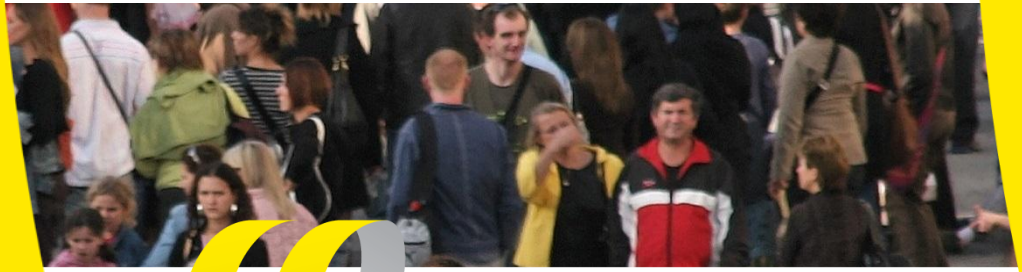
The introduction of 0.1% S fuels in European SECAs

Jasper Faber, 28 March 2017



CE Delft

CE Delft

- Independent research and consultancy since 1978
- Transport, energy and resources
- Know-how on economics, technology and policy issues
- 40 Employees, based in Delft, the Netherlands
- Not-for-profit
- Projects on environmental impacts of shipping for over 15 years.

Clients: Ports, ACP, International Maritime Organization, European Commission, national and regional governments (Germany, UK, Netherlands), shipping companies, trade associations and environmental NGOs.

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Outline of the presentation

- Introduction
- Air quality improvements
- Socio-economic benefits and costs
- Economic and business impacts – fuel prices and modal shift
- Compliance and enforcement
- Outlook to 2020
- Conclusions

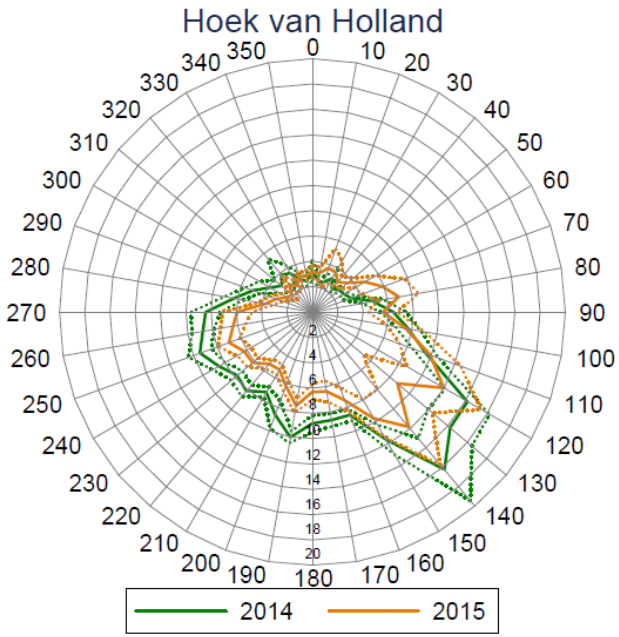
Introduction

- As of 1 January 2015, the maximum allowed sulphur content of marine fuels in SECAs was reduced to 0.1% from 1.0%.
- Several studies had been published showing negative impacts on demand for sea transport, and predicting price spikes of MGO.
- CE Delft was commissioned by NABU to analyse the impacts of the sulphur cap after one year (spring 2016).

