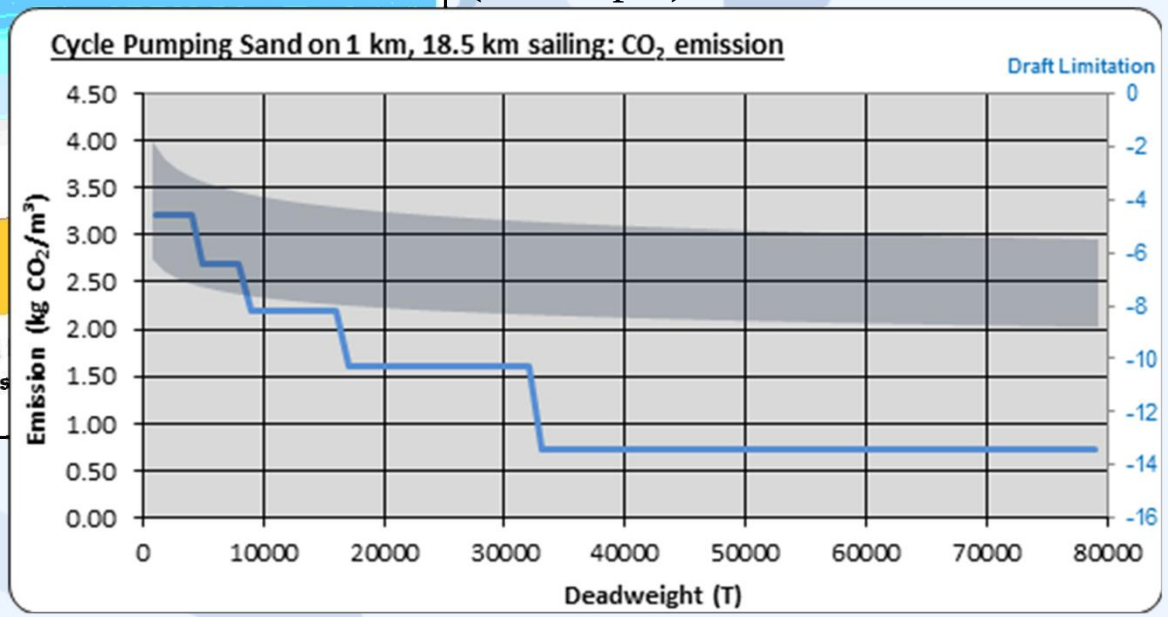
CO_2 emissions
External Communication TSHD



Description of TSHD

Basis for Calculation

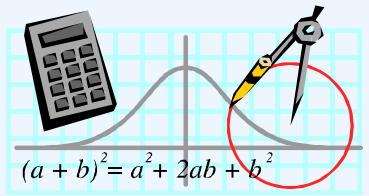
Graphs of expected Performance in 'Normalised' Cycles (+example)

