

Working Group 7: Sector approaches in air pollution control – Transport, with special emphasis on shipping and air traffic.

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Issues/structure

Shipping

Introduction

Concentrations and depositions of air pollutants are significantly influenced by emissions from international shipping, and so are also resulting air pollution damage to health and the environment. While emissions from most land-based emission sources have come down in EU and North America, and is expected to continue to decline, those from shipping are steadily increasing. Recent projections of emissions from global freight shipping indicate an expected growth of about 4% per year over the coming decades. An ongoing study on shipping in European sea areas estimate that emissions of SO₂ and NO_x from international shipping around EU will increase by about 45% from 2000 to 2020.

Currently, approximately 15-25% of global NO_x emissions, 5-10% of global SO₂ emissions, and 3-4% of global CO₂ emissions are estimated to originate from international shipping.

The technical potential to reduce ship emissions is high (80-90% or more for SO₂, NO_x and PM), and emission reduction measures for ships are highly cost-effective as compared to additional measures on land-based sources.

Conclusions

As a result of the expected growth (about 4% annually) in shipping and associated emissions, in order only to maintain 2002 level of emissions there is a need to reduce fleetwide average emissions by at least 60% by 2025 and by at least 85% by 2050.

While it is recognised that health and environmental impacts of emissions will vary with distance to sensitive receptors, there appears to be no contradiction between emission reduction measures at global, regional or local scales. However, when focussing primarily on “traditional” impacts on health and sensitive ecosystems, a higher level of ambition is motivated at local (e.g. in port areas) and regional (e.g. within 200 nautical miles from land) scales, as compared to the global scale. Moreover, global scale abatement measures may be motivated also to avoid global warming effects of air pollutants.

Rules under UNCLOS and IMO are not crystal clear, which cause some uncertainty about what type of measures can be introduced and for which geographic entities (local, national or regional) such measures can be introduced. Moreover, the process of negotiation in IMO is fairly “closed” (not well-known by or accessible to the public), and a few flag states have relatively high influence e.g. through the ratification process.

Historic developments in IMO has been very slow, and measures agreed so far have been totally inadequate to solve the problem. Therefore, unilateral action for example by the EU and/or the US is needed to push – but not replace – action in the IMO.

As the agreeing and introduction of new or stricter legally binding emission requirements usually takes some time, economic instruments can be used to promote faster emission reductions. Such instruments can also be used as complement to binding standards, to promote additional emission reductions, beyond the minimum requirements.

Recommendations

The EU and/or the US should take unilateral (or bilateral) action and introduce measures to reduce emissions from shipping. Such action should be accompanied by initiatives aimed at agreement within IMO to significantly strengthen MARPOL Annex VI.

The following ambition levels were recommended:

Short term:

- Lower allowed fuel sulphur level in Sulphur Emission Control Areas (SECAs) from 1.5% to 0.5%.
- Expand SECA program to cover more areas, e.g. high ship-traffic areas in Pacific Rim and North Atlantic.
- NO_x from new engines: 40% percent below current IMO standards (2000 level).
- PM from new engines: 20% below uncontrolled levels.
- NO_x from existing engines: Retrofit of SCR, at least to ships in high ship-traffic areas.

Medium term:

- Require 0.5% sulfur fuel – possibly initiate transition from residual to distillate fuels.
- NO_x: 95% percent reduction below current IMO standards (2000 level).
- PM: 95% reduction below uncontrolled.

[Long term:

- Harmonization with sulphur requirement for on-road diesel fuels (from 500 ppm to 10-15 ppm over time)] (no consensus!).

Individual countries and/or the EU should introduce economic instruments to promote early and additional emission reductions. Such instruments could include:

- Environmentally differentiated port and fairway dues;
- Environmentally differentiated en-route charging
- Emission charges/taxes
- Emissions trading

Air traffic

Introduction

Regarding air quality, air traffic contributes to local increased levels of e.g. NO₂ and fine particles (PM) in and around airports. The regional impacts of non-LTO emissions from aviation over Europe is likely to be limited, since the NO_x emissions are estimated to amount to less than 2% of anthropogenic NO_x emissions in Europe. Impacts on northern hemispheric air quality (e.g. background ozone levels) appears to be uncertain.

Air traffic is estimated to contribute about 3-6% to global warming (combined impacts of emissions of CO₂, NO_x and water vapour).

Emissions of CO₂ and other air pollutants from air traffic globally is estimated to increase by about 5% per year.

Conclusions

The Chicago-agreement may complicate the introduction of measures aimed at reducing emissions from aviation.

To include aviation in EU ETS-system as is currently proposed/discussed may lead to contradictory results, since optimising aircraft engines to reduce CO₂ may result in increased NO_x emissions, and high altitude NO_x emissions is a potent greenhouse gas.

Technical options to reduce NO_x-emissions from aviation are limited. Staged combustion is a potential technical solution capable to reduce NO_x by about 80% without impacting on fuel consumption, but this technology is not yet commercially available.

In the short-term there appears to be no technical measures readily available to cut NO_x-emissions from aircraft engines. Therefore economic instruments should be used as a means to create incentives for innovation and behavioural change, and also improve internalisation of external costs.

Recommendations

Individual countries and/or the EU should introduce economic instruments aimed at lowering emissions of CO₂ and other air pollutants. Such instruments could include:

- Fuel taxation
- VAT
- Airport/landing charges
- Route charging
- Emissions trading

Action is needed to improve public awareness about the environmental impacts of aviation.