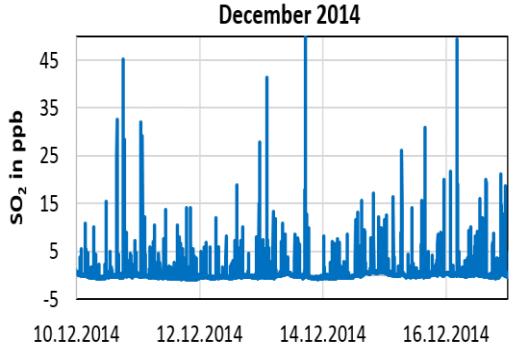
Air quality improvement

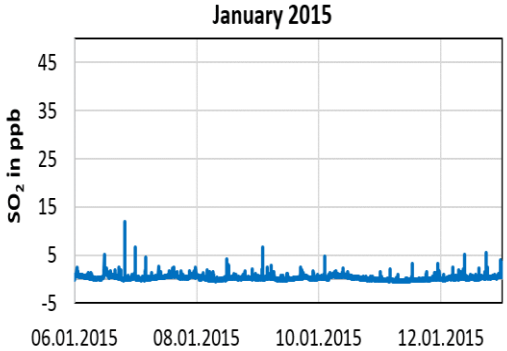
- Rotterdam (NL): 24-37% reduction SO_2 conc.
- Great Belt bride (DK):50-60% reduction
- Neuwerk (DE): 50% reduction
- SE Sweden: 50% reduction
- Plymouth (UK): 66% reduction

SO_2 concentration changes (2.5 - 3.0 µg/m³) for various wind directions, including 95% confidence interval (0=North; DCMR, 2015)



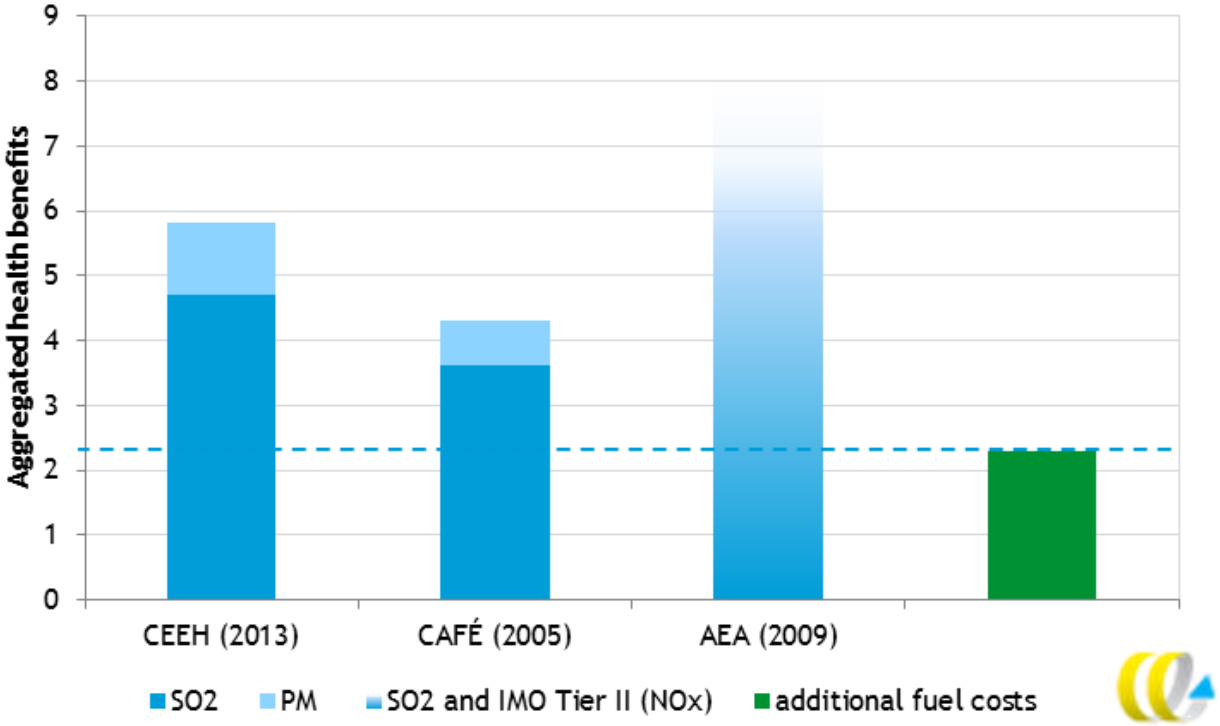
Absolute SO_2 volume mixing ratio values in December 2014 and January 2015 (Neuwerk, DE)



