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PREVENTION OF AIR POLLUTION FROM SHIPS

Recent findings on global warming justifying the need for speedy reductions of greenhouse gas emissions from shipping

Submitted by Friends of the Earth International (FOEI)

SUMMARY

Executive summary:	Carbon dioxide and other greenhouse gas emissions from shipping are increasing at an alarming rate which will have a serious impact on global warming if urgent measures are not taking to prevent and reduce them. In this paper Friends of the Earth International summarizes climate change effects, ship emissions inventories and solutions to address this global crisis, and seeks immediate action from the IMO to reduce greenhouse gas emissions from ships. This document was produced by a coalition of environmental NGOs[1]
Action to be taken:	Paragraph 7
Related documents:	MEPC 47/4/3; MEPC 52/4/5; BLG 11/5/5 and MEPC 45/8

1 Introduction

1.1 Recent reports show dramatic developments in the contribution of human activities to climate change.

> "Global atmospheric concentrations of carbon dioxide, methane and nitrous oxide have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values determined from ice cores spanning many thousands of years" [2].

1.2 In the recently published IPCC report, Climate Change 2007 – "The Physical Science Basis, the proof of human activities influencing the process of global warming becomes evident. Emissions of CO_2 and other substances contributing to climate change have risen dramatically and will continue to do so if no measures are taken. Anthropogenic warming and sea level rise

[1] Clean Air Task Force, Friends of the Earth-US, Bellona Foundation, European Federation for Transport and Environment, North Sea Foundation, and Swedish NGO Secretariat on Acid Rain.

[2] IPCC: Climate Change 2007: The Physical Science Basis.

will continue for centuries due to the timescales associated with climate processes and feedbacks, even if greenhouse gas concentrations will be stabilized." If they are not stabilized, the effects will be even worse.

1.3 Increase of CO_2 in the atmosphere will lead to a range of effects, notably warming of the Earth's atmosphere, change in weather patterns, increased frequency and magnitude of flooding, change in distribution of plants and animals, impacts upon fish stocks sensitive to small changes in temperature and acidification of the oceans. The result of these effects will be devastating on people around the globe and on natural habitat and specific species. Many of these changes will be irreversible.

1.4 According to the Stern Review, the costs of strong and urgent action on climate change will be less than the costs thereby avoided of the impacts of climate change under a *business as usual scenario*. The Review states that there is still time to avoid the worst impacts of climate change, if strong actions are taken now, but delay could significantly increase the dangers and the costs.[3]

1.5 The message from the experts involved in these studies is clear: the increased emissions of greenhouse gasses into the atmosphere are already showing adverse effects. This means that every source has to take its share of responsibility and adopt ambitious reduction strategies.

2 Global Ship CO_2 emissions

2.1 Carbon dioxide emissions from shipping worldwide are by recent study estimated to total as much as 5% of total GHG emissions, exceeding that of airline industry (2 to 3 per cent).[4] Recent studies, using improved methodology, project that shipping emissions of CO_2 and other pollutants will increase by over 4% per year, compounded annually, over the next few decades—resulting in a doubling of shipping emissions from 2002 levels by 2020 and a tripling of such emissions by 2030.[5]

2.2 Recent studies from Institute of Atmospheric Physics of the German Aerospace Centre DLR have shown that fuel consumption from ocean-going ships has increased by a factor of 4.3 from 1950 to 2000, reaching around 280 Tg today. Future scenarios demonstrate that significant reductions are needed to offset increased emissions due to growth in seaborne trade and cargo energy intensity. If no aggressive emission reduction strategies are introduced, CO_2 emissions from ships could double present-day values by 2030, and NOx emissions could exceed present-day global road transport. See chart below.

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[3] Stern Review: The case for action to reduce the risks of climate change.

[4] Comparing Fuel Consumption, CO2 and Other Emissions from International Shipping and Aircraft: A Summary of Recent Research Findings by Veronika Eyring and James J Corbett, release date 8/03/07 http://www.pa.op.dlr.de/SeaKLIM/Fuel_Emissions_International_Shipping.html

[5] BLG 11/INF.3, annex, at pp. 14-21.

