

# Environmental performance of SSS

Europort Short Sea Conference, 4 November 2009, Rotterdam

Eelco den Boer

## ▶ CE Delft

- Independent, not-for profit consultancy, founded in 1978
- Based in Delft, the Netherlands
- Transport, Energy, Economy
- 15+ years of experience with environmental policies for aviation and shipping
- Clients include IMO, European Commission, national governments, ports, NGOs

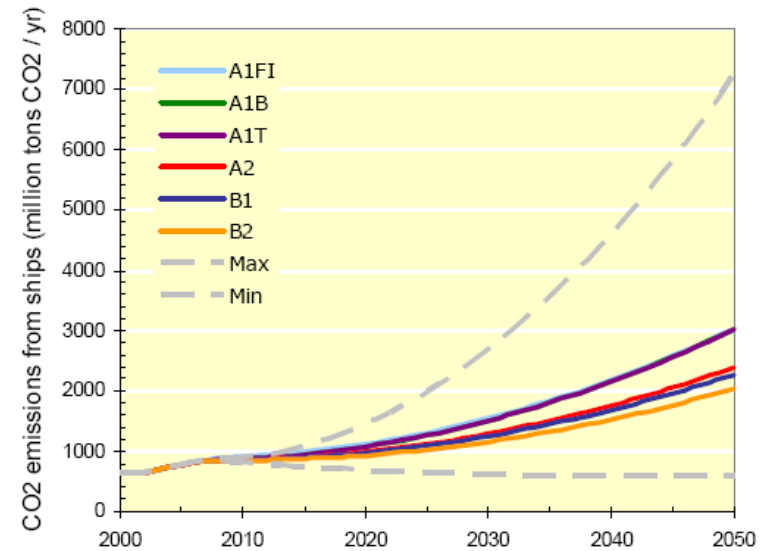
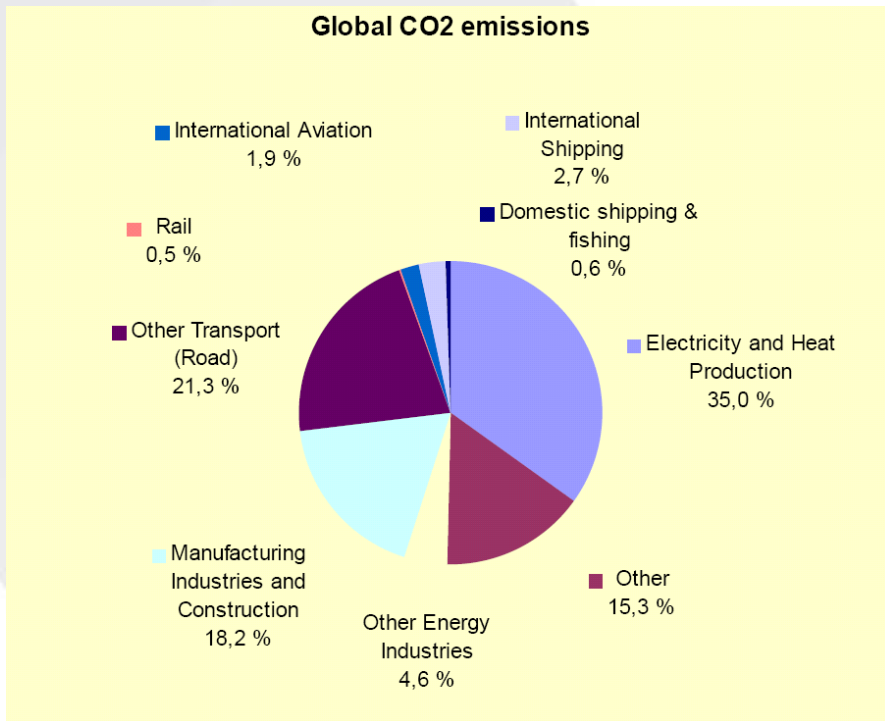


## ▶ Outline

- Introduction
- Shipping, air quality and climate
- Environmental regulations
- Comparison with other modes
  - Per fuel
  - Per unit of engine output (kWh)
  - Per unit of transport (ton-kilometer)
- Policy measures and conclusions



