

Environmental regulation

Benefits for society

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Air pollution from shipping

- Shipping emits around 1 billion ton CO₂ annually i.e. about 3% of the global emission.

2015 estimate (ton)	PM _{2.5}	SO ₂	NO _x
Northern hemisphere	240,000	1,500,000	3,355,000
North Sea and Baltic Sea	13,000	29,000	955,000
Seas around Denmark	2,500	6,000	173,000
Danish sources (land)	21,000	12,000	125,000



Health effects

- Shipping causes almost the same health effects in DK as the sum of all land based emissions in DK.

2015 estimate	Shipping on the Northern hemisphere		Shipping in the North Sea and Baltic Sea	
	DK	Europe	DK	Europe
Years of lost living	4,600	570,000	3,500	140,000
Airway diseases	280,000	32,000,000	225,000	7,900,000
Sick days (B-days)	430,000	50,000,000	350,000	12,600,000



Health costs

2015 estimate	Europe (billion \$)			Total (billion \$)
	SO ₂	NO _x	PM _{2.5}	
Health costs related to air pollution from shipping:				
Northern hemisphere	25	41	6	72
North Sea and Baltic Sea	0.6	14	0.6	15.2

Is regulation needed ?

- **Yes:** If health costs (externalities) > removal costs

Health externalities (\$ per kg)	SO₂	NO_x	PM_{2.5}
Northern hemisphere	17	12	25
North Sea and Baltic Sea	20	15	45

- What are the removal costs ?

2015: Cost-benefit

- **North Sea and Baltic Sea (2015):** Fuel prices from Rotterdam
- Externalities (health costs) SO₂: 20 \$ per kg
- Removal costs (Replacing 1.5% S with 0.1% S):
- MGO: (430 \$ - 430 \$) / 28 kg SO₂ = 0 \$ per kg

Northern hemisphere (2020):

- Externalities (health costs) SO₂: 17 \$ per kg
- Removal costs (Replacing 2.7% S with 0.5% S):
(430 \$ - 250 \$) / 44 kg SO₂ = 4 \$ per kg

The polluter pays principle

- Using 1 ton bunker fuel in the Northern hemisphere emits about 54 kg SO₂, 70 kg NO_x and 1.5 kg PM_{2.5}.
- Health externalities 1,900 \$ per ton.
- Present price on bunker fuel: 250 \$ per ton.
- If shipping companies paid for health damage from air pollution then the price of bunker fuel would be 8-9 times higher than today + other externalities.
- **What would happen if shipping had to pay ?**

Will regulation sink all ships ?

- If 0.1% S fuel, SCR and filters would double shipping costs.
- What would be the price increase on wine from New Zealand ?
- The price today is 50 kr. Shipping costs is 0.5 kr. If the price on shipping doubles the wine will cost 50.62 kr (incl. 25 % VAT).
- Will I buy less wine ?



SOO! KOMMT'S SAUBER!
PER CONTAINERSCHIFF

* PREIS
BEIM TRANSPORT
AUF UMWELT-
FREUNDLICHEREN
SCHIFFEN

599,05*
~~599,-~~

RUSSFREI GELIEFERT
WENIGER ABGASE

MIT ABGASTECHNIK VERSCHIFFT
KLIMAFREUNDLICHER TRANSPORTIERT

129,01*
~~129,-~~

WENIGER LUNGENKREBS
BESSERE ATEMLUFT INKL.