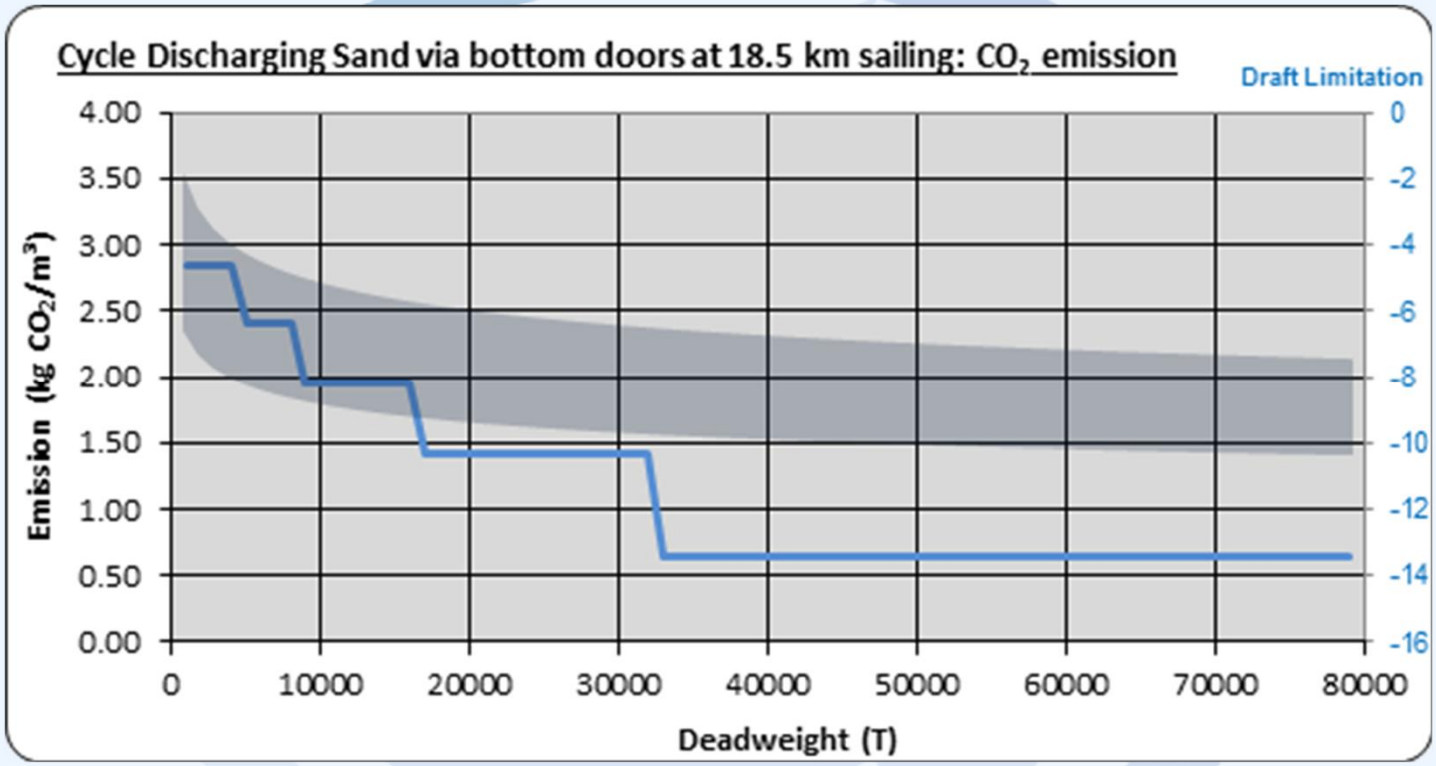


Available on demand only

CO_2 emissions
TSHD Operations

CO_2 emissions
TSHD Normalised conditions

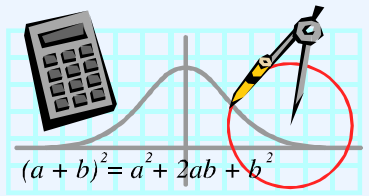


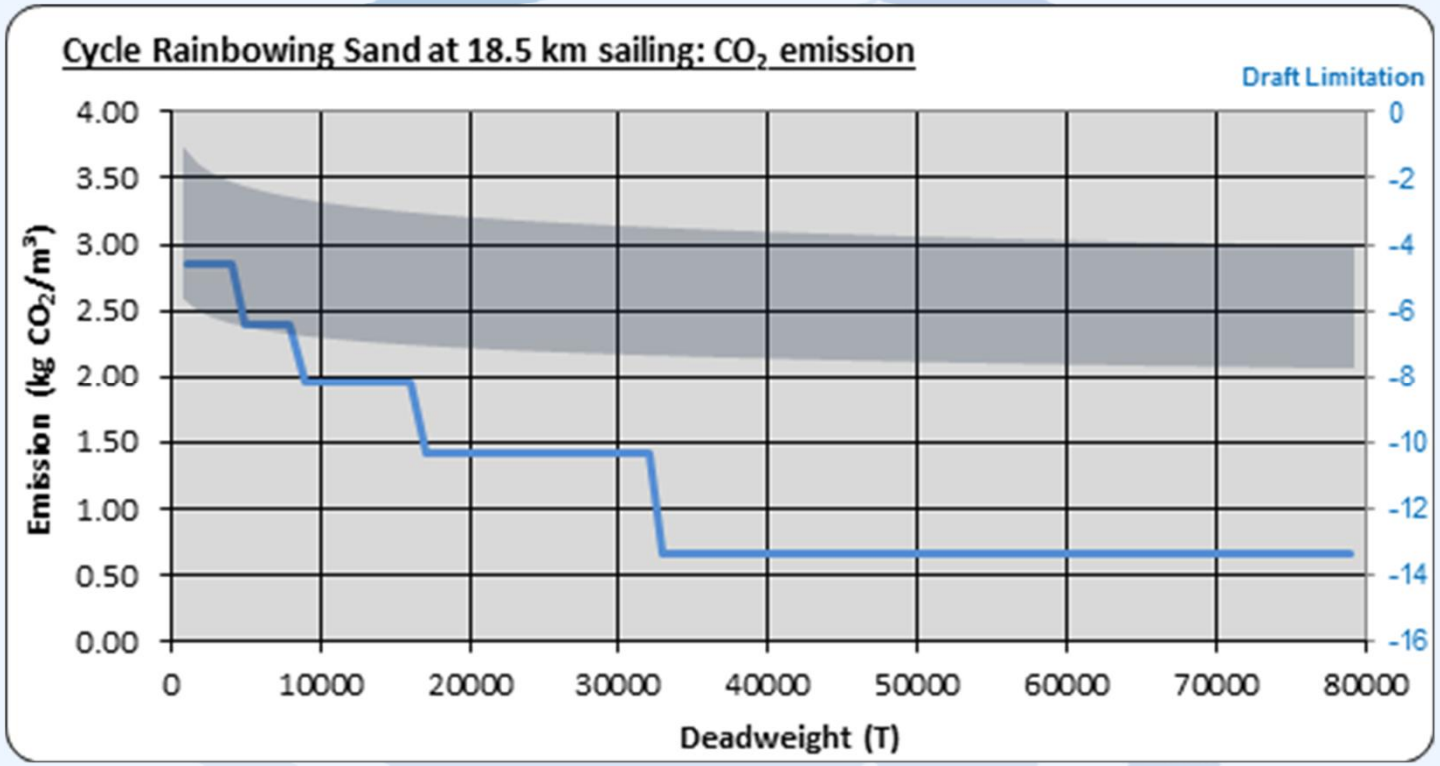


DWT	10,000	20,000	30,000	40,000	50,000	60,000	70,000
Max (kg CO_2/m^3)	2.69	2.48	2.37	2.30	2.24	2.20	2.16
Min (kg CO_2/m^3)	1.80	1.66	1.59	1.54	1.50	1.47	1.45

This distance is equivalent to 10 Nautical miles, used for sailing (1 NM corresponds exactly to 1,852 metres or one minute of arc measured along any meridian).

CO_2 emissions
TSHD Normalised conditions





DWT	10,000	20,000	30,000	40,000	50,000	60,000	70,000
Max *(kg CO_2/m³)*	3.32	3.20	3.14	3.10	3.06	3.04	3.01
Min *(kg CO_2/m³)*	2.33	2.25	2.20	2.17	2.15	2.13	2.11

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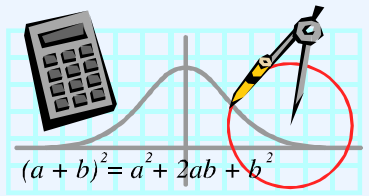
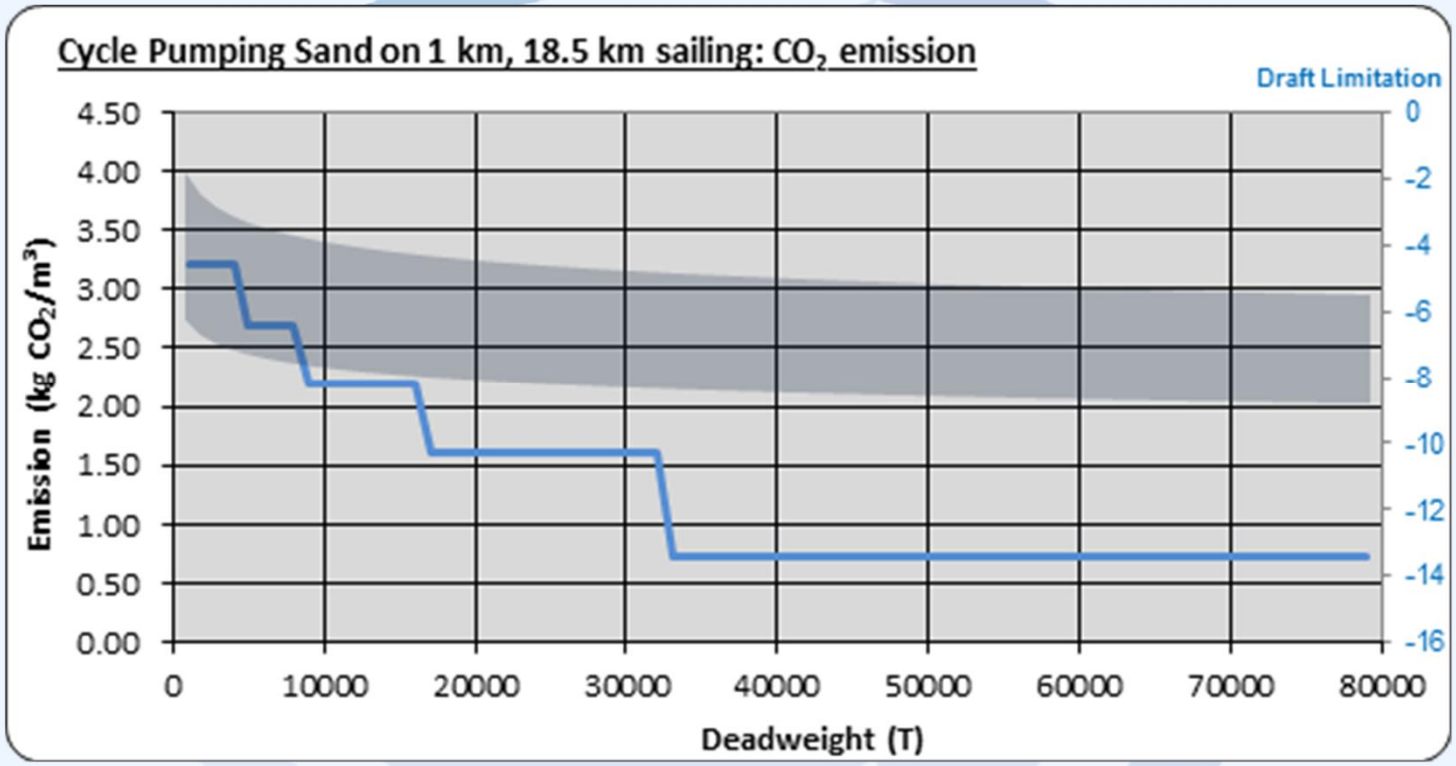
CO_2 emissions
TSHD Normalised conditions





DWT	10,000	20,000	30,000	40,000	50,000	60,000	70,000
Max *(kg CO_2/m³)*	3.41	3.26	3.17	3.11	3.06	3.03	2.99
Min *(kg CO_2/m³)*	2.36	2.25	2.19	2.15	2.12	2.09	2.07

This distance is equivalent to 10 Nautical miles, used for sailing (1 NM corresponds exactly to 1,852 metres or one minute of arc measured along any meridian).