# ▶ CO<sub>2</sub> emission estimates (Source: second IMO GHG study 2009)

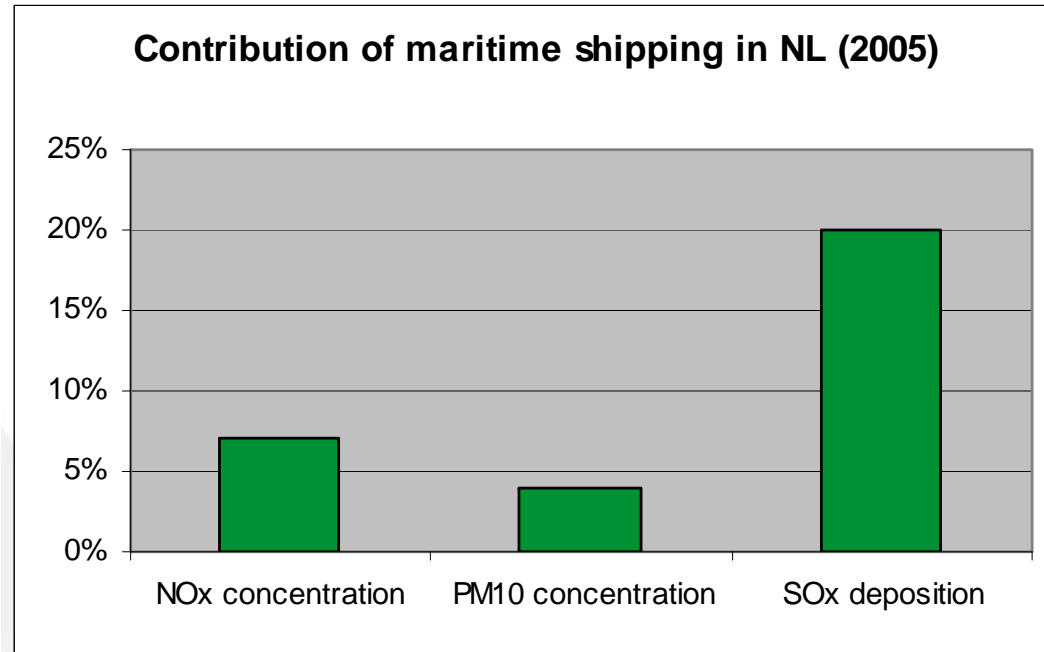
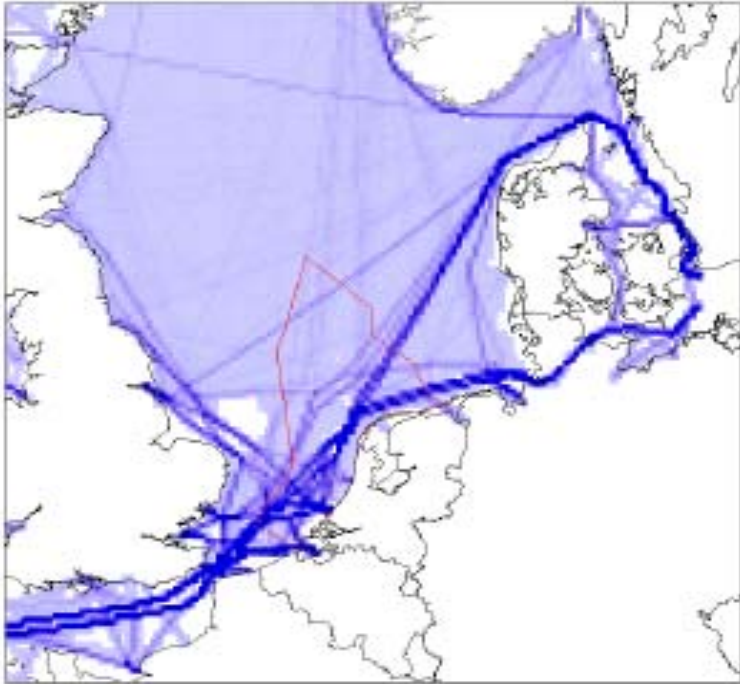


High growth, high speeds

vs.

low growth, low speeds, increased efficiencies

## ▶ Shipping and air quality

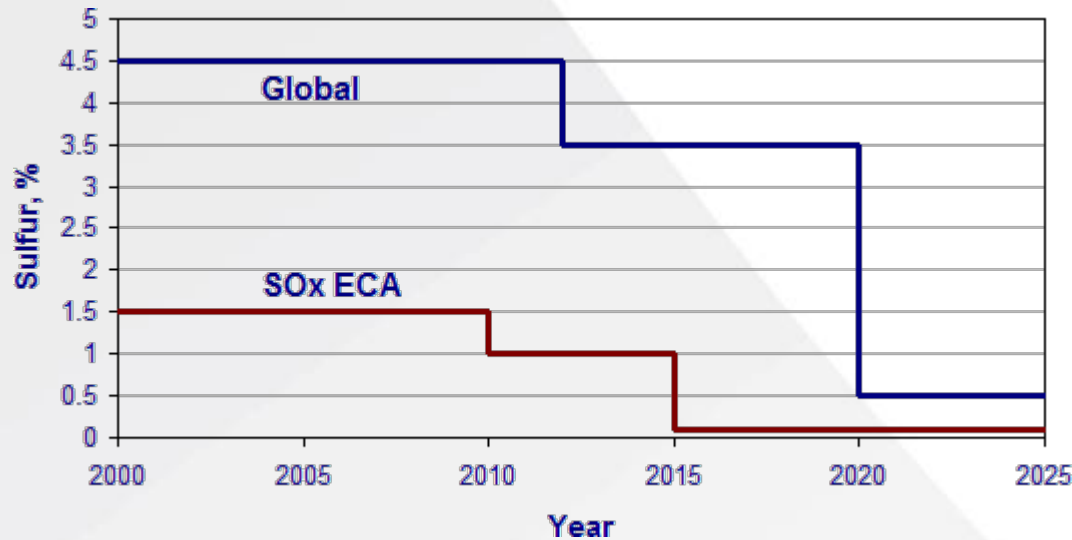


Source: Dutch EPA

- Significant variation between west and east
- Contribution to pollutant concentrations in Port of Rotterdam area at hot spots up to 20%