89,20*
~~89,-~~

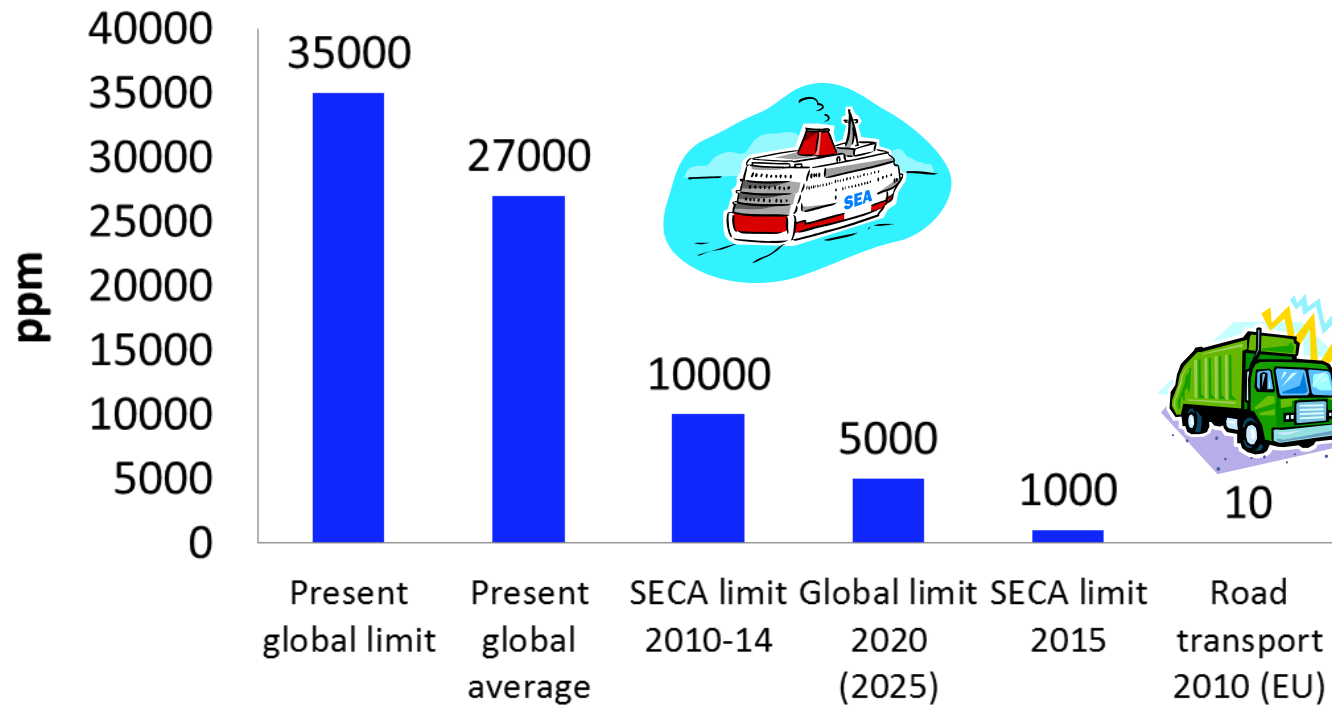
BLÖD WER DA NOCH
MIT SCHWERÖL
FÄHRT

NABU

WIR HASSEN ABGASE!
WWW.NABU.DE/CONTAINERSCHIFFE

Is shipping regulated too strict ?

Sulphur in marine vs. road fuel



New trucks in EU have SCR & particulate filters !



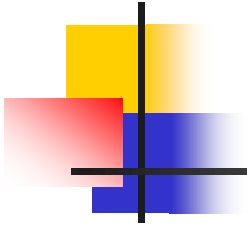
Brussels event: SECA compliance

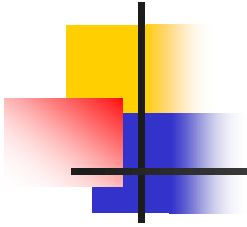
SECA compliance:

Cleaner shipping due to effective enforcement

European Parliament, October. 21st, 4-6.30 pm

Register until October 9th at ports@NABU.de with name, organization, address, date of birth and number of passport or ID card.







Pollutants and adverse effects

	CO ₂	BC/PM _{2.5}	SO ₂	NO _x
Direct health effects		X	(X)	(X)
Indirect health effects			X	X
Acidification (land)			X	X
Acidification (sea)	X		(X)	(X)
Eutrophication (sea)				(X)
Global warming	X	X		

No efficient NO_x regulation ...