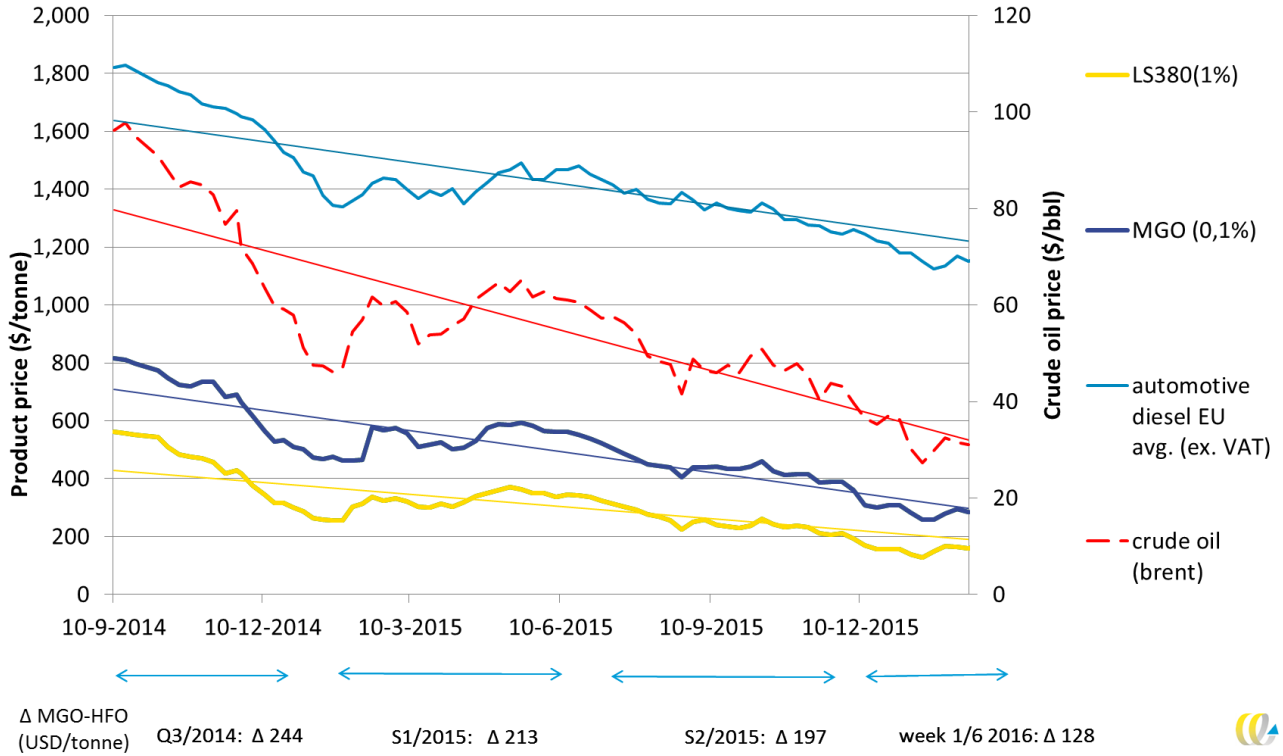


Socio-economic costs and benefits of 0.1% Sulphur

- North sea and Baltic sea
- 1.9-3.5 times higher benefits than average costs in 2015