## ▶ Environmental regulations (SOx)

- Annex VI to the MARPOL convention entered into force in 2005 (2000)
- October 2008: policy defined until 2015



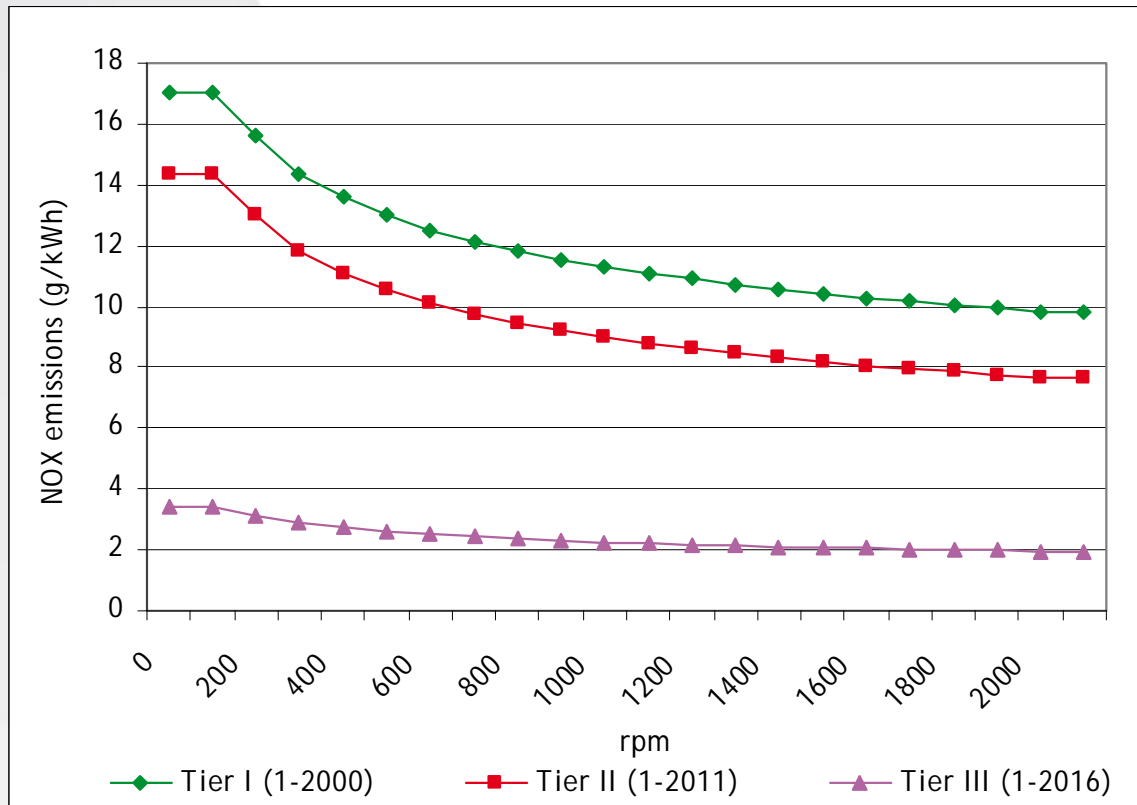
Current average  
2.4% S (2008)

SOx ECA:

