Low emission Shipping: Environmental and Economic impacts

EnviSuM project results

Sari Repka, March 2019

Interreg Baltic Sea Region
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EUROPEAN REGIONAL DEVELOPMENT FUND
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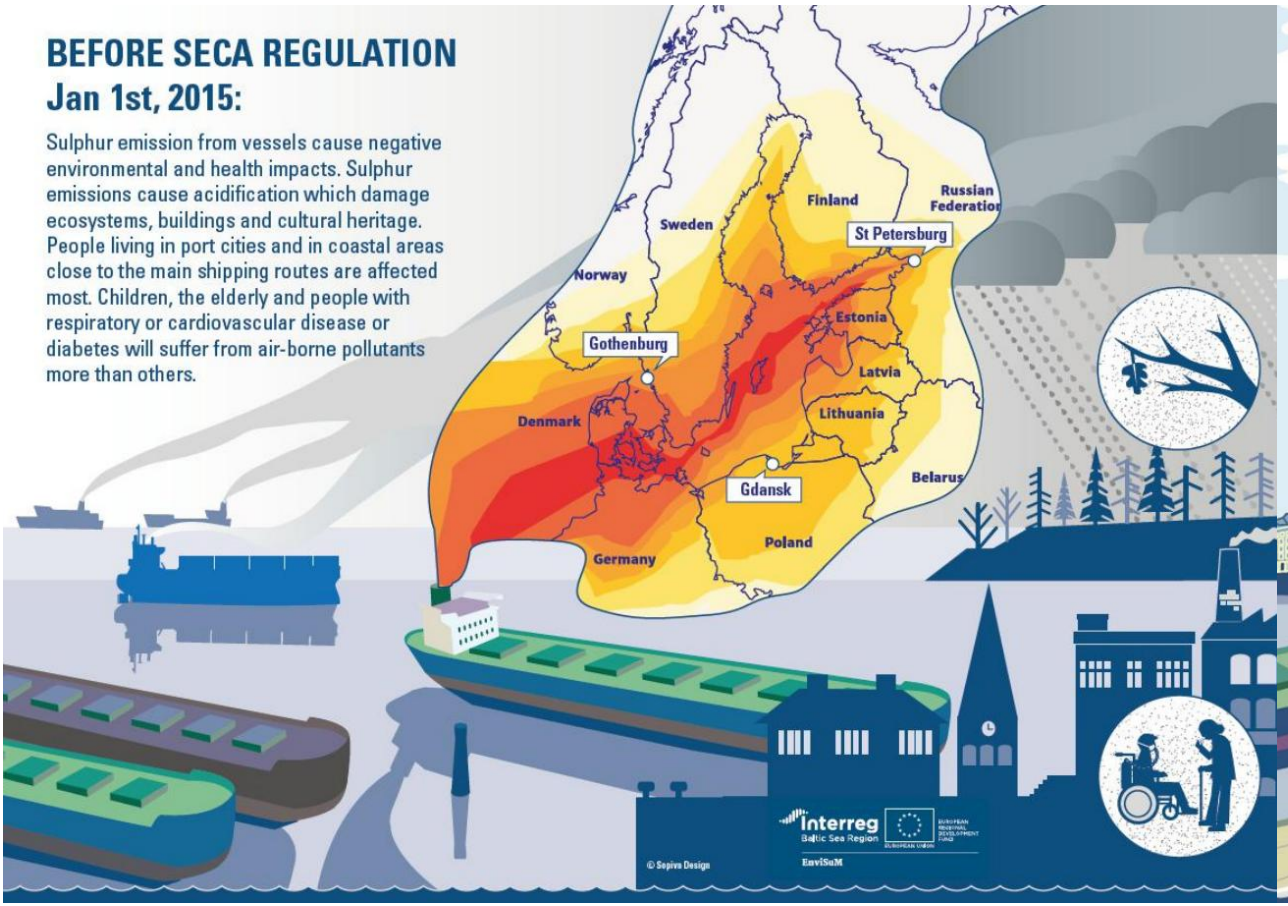