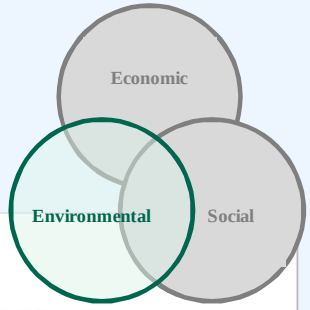
CO_2 emissions
EuDA Comments on MRV Regulation

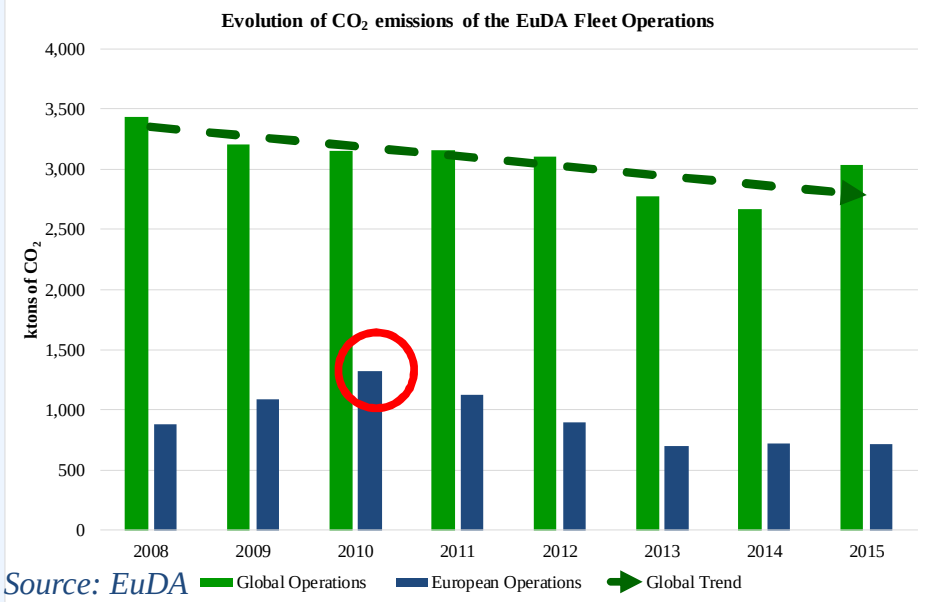
The European Dredging Association's views are:

- ✓ MRV system should be global (IMO);
- ✓ Annual reporting;
  - ⇨ *No publication of individual ships' performance;*
- ✓ from ships **>5,000GT**;
  - ⇨ *Excluding small emitters (ships < 5,000GT);*
- ✓ **voyages** into, out of and between EU ports;
  - ⇨ *What about 'working' vessels ? Dredging cycles ?* ***Project approach****;*
- ✓ Use existing (IMO) systems/data;
  - ⇨ ***ISO 14064*** *(GHG accounting and verification) ?*
- ✓ (if possible) other GHG/SO_x/NO_x (*not standard on board*);
- ✓ link to carbon offsetting (e.g. blue carbon restoration).

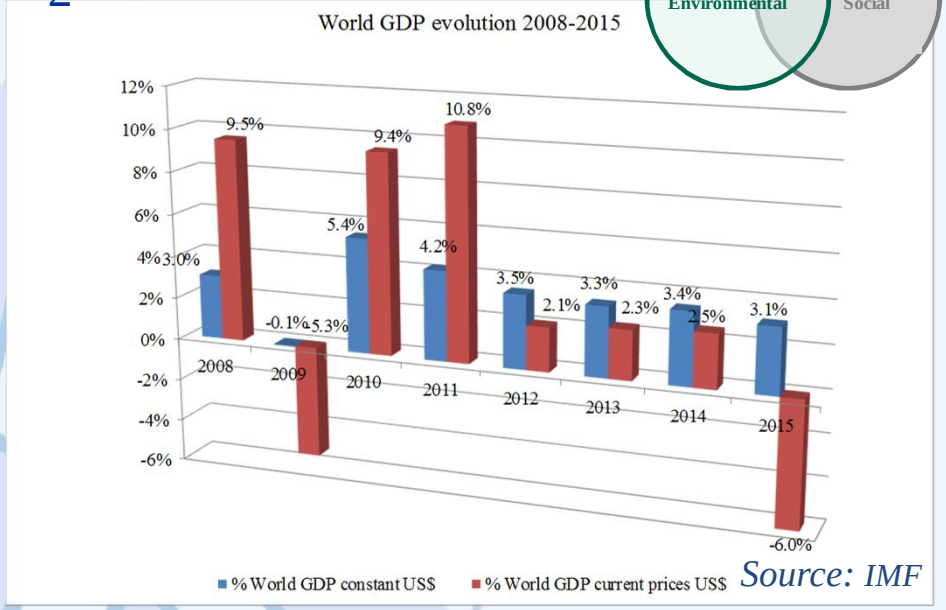
CO_2 emissions

EuDA Fleet CO_2 emissions





Source: EuDA

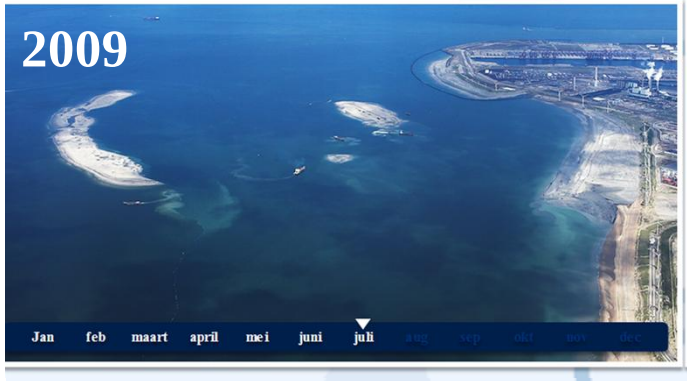


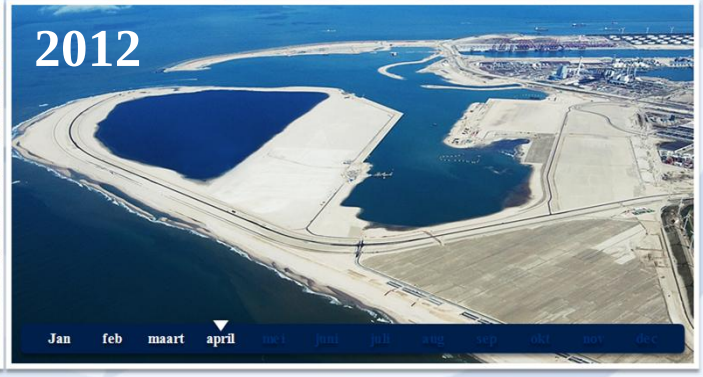
Source: IMF

EuDA Sea-Going Fleet		2008	2009	2010	2011	2012	2013	2014	2015
Global Operations									
Installed Power	MW	1,510	1,587	1,591	1,779	1,845	1,666	1,599	1,171
Fuel Consumption	*kton*	*1,090*	*1,016*	*999*	*1,003*	*986*	*881*	*847*	*959*
CO_2 Emissions	**kton**	**3,440**	**3,211**	**3,155**	**3,163**	**3,108**	**2,775**	**2,673**	**3,033**
European Operations									
Installed Power	MW	420	511	654	637	502	527	531	409
Fuel Consumption	*kton*	*280*	*307*	*420*	*357*	*283*	*220*	*229*	*223*
CO_2 Emissions	**kton**	**880**	**1,088**	**1,326**	**1,126**	**896**	**696**	**724**	**713**