North sea, Baltic sea

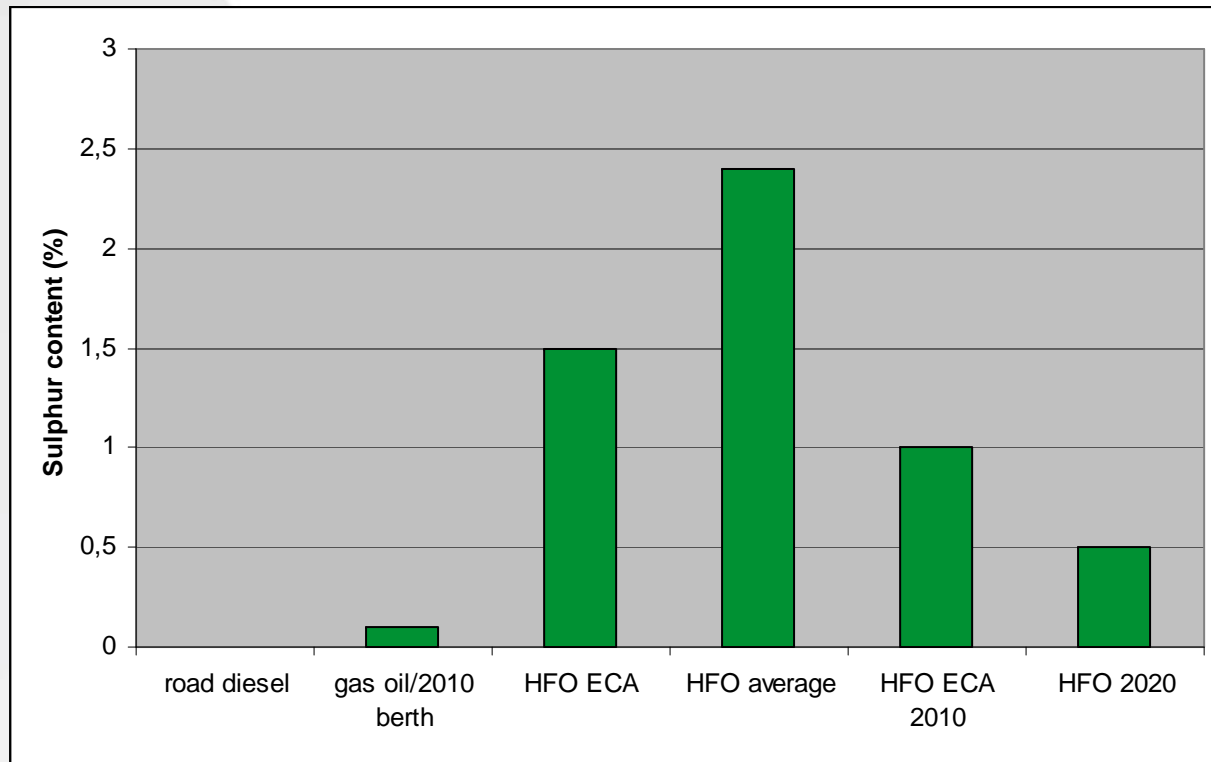
- Sulphur content of gasoil (MGO) 0.2% max.
- 0.1% from 2010 (EU Directive 2005/33)

## ▶ Environmental regulations (NOx)



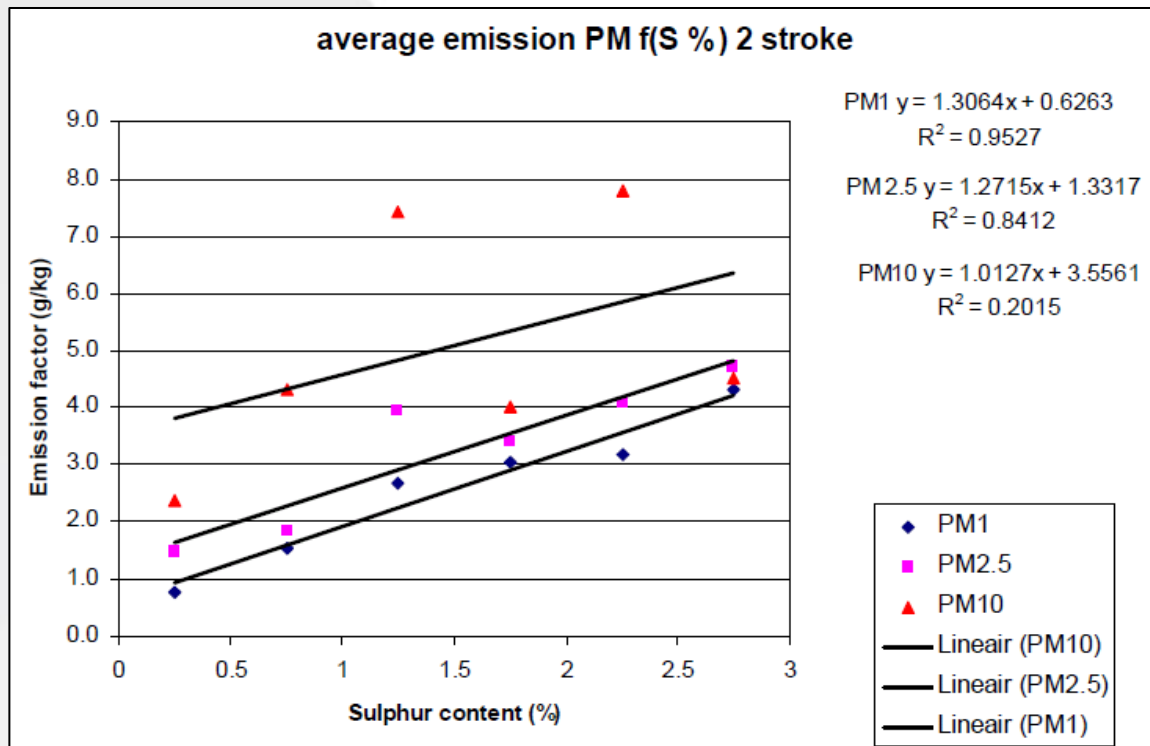
- No standard for PM emissions of marine engines