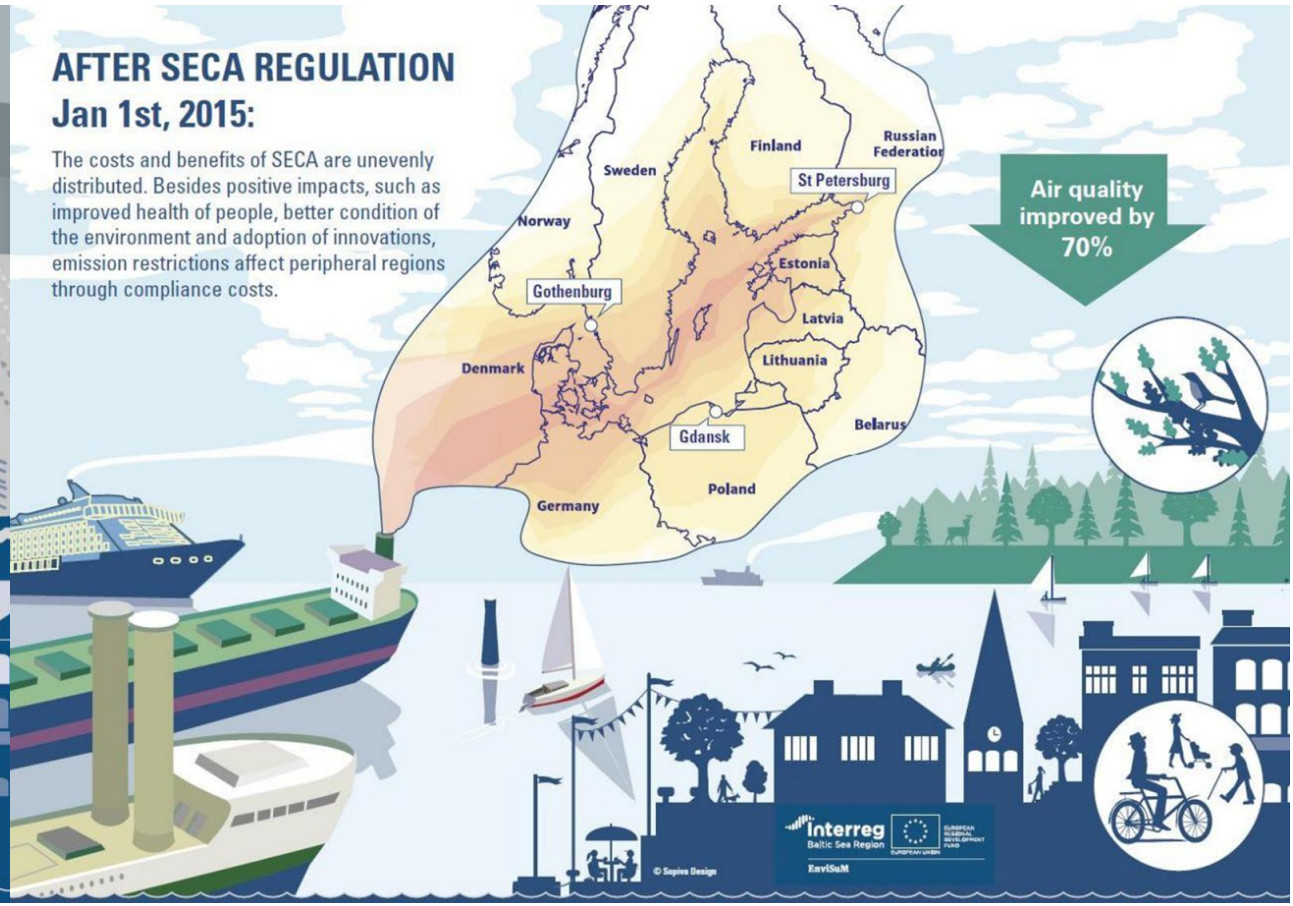

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The big picture of EnviSum

Environmental Impacts
Benefits of clean nature and biodiversity as valued by citizens and society

Macroeconomic Impacts
The macroeconomic perspective: e.g. national competitiveness

Health Impacts
Benefits of reduced mortality and ilness for citizens and society

Administrative Impacts
Costs of administration, including direct and indirect administration costs