CO_2 emissions

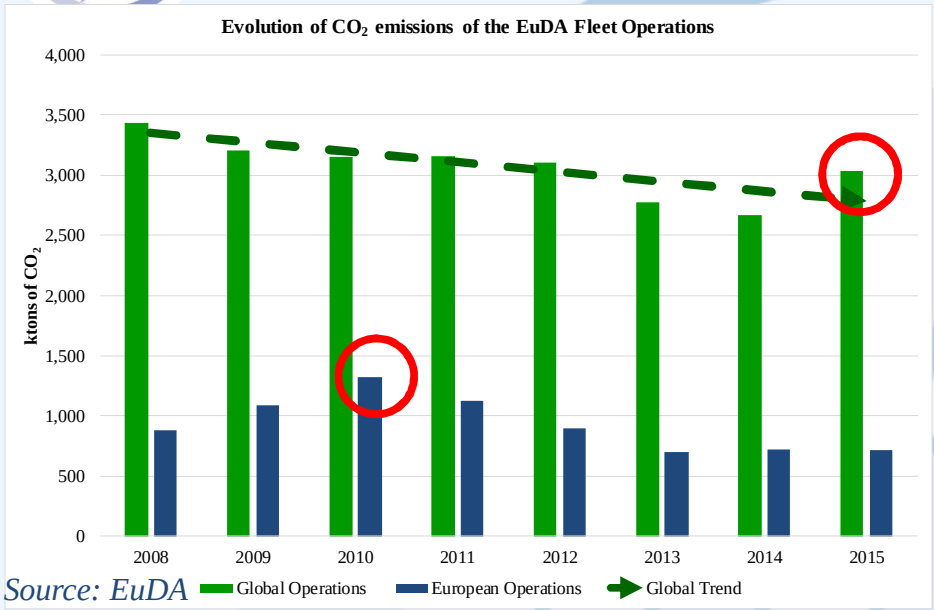
2010: Maasvlakte2 (240 mn m^3 of sand)





CO_2 emissions

EuDA Fleet CO_2 emissions



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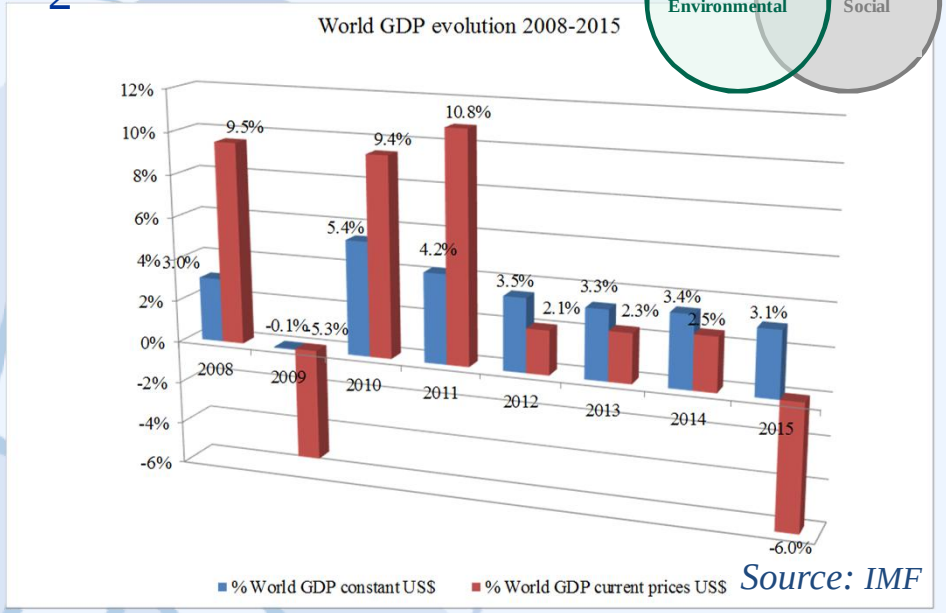