## ▶ Comparison between modes (fuels)



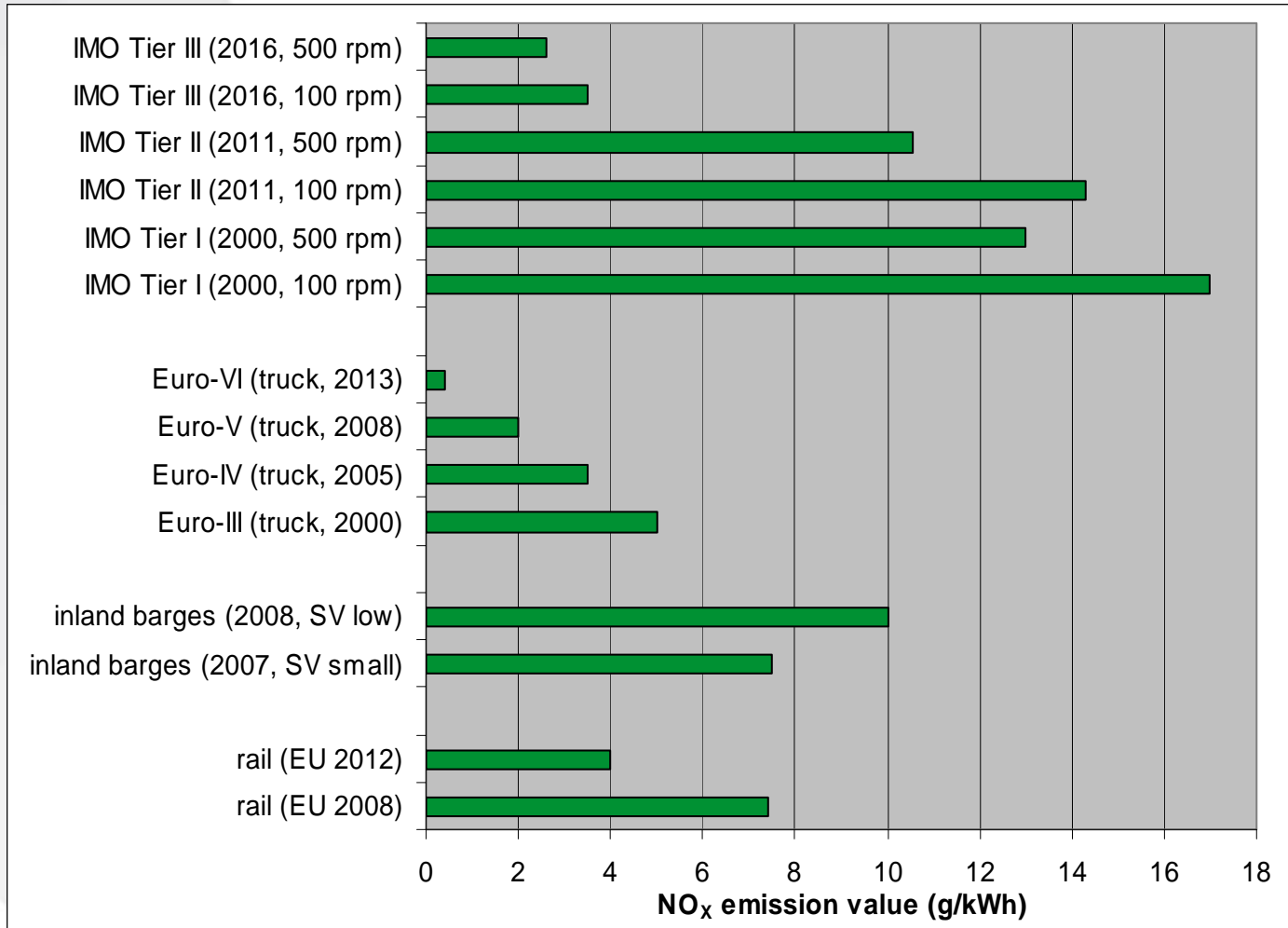
- No standard for PM of marine engines
- Clear link between PM emissions and Sulphur content
- 50% of PM emissions is linked to sulphur