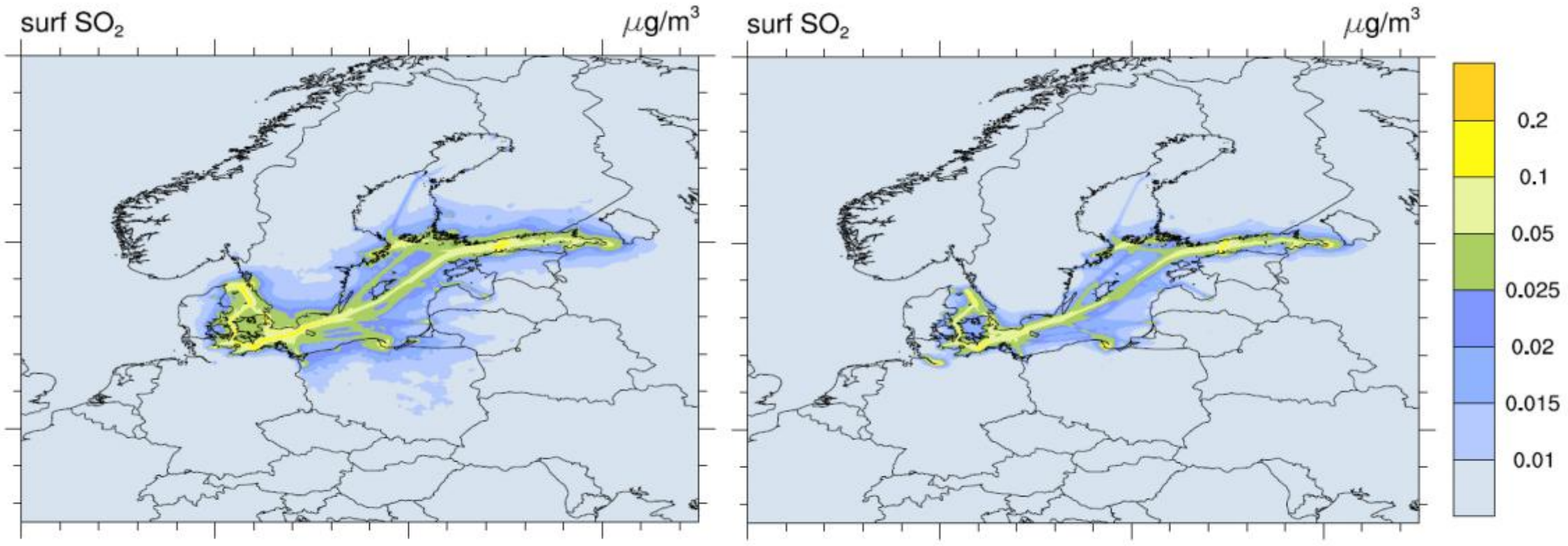
Business Impacts: Ecological Goods
Benefits of enhanced commercial ecological resources (fish, crops, forest) for business and society

Business Impacts: Innovation
Benefits for cleantech industries and on innovation inducement in cleaner shipping

Business Impacts: Compliance
Costs of compliance for the maritime industry, its costumers and society

Lähteenmäki-Uutela A., Repka S., Haukioja, T., Pohjola T. 2017. How to recognize and measure the economic impacts of an environmental regulation: case SECA. Journal of Cleaner 154:553-565.