Economic impacts - trend in fuel prices



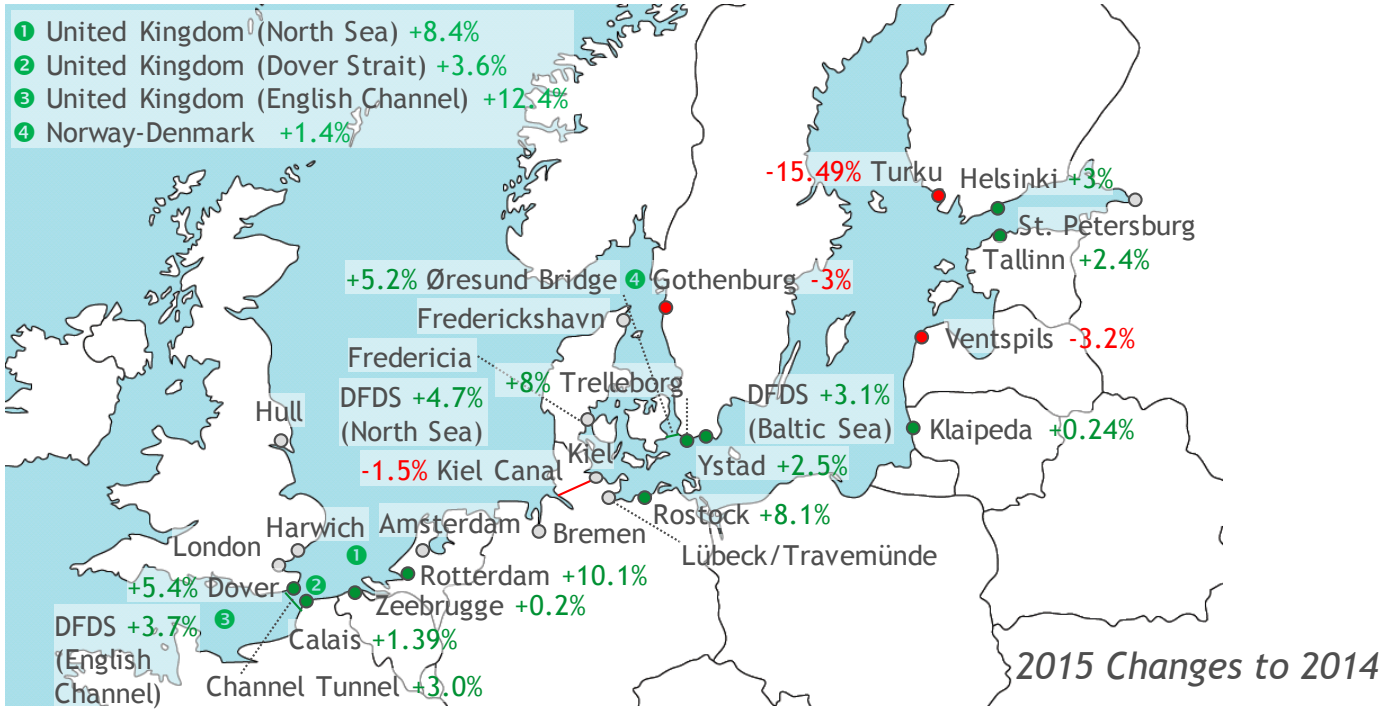
- MGO price reduced more sharply than automotive diesel price:
  - ✓ MGO availability is uncritical (ongoing shift towards distillates)
  - ✓ Economy of scale advantages
- Will prices follow the same pathway again if crude oil prices increase?

Road fuel vs. MGO (USD/tonne)

Period	Shipping fuel price	EU weighted average automotive diesel price (incl. excise duty/ excl. VAT)	Delta fuel price
Q4/2014	448 (1%HFO)	1,690	1,242
1st semester 2015	528 (0.1% MGO)	1,414	886
2nd semester 2015	406 (0.1% MGO)	1,306	900

- Delta fuel price has become smaller
- New fuel types have entered the market (ULSHFO), cheaper than MGO
- Typical RoRo ship with a € 32,500 overall per day: cost increase of 13-25% due to additional fuel costs of 128-244 $/tonne

Economic impacts - Modal shifts for RoRo?

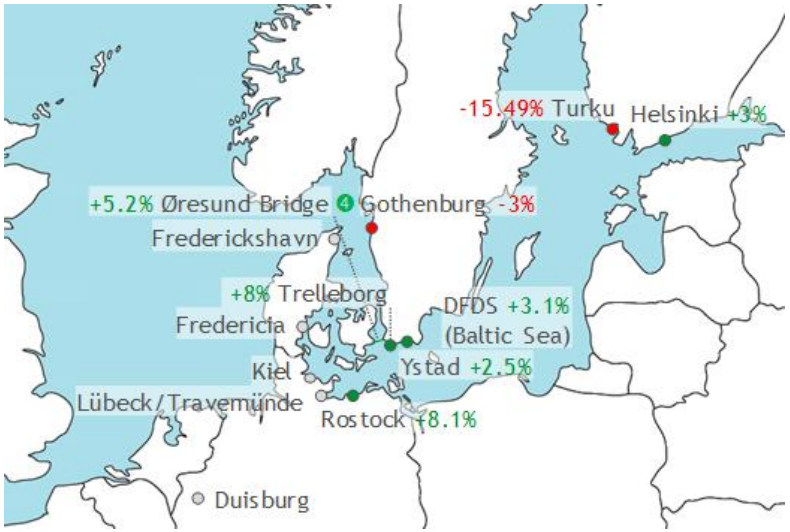


- An expansion of RoRo services over 2015 can be observed
- Positive general sector trend, aftermath of economic crisis
- An ESSF survey amongst ship-owners indicated no modal shifts (71%)