## ▶ Comparison between modes (fuels)



Source: TNO

## Comparison between modes (NOx standards)



## ▶ Comparison between modes (methodology)

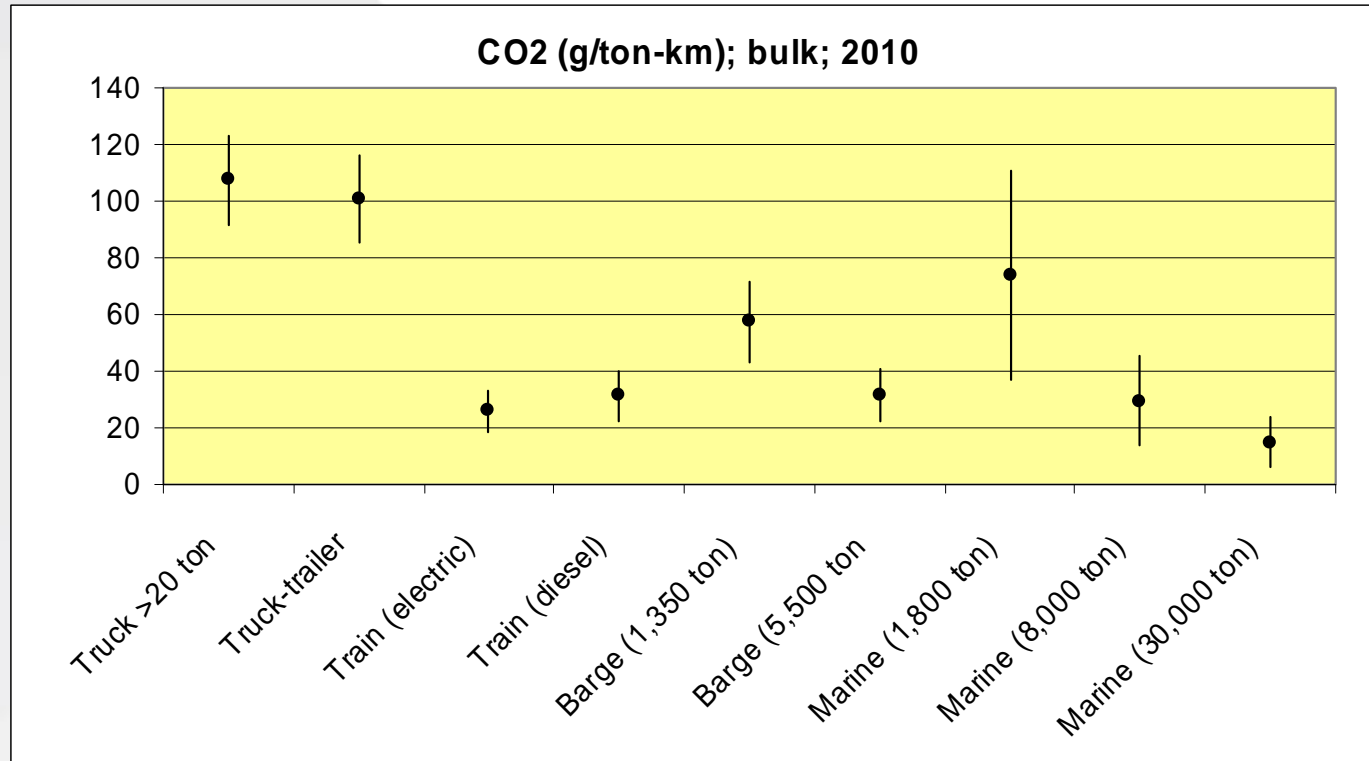
How to compare a seagoing ship and a truck?

- Well-to-wheel analysis; fleet averages
- Is there competition? Define markets
  - Ocean going ships and vans not included
  - Bulk/non-bulk, short distance/long distance
- How to deal with variation?

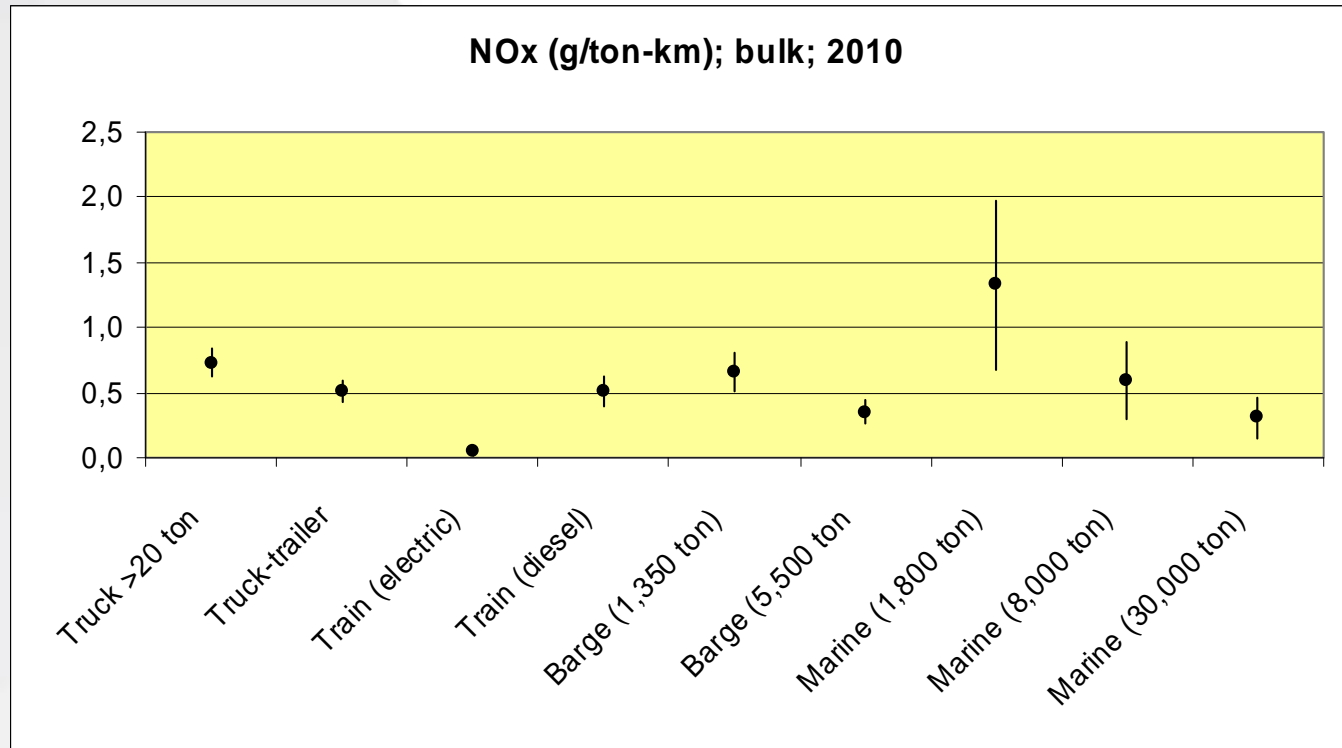
Worst case	Best case
transport to/from loading points (10%)	no transport to/from loading points
maximal detouring (20%)	minimal detouring (0%)
15% lower load factor than average	15% higher load factor than average