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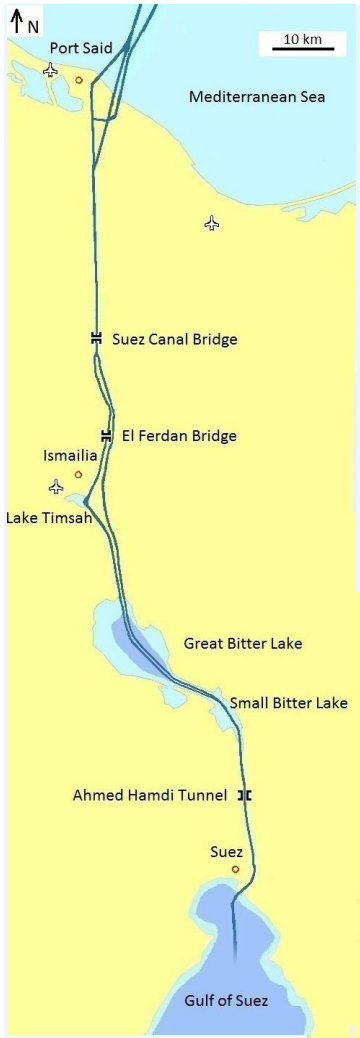
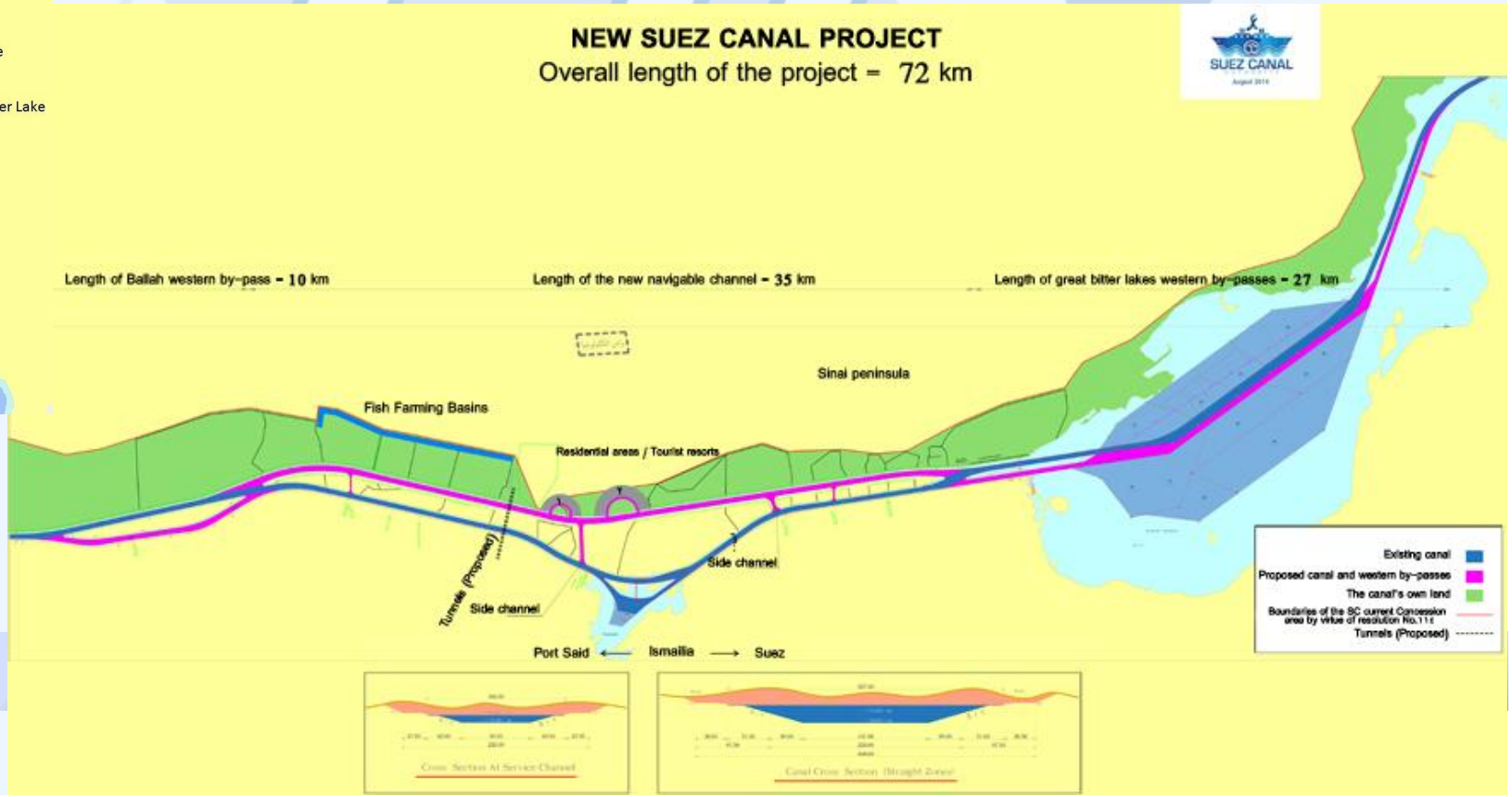
CO_2 emissions

2015: Suez Canal Expansion (258 mn m^3)

Facts and Figures about the new Suez Canal	*Source: EuDA & Suez Canal Authority*
Total length	**72 km**
Dredging works	**258 mn m^3**
Duration of execution	**10 months** (11/2014–08/2015, excl. mobilisation 2 months)
Estimated cost	EGP 15 billion (~2.1 billionUS$, ~**1.9 billion€**)
Equipment	**45 dredgers** (incl. 27 CSDs and 13 TSHDs)





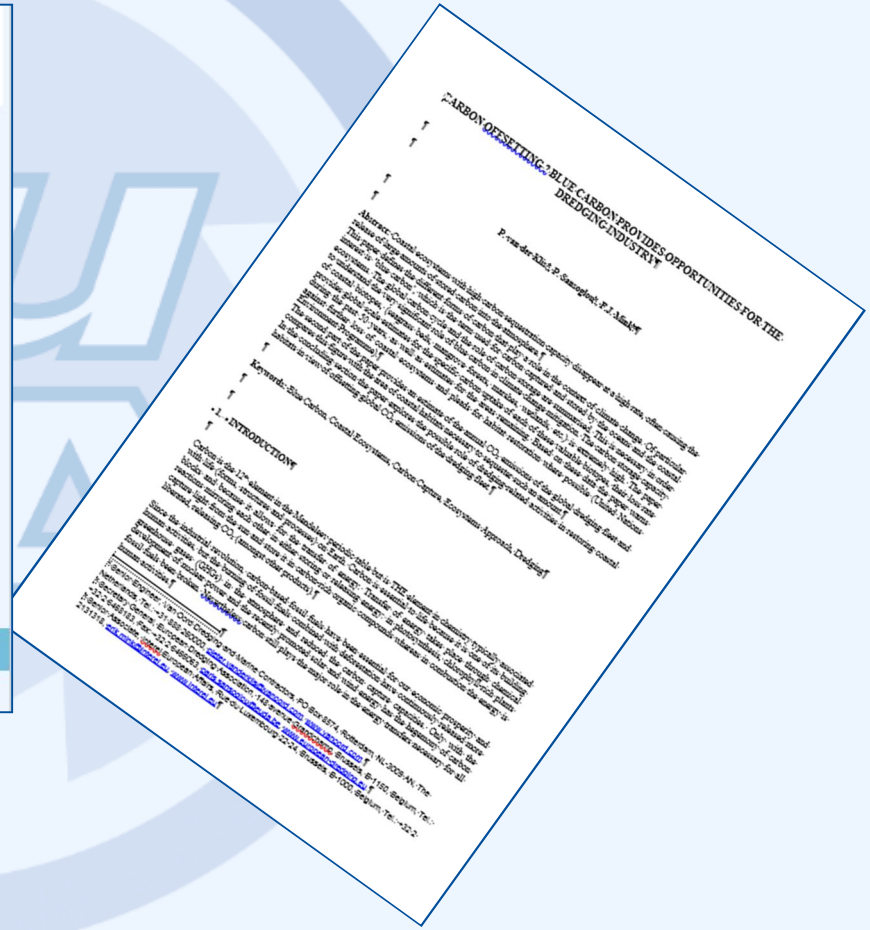
CO_2 emissions
Global Economy & Waterborne Transport

- Emissions reductions cannot be disconnected from global economy (and global trade);

- Absolute targets, such as -40% / -50% by 2050, cannot be achieved with relative measures on emission sources, particularly when the global economy is booming;

⇨ Complementary work needs to be done on the **atmospheric concentrations of CO_2.**

WODCON XX Brussels 2013



WODCON XX Brussels 2013

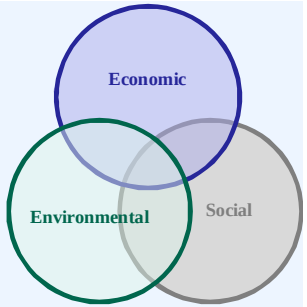
What is Blue carbon?