Example: North sea vs. Dover Strait & Germany-Scandinavia

- Analysis of 5 ex-ante studies on the 2015 fuel sulphur requirement
  - Shifts from North sea to Dover Strait (Channel Tunnel) predicted
  - Shifts to road-only options between Germany and Sweden (Øresund Bridge)
- In most cases, no shifts from longer sea routes to shorter ones
- Probably no shift to on-land routes

North sea vs. Dover Strait (2015 vs. 2014)



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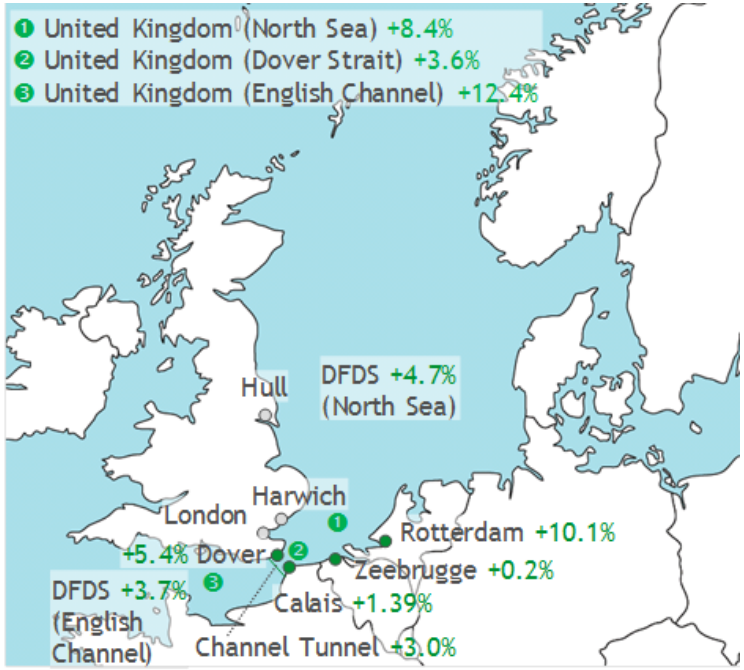

