Low emission Shipping: Environmental and Economic impacts

EnviSuM project results

Sari Repka, March 2019
BEFORE SECA REGULATION
Jan 1st, 2015:
Sulphur emissions from vessels cause negative environmental and health impacts. Sulphur emissions cause acidification which damages ecosystems, buildings and cultural heritage. People living in port cities and in coastal areas close to the main shipping routes are affected most. Children, the elderly and people with respiratory or cardiovascular disease or diabetes will suffer from airborne pollutants more than others.

AFTER SECA REGULATION
Jan 1st, 2015:
The costs and benefits of SECA are unevenly distributed. Besides positive impacts, such as improved health of people, better condition of the environment and adoption of innovations, emission restrictions affect peripheral regions through compliance costs.

Air quality improved by 70%
The big picture of EnviSum

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

**Health Impacts**
Benefits of reduced mortality and illness for citizens and society

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

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

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

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

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

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Contribution of Baltic Shipping – SOx

2015 + SECA (2015)  2030
Contribution of Baltic Shipping – PM2.5

+ SECA (2015)
Tricity, Poland (SO2 – manoeuvring, berthing, 1h)

Before SECA

After SECA
Case study - Tricity, Poland

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

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<thead>
<tr>
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<th>2014</th>
<th>2016</th>
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<tbody>
<tr>
<td>SO2 (%)</td>
<td>6.7</td>
<td>0.65</td>
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<tr>
<td>PM (%)</td>
<td>2.5</td>
<td>1.8</td>
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<tr>
<td>NO2 (%)</td>
<td>19.3</td>
<td>23.8</td>
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Monitoring Compliance

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

- 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
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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