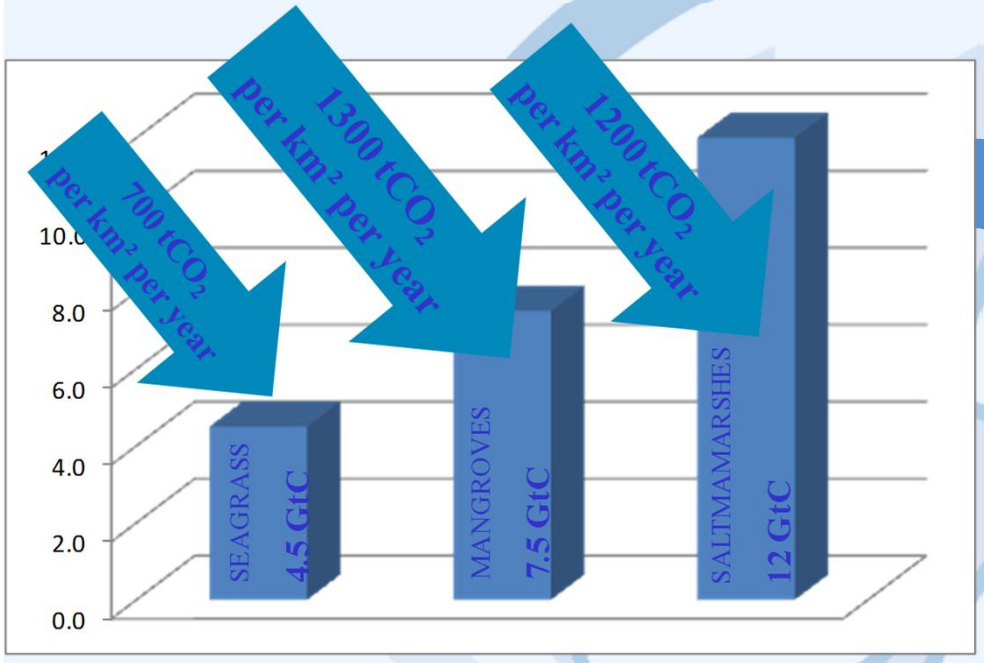
- ✓ oceans & coastal biotopes that are **natural carbon sinks** (mangroves, seagrasses, salt marshes, coral reefs, etc.);
- ✓ captures atmospheric CO_2 through the plants' **photosynthesis**;
- ✓ stores carbon in the long-term through the natural growth processes in the ecosystems' plants and animals (respectively the **gross primary and secondary productions**).

"Blue carbon" ecosystems:

- ✓ play a significant role in the global carbon cycles;
- ✓ are important carbon sinks;
- ✓ provide a range of valuable other services (ecosystems services);
- ✓ their enhancement, restoration or development should be better integrated in coastal development projects (Building with Nature approach).

WODCON XX EuDA Paper:
A 'sizeable' offsetting opportunity

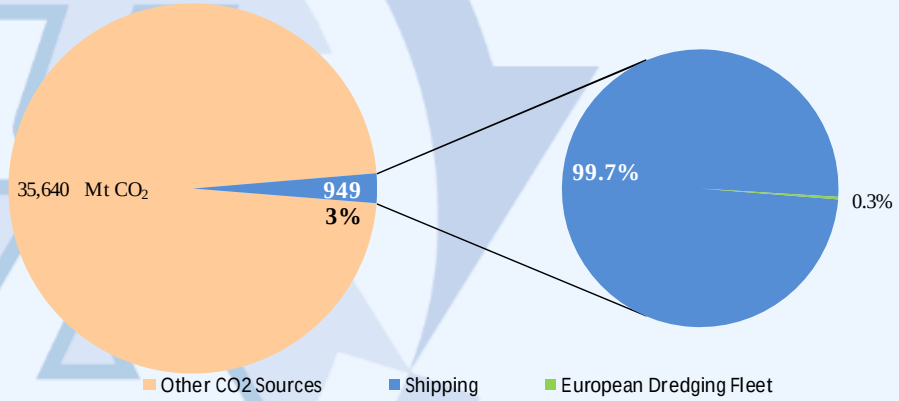




Estimated Blue Carbon Storage vs Blue Carbon uptake

Maritime Sector (2012): 3% of global CO_2 emissions

European Dredging Fleet: **0.3%** of Maritime CO_2 emissions

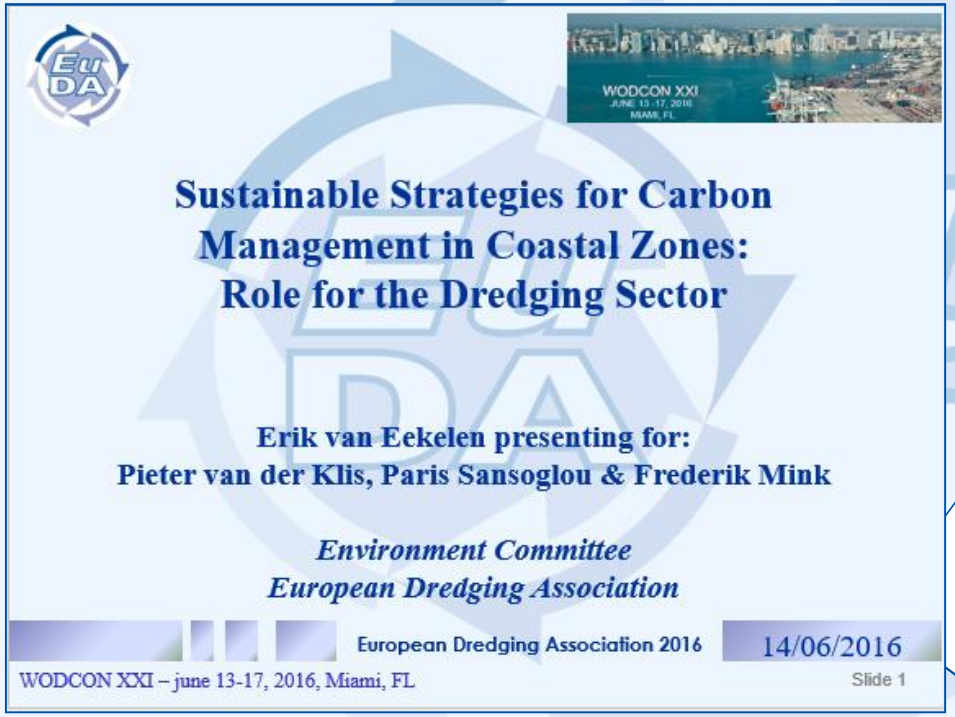


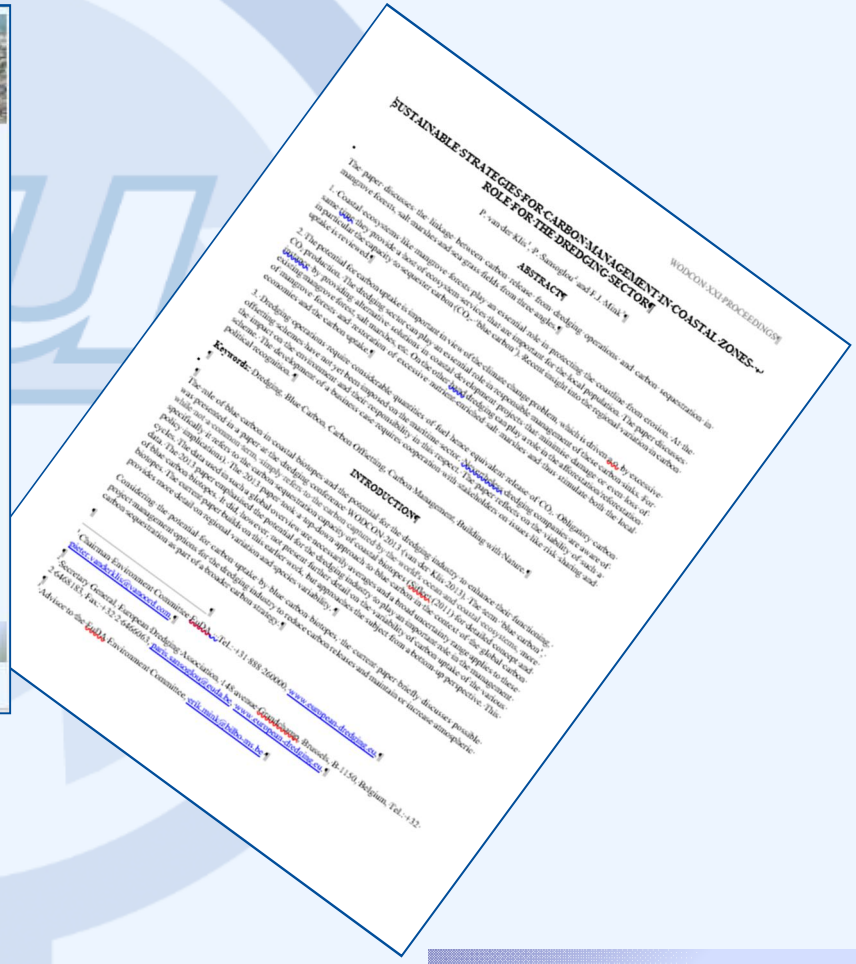
~ Surface of Luxembourg (2,586 km²)