- Detouring important factor for short sea shipping!!
  - Compare Bilbao-Cork and Rotterdam-Barcelona
  - -40....+40%
  - Statistics indicate that detouring is often low.

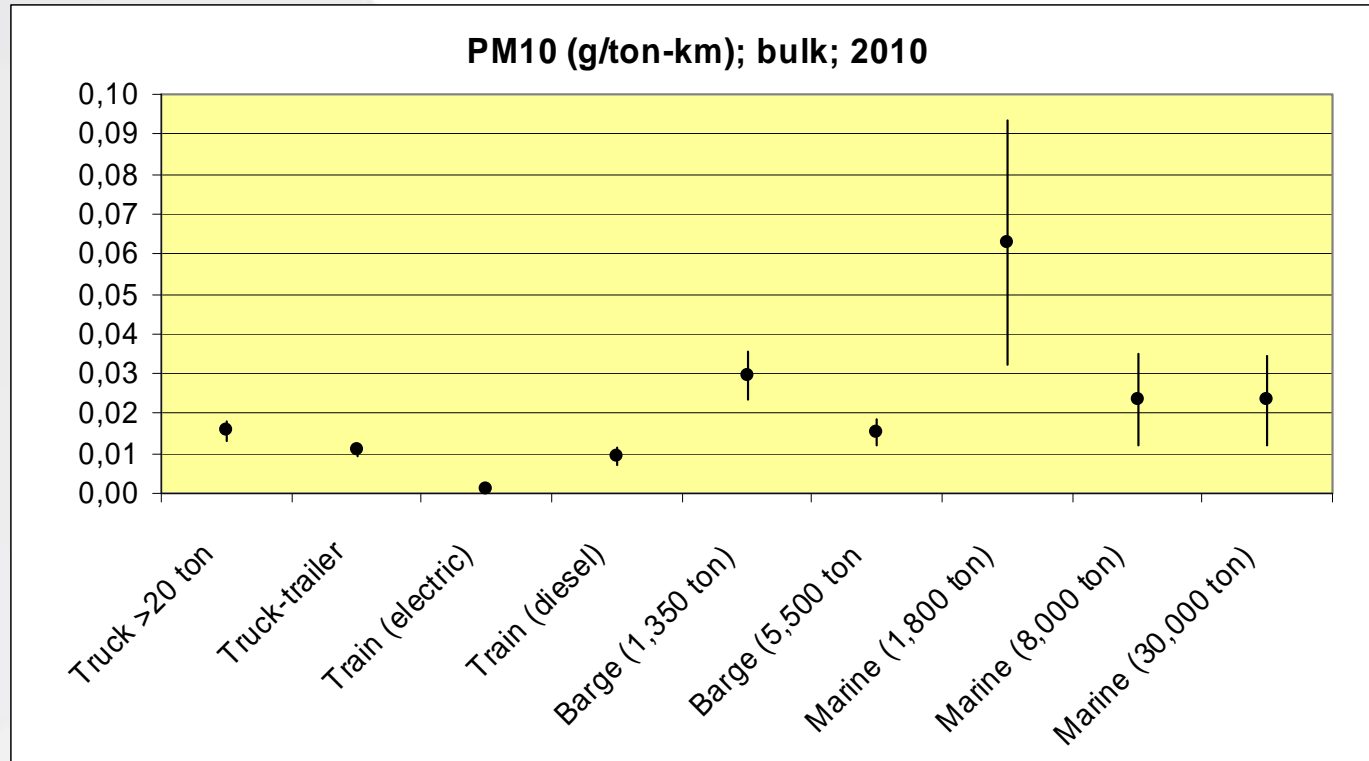
▶ Comparison between modes (CO<sub>2</sub> per tonkm)