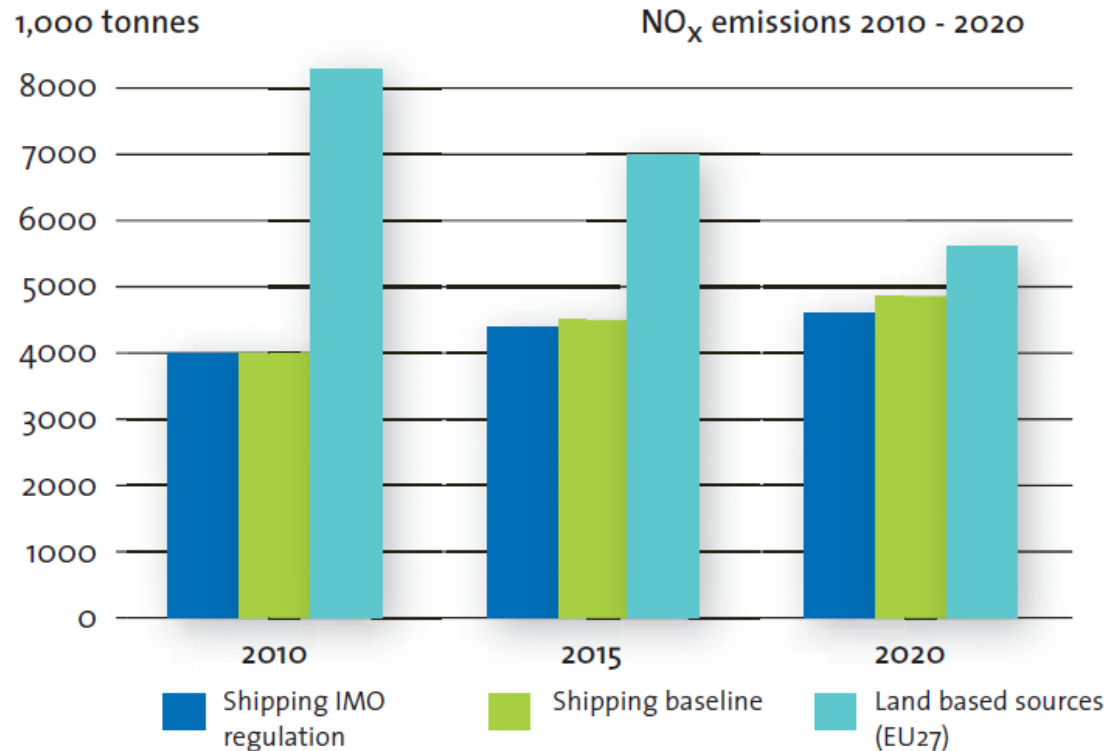


Figure 6: Estimated effect of the IMO regulation on NO_x from shipping in the northern hemisphere. In comparison the baseline (no regulation on NO_x) and the land based emissions in Europe (EU27) are shown.

Reference: The Air Pollution & Climate Secretariat.

NO_x causes 50% (Northern hemisphere) and 70% (North Sea and Baltic Sea) of the total health effects !

How about Sirena Seaways

- Going from Esbjerg to UK since 1875.
- Now the route has been stopped ...
- Was this route stopped due to the new sulphur regulation as claimed by some interests ?
- Or was it the drop in passengers from 300,000 to 80,000 per year ... as a result of many low price flights and the stop of tax-free sale ...





Conclusion

- Reduced air pollution from shipping will provide people longer and healthier lives and as a whole benefit society from an economical point of view.
- Air pollution from shipping can be reduced without increasing shipping costs to a critical level.
- But successful enforcement (avoiding free-riders) is needed to ensure that shipowners can pass on the costs to cargo owners - thereby making shipping a cleaner business and maintaining fair competition.