Contribution of Baltic Shipping – SOx



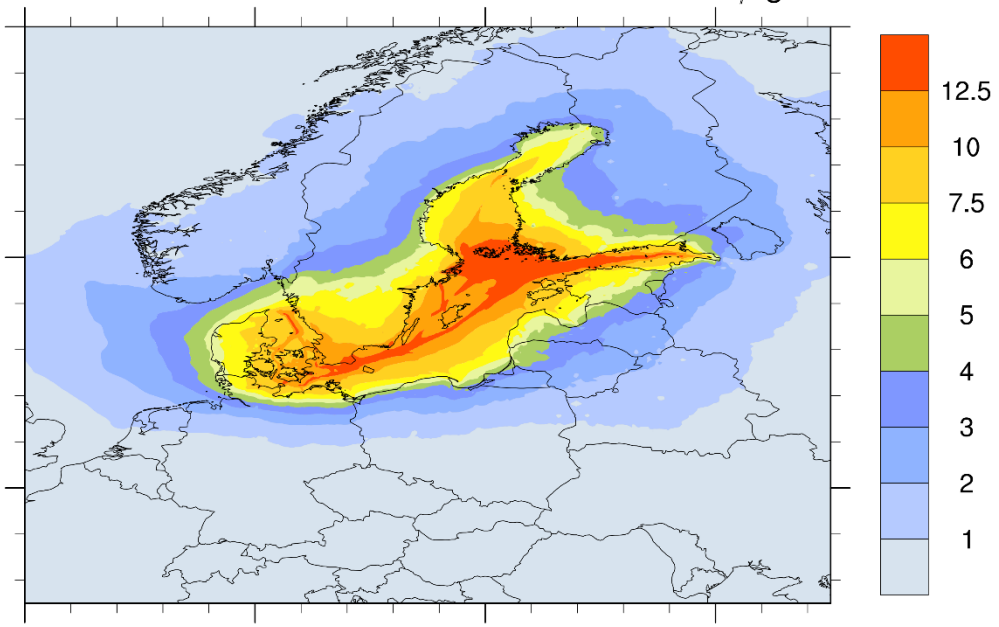
2015

2030

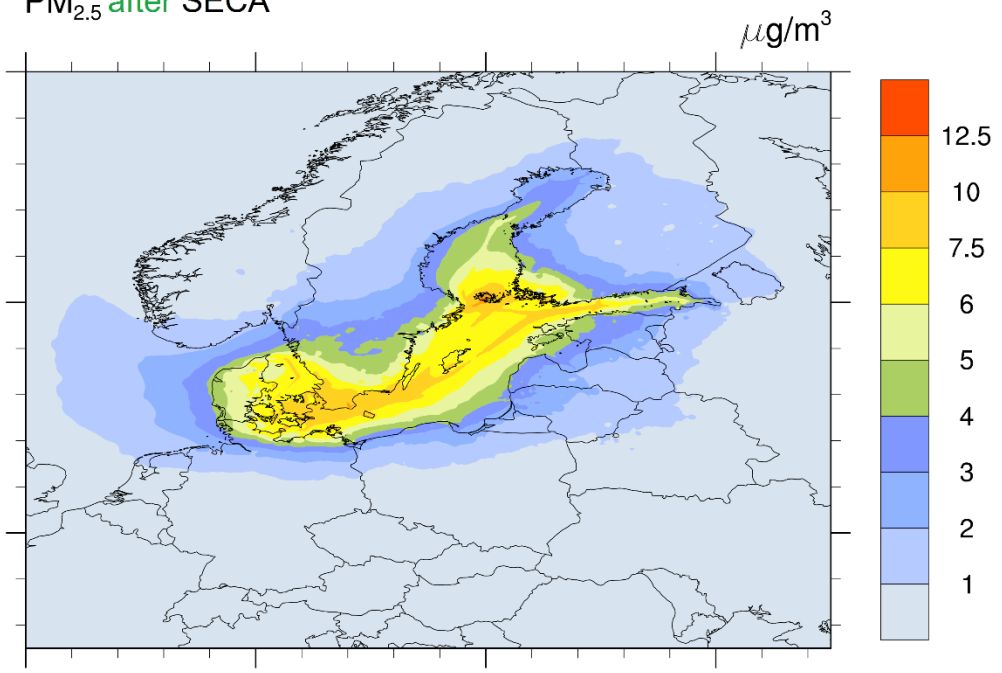
+ SECA (2015)