Estimated Restoration Surfaces

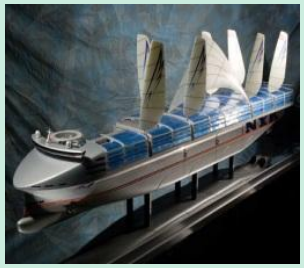
- ✓ 2,700 km² of salt marshes;
- ✓ 2,500 km² of mangrove forests;
- ✓ 4,600 km² of seagrass beds.

WODCON XXI Miami 2016





WODCON XXI EuDA Paper:
Carbon Strategies

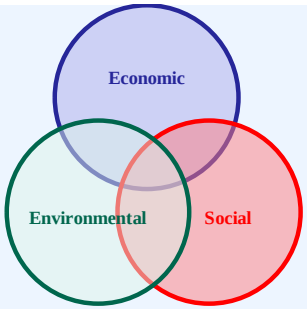
	Investment based	Operational
Strategy at company/ project level	(1) Invest in **fleet efficiency** or alternative fuels 	(2) Project-based: offset loss of mangroves / salt marsh / seagrass (**replant**). 
Strategy/Policy at sector/intersector level	(3) Up-front **investment** in large plantations 	(4) **Carbon trading**: buy CO_2 certificates to compensate for project or fleet emissions 

EuDA Papers on Blue Carbon

- ⇨Blue Carbon should be part of sustainable strategies for carbon management in coastal zones !
- ⇨Pro-active carbon management includes either:
  - ⇨Project based replanting
  - ⇨Upfront investment in large-scale carbon uptake
- ⇨Pro-active carbon management using nature based design (eg Building with Nature) provides opportunities to the dredging industry!

The Way Forward: Building with Nature

Need for a Paradigm Switch



⇨ From defensive approach, minimising environmental impact,

"Environment = Constraint"

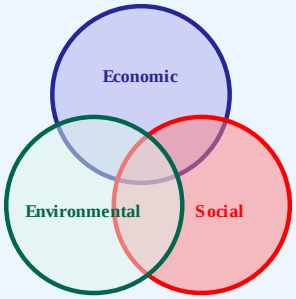
⇨ To constructive approach, optimising full (socio-)economic and environmental potential.

"Environment = Opportunity"

Considering the project's added value to:

Safety ? | Nature ? | Attractiveness ? | Sustainability ? | Society ? Economy ?

Building with Nature
A Nature-Based Concept



Building with Nature

is a partnership with Nature, integrating both physical and biological aspects of Nature into a project's design, EcoDynamic Design or Geo-Engineering, and its implementation so that the project integrates more harmoniously and more harmlessly into Nature and when possible to Nature's benefits.

"Where Nature and Man work together for their mutual benefit."