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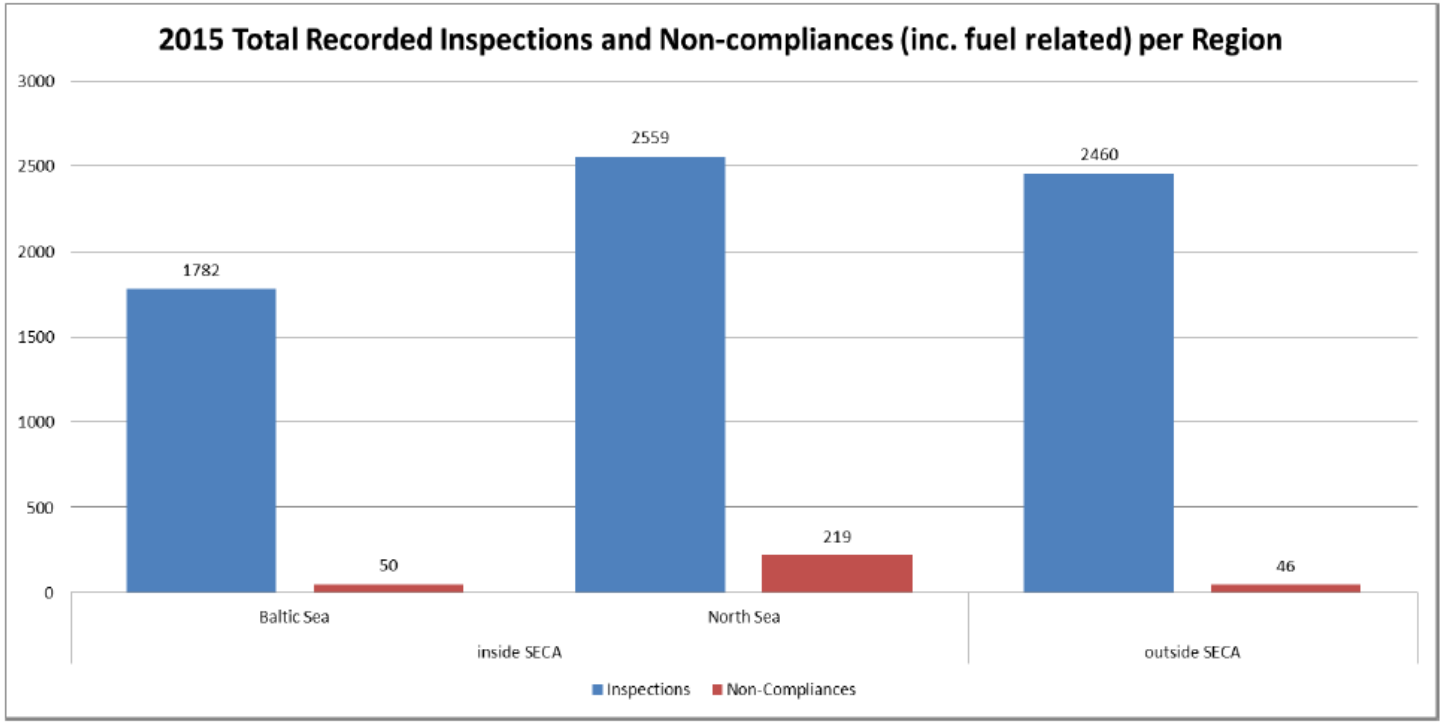
Compliance and enforcement statistics

- 3 and 9% of the ships inspected were non-compliant in the Baltic Sea and North Sea respectively (various types)
- The number of fuel samples needs to be increased in order to meet the 30-40 samples per 100 inspections



Compliance on open sea

- Available data on compliance mainly reflects the situation in port areas
- A typical margin used by inspectorates is 0.5%
- The number of sanctions is still limited (30 %)
- The situation on open seas is still relatively unknown
- Non-compliance is very attractive (~$30,000 per day)
- Danish remote sensing data shows that ships have not continued to use high Sulphur fuel, but the technology is not mature yet

- Recommendations for an increase of intelligence:
  - More (verified) remote sensing/sampling techniques and data needed
  - Coordination of surveillance activities and back and forth reporting
  - Continuous monitoring?

Outlook to 2020

- As of 2020, ships will be required to use fuels with a sulphur content of 0.5% or less globally. This will change the relative impacts of ECAs:
  - Because the SO_x and PM emissions of all ships will be reduced, the impact of ECAs on SO_x and PM concentrations will be smaller. The impact on NO_x concentration will remain the same.
  - The health benefits will be relatively smaller, but the costs will also be lower because the price difference between 0.1% and 0.5% fuel will probably be smaller than between 0.1% and 3.5%.
  - The impacts on modal shift will be relatively smaller.
  - Enforcement will remain a very important issue.

Conclusions

- Air quality noticeably improved (50-60%)
- Socio economic benefits outweigh the costs of introduction. This holds if the price difference between fuels will increase again.
- The fuel availability has not been critical
- No modal shifting or economic impacts can be observed on the basis of available data (RoRo), while the economic position weakened
- Rising oil prices may worsen the situation, but the extent is unclear
- 3-9% of ships are non-compliant in the Baltic and North Sea ports
- Various types of non-compliances
- A more intelligent control system requires:
  - Coordination and cooperation of surveillances and control activities
  - Reliable figures on open sea compliance (advanced verified remote techniques)

Main conclusion of the study

The introduction of the 0.1% sulphur cap in the Northern European SECAs has proven to be an environmental success, without noticeable negative impacts on demand for shipping. Enforcement could be improved.

Thank you for your attention!

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