Contribution of Baltic Shipping – $PM_{2.5}$

$PM_{2.5}$ before SECA



$PM_{2.5}$ after SECA

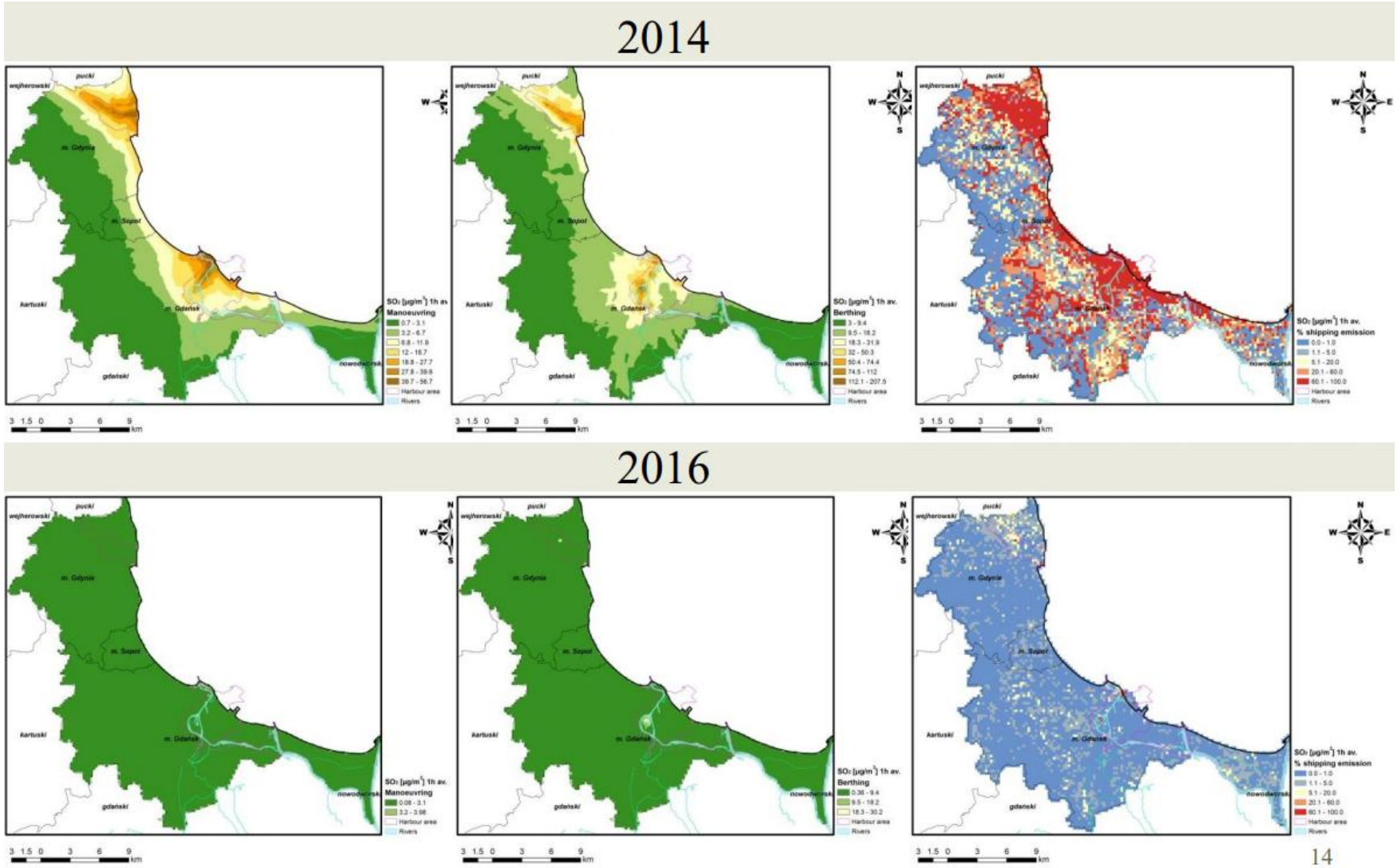


+ SECA (2015)

Tricity, Poland (SO2 – maneuviring, berthing, 1h)