Building with Nature works

soft solutions

hard solutions

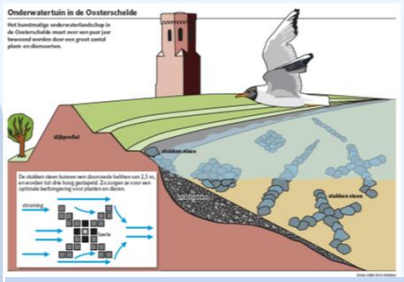
Temperate

Tropical

Pilot Sand Motor Delfland Coast

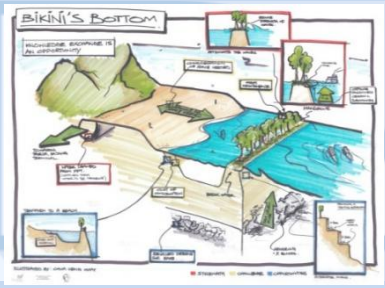
IJsselmeer foreshore nourishment

ES: oyster reefs as shore protection



Eastern Scheldt Underwater garden

Coastal protection Sea grass



BwN design Singapore Labrador Park

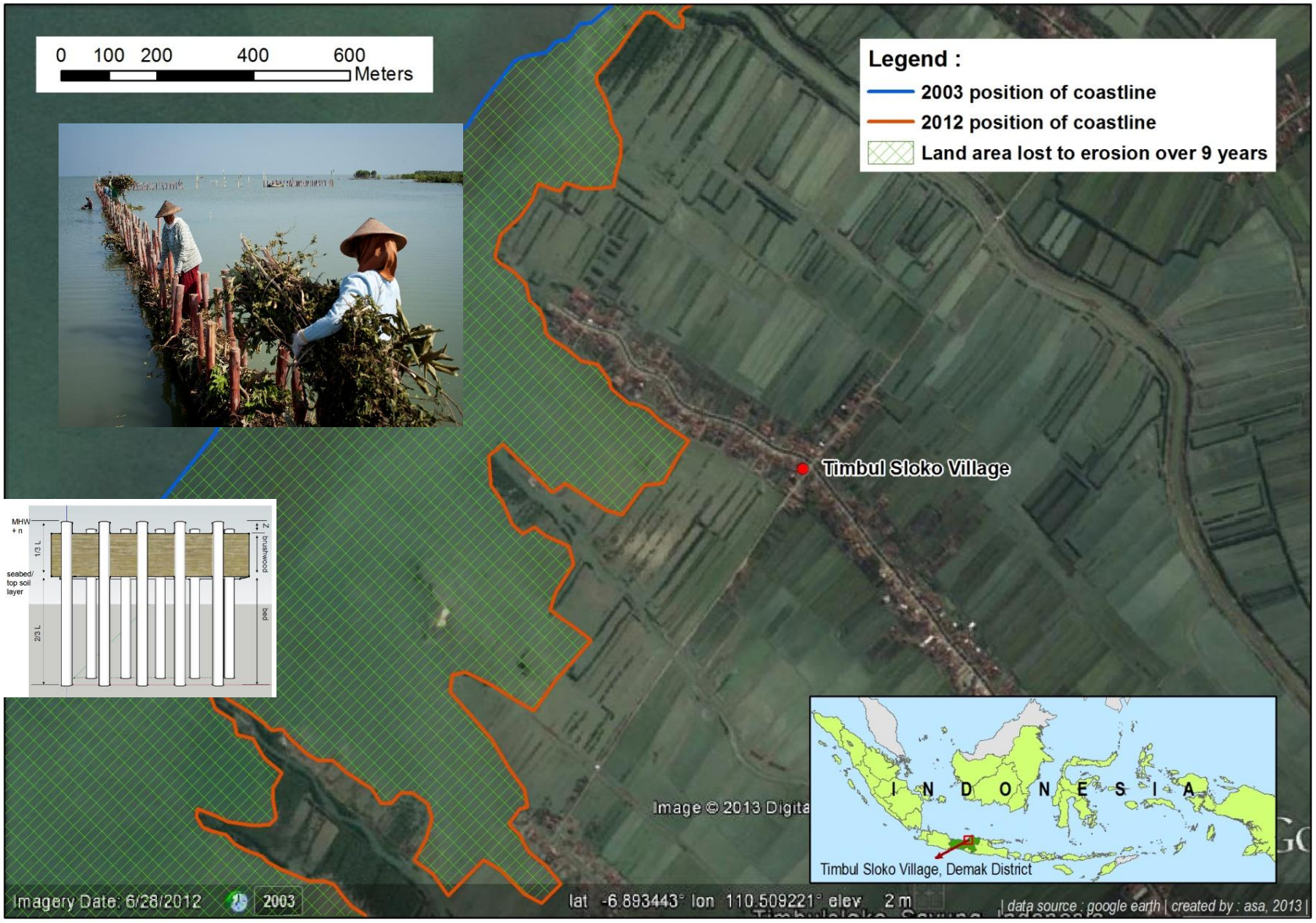
Coastal protection Mangroves

Singapore 'rich levee'

focus on ecosystem functioning

focus on infrastructure development

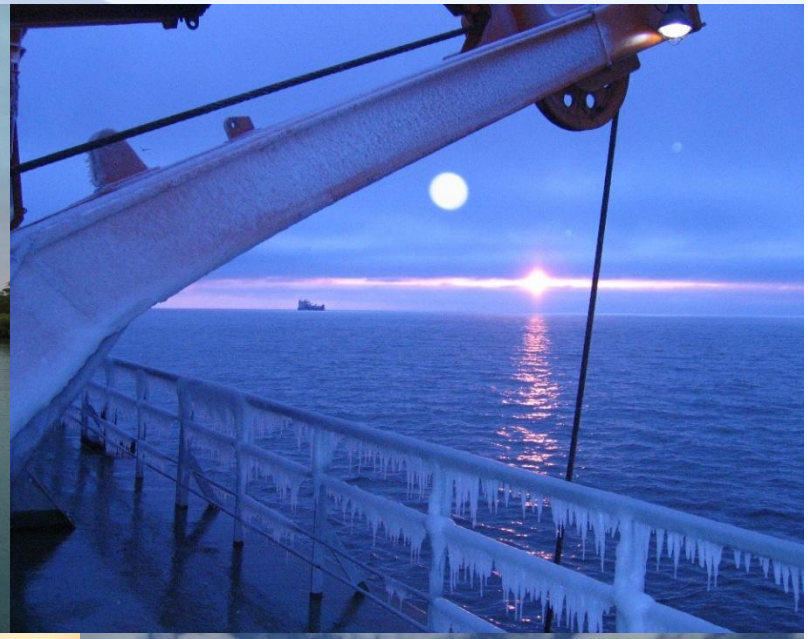
Building with Nature in Indonesia



Blue Carbon: Mangrove restoration Demak

EcoShape

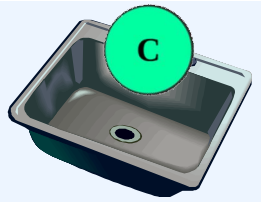
Conclusions



Conclusions

- ⇨ Dredging is not a problem
  … it is part of the solution !
- ⇨ Dredgers can and do contribute to
  - ✓ CO_2 emissions reduction;
  - ✓ CO_2 Offsetting;
  - ✓ Mitigation of Climate Change Effects.
- ⇨ Building with Nature provides a frame to design and implement innovative approaches for waterborne infrastructures including pro-active carbon management.
- ⇨ Blue Carbon should be part of sustainable strategies for carbon management in coastal zones !

Conclusions
Blue Carbon next steps



Blue carbon:

- ✓ oceans & coastal biotopes that are **natural carbon sinks** (mangroves, seagrasses, salt marshes, coral reefs, etc.);
- ✓ captures atmospheric CO_2 through the plants' **photosynthesis**;
- ✓ stores carbon in the long-term through the natural growth processes in the ecosystems' plants and animals (respectively the **gross primary and secondary productions**).

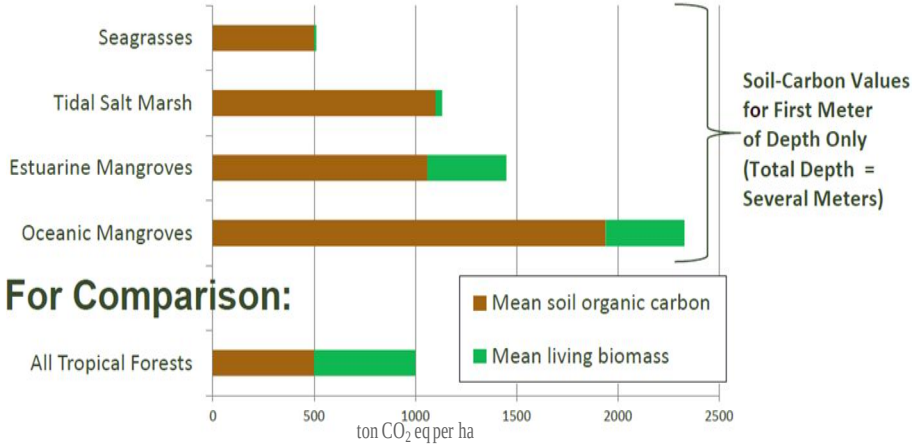
Prerequisites

- ✓ Establishment of **Market Based Measures** (MBM);
- ✓ **Political recognition** (IMO, EU); and
- ✓ direct link (market certification) to MBM;
- ✓ Functioning MBM market.

CO_2 emissions reduction:

- ✓ emissions reductions cannot be disconnected from **global economy** (and global trade);
- ✓ -40% by 2050 are impossible to achieve if only acting on the **emission sources**;
- ✓ Blue Carbon reduces **CO_2 atmospheric concentrations**
  = offsetting opportunities that can be bought/sold.

Examples



Thank you !

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  148 Avenue Grandchamp, B-1150 Brussels
  e-mail: info@euda.be
  Tel.: +322 6468183
  Fax : +322 6466063

- Website:
  www.european-dredging.eu

More on Building with Nature @:

EcoShape

www.ecoshape.nl

Vlaamse Baaien
Veilig, natuurlijk, aantrekkelijk, duurzaam, ontwikkelend

www.vlaamsebaaien.com

What is EuDA about ?

EUROPEAN DREDGING ASSOCIATION

"EuDA is the official interface between the European dredging industry and the European Institutions"

- founded in 1993
- represents the European Dredging Companies
- from 20 EU Member States
- from 1 EEA Member State
- world leaders (top 4)
- with a turnover (2015): € 9.2 bn
- +/- 25,000 European direct employment
- >50,000 indirect employment (*supply and service companies*)