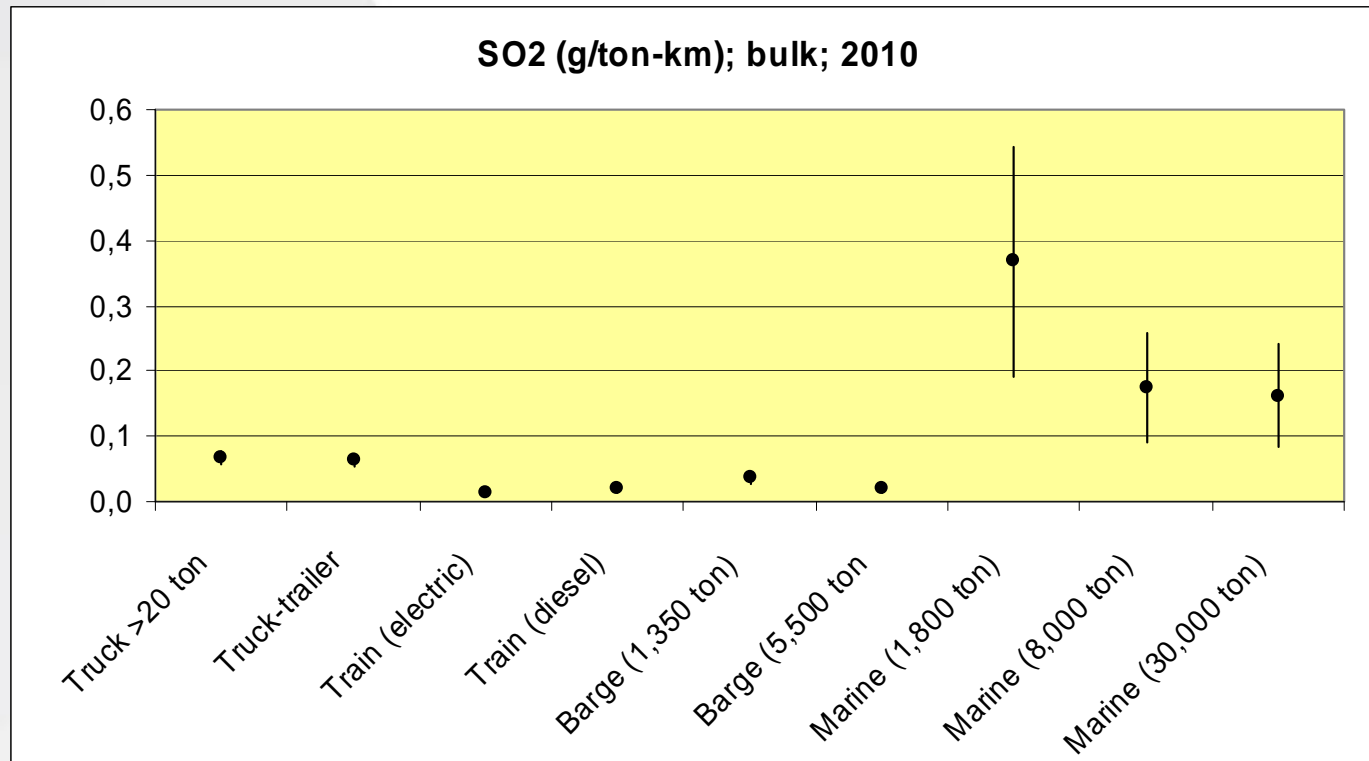
► Comparison between modes (NO<sub>x</sub> per tonkm)



▶ Comparison between modes (PM<sub>10</sub> per tonkm)



► Comparison between modes (SO<sub>2</sub> per tonkm)



## ▶ Policy measures - conclusions

IMO air quality policy developed in 2008 is a step forward

- North sea/Baltic sea needs to be designated as an NOx ECA (Tier III)
  - Global fuel sulphur content from 2020?
  - Shore side electricity for local solutions
  - Other modes will be come cleaner and more efficient too
- 
- GHG policy
    - *IMO Energy Efficiency Design Index (EEDI)*
    - *Ship Energy Efficiency Management Plan (SEEMP)*
    - *MEPC agreed on a work plan to consider market based instruments*
  - *“By 2050, global greenhouse gas emissions should be reduced by at least 50 % below their 1990 levels. All sectors of the economy should contribute to achieving these emission reductions, including international maritime shipping and aviation” (EU Directive 2009/29).*



Thank you for your attention

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## ▶ Modal shift

- Price increases may result in modal shifts
- Environmental effects depend on situation:
  - Vessel size
  - Vessel speed
  - Detouring
- The other modes will not be untouched in the next years
- Fuel price fluctuations are high
- Costs of CO2 policy are limited compared to MARPOL Annex 6
- The market position of SSS is linked to the environmental performance. On routes where the position is strong, the environmental benefits compared to the other modes are the biggest