Before SECA

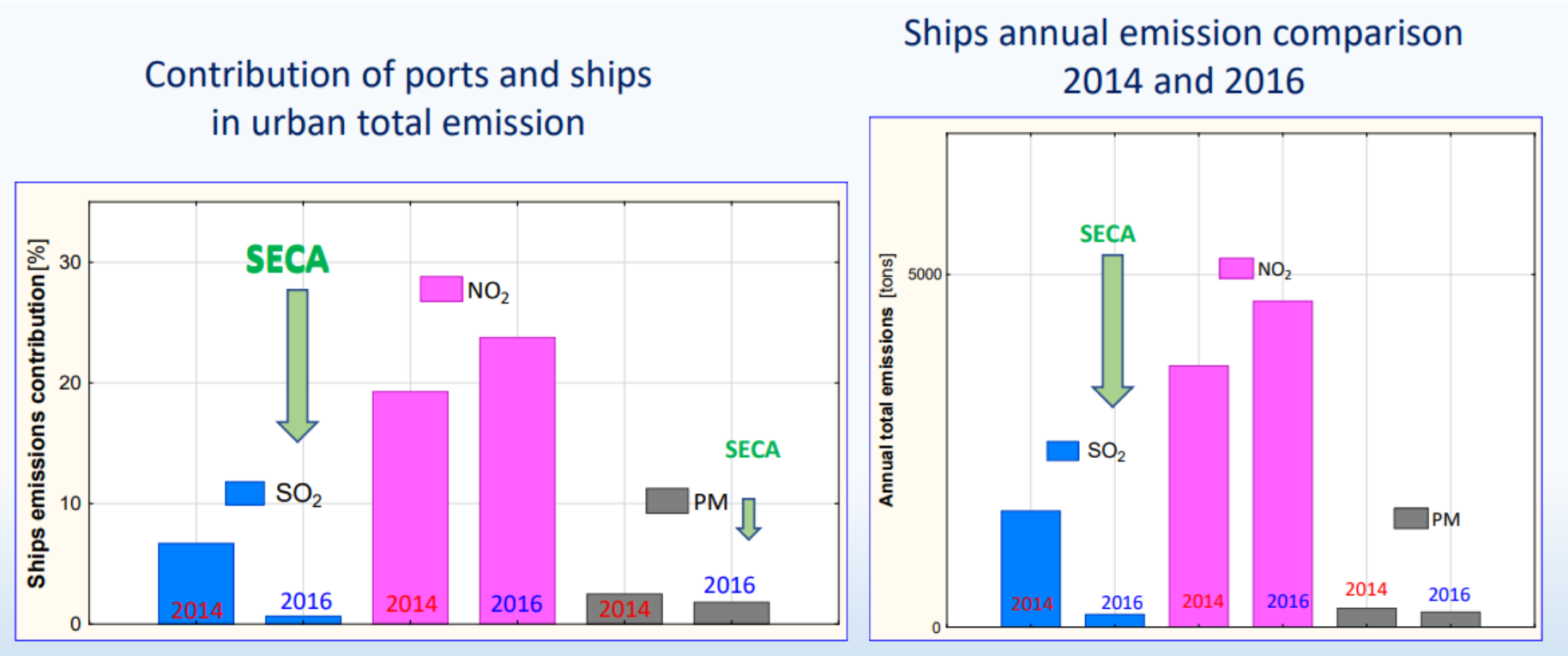
After SECA



Case study - Tricity, Poland

	2014	2016
SO2 (%)	6.7	0.65
PM (%)	2.5	1.8
NO2 (%)	19.3	23.8

Table 1: Emissions discharge comparison
Estimate of ship emissions based on ship calls.



Monitoring Compliance

The sniffer method is fully operational, for fixed sites and airborne measurements.

Campaign TriCity Oct 2017

Göteborg and Great Belt , fixed measurements 2016-2018

- Highest non compliance in western English Channel and middle Baltic Sea
- In general good compliance rate, 96 % at great Belt bridge, 94 % from airborne. Good compliance near the ports Gothenburg and Gdansk (99%), Saint Petersburg (95% compliant, but 2% were gross emitters)
- Some specific ship owners/lines are often encountered with high emissions (flag less important)
- Several ferry lines have been operating with malfunctioning scrubbers
- Some cruiser lines makes long term tests with permission from non SECA flagtest

Airborne campaign midell of of Baltic sea Sep 2017

Campaign Sankt Petersburg Sep 2018

Scrubbers efficiency

- No dramatic increase in scrubber installations after SECA

  - Low fuel prices and high investments cost of EGCS (exhaust gas cleaning system) on ships has pushed owners to low sulfur fuel oil option

- Global SOx emissions reductions in 2020 may contribute to the increased interest and cost-effectiveness of EGCS

- Black carbon not decreased with scrubbers

- The results of the surveys conducted on ships equipped with EGCS indicate a number of technical aspects requiring modification and improvement

Health Impacts – EnviSUM results

~1000 extra deaths annually (pre 2016) due to shipping in the Baltic

34% reduction in premature deaths -< 2014 – 2016 (SECA benefits)

Health assessment - Case study of Tricity, Poland

SECA regulation on ship emissions → **drop of health hazards in Tricity** (mainly: Respiratory mortality & Cardiovascular hospital admissions)

The impact of pollutants emitted by ships varies spatially:
Sopot – association with mortality (PM10, PM2.5, SO2, NOx) and hospitalizations (NOx)
Gdynia – association with mortality (SO2) and hospitalizations (PM10, PM2.5, SO2)
Gdansk – no significant influence (residential sector plays a key role)

Economic effects

- Compliance costs 595 M€, mortality benefits 500 M€, environmental benefits 145 M€
- SECA effects on transport costs only a small detail in natural market variation
- On a short term increase in incremental innovations:
  - SECA has created markets for emission abatement technologies and motivated investments
- Administrative costs negligible and modal shift not detected
- According to a survey, SECA improved the reputation of the area

Source: DNV GL (2017). Illustration by Nina Viesnes

EnviSuM Final Conference 24th April in Copenhagen
Register at: https://mdc.nemtilmeld.dk/82/

FURTHER INFORMATION

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Video: https://www.youtube.com/watch?v=0Q9yByQdixQ&t=11s

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