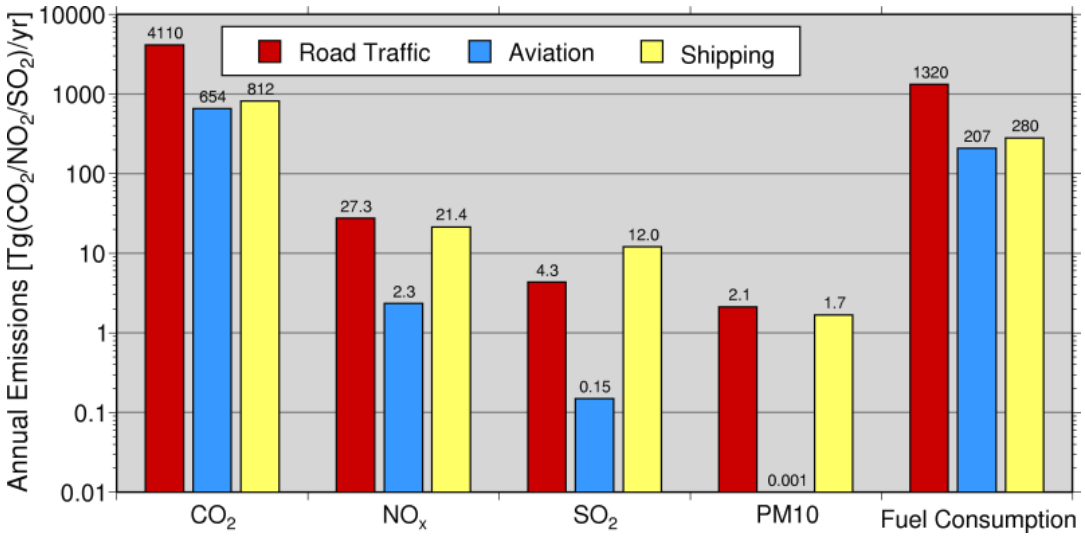

Figure 1: Transport-related annual emissions of CO_2, NOx, SO_2 and PM10 and the fuel consumption in Tg (1 Tg = 10^12 g = Mt) estimated for the year 2000. Modified from **Figure 3 of Eyring et al. (2005), Emissions from international shipping: 1. The last 50 years, J. Geophys. Res., 110, D17305, doi:10.1029/2004JD005619 (Copyright 2005 by the American Geophysical Union)**.

2.3 Ship emissions are not covered by the commitments of the Kyoto Protocol and have been ignored in most government policies designed to reduce global warming gases. In a climate context, emissions from ships are in a special category. Not only are they not assigned to a reduction target under the Kyoto Protocol, but – more fundamentally – these emissions contain components with short lifetimes that have specific local effects.

3 Non-Kyoto emissions

3.1 In addition to CO_2, ships produce significant volumes of non-Kyoto emission including smog-forming nitrogen oxides and black carbon that contribute to short-term climate change and global warming. While a full discussion of the climate change impacts from non- CO_2 emissions from ships is beyond the scope of this document, and the science is still being developed, Friends of the Earth International wants to make note of the potential co-benefits of reducing these emissions to climate change, public health and the environment.

3.2 According to the Centre for International Climate and Environmental Research (CICERO), ship emissions of nitrogen oxides in unpolluted areas have a particularly large effect on ozone formation compared to, for example, emissions from road traffic or land-based industry. Ships now contribute as much as 30 per cent of the world's nitrogen oxide emissions, an estimated 25.2 million metric tons per year. Ships are the primary smog-forming source over the open ocean. The emissions growth is so rapid that even a 60 per cent cut in ship engine emissions of NOx today would be outpaced by 2030.[6]

3.3 Black carbon as a component of PM is a potent warmer, exerting its effect both in the atmosphere and when deposited on snow and ice. When deposited, the dark colour allows more of the sun's energy to be absorbed, thus warming the air above the ground surface and contributing to snow and ice melting. Black carbon may play a particularly important role in

[6] BLG 11/INF.3, annex at p21.

Arctic climate change. Ships are known sources of black carbon emissions. Preliminary estimates suggest that ships emit between 50,000 metric tons (Eyring 2007) and 71,400 metric tons (Corbett 2007) per year. As the Arctic experiences more ice-free days in the summer, which is predicted to occur by mid century (Stroeve, 2007)[7], even small amounts of emitted and deposited black carbon will further exacerbate Arctic warming and melting. Currently, no regulations exist for particulate matter from ship engines.

3.4 See our comments in Section 6 for our position on the need to reduce greenhouse gas emissions relative to criteria air pollutants.

4 IMO course should be altered

4.1 Current policy and progress at IMO to reduce greenhouse gas emissions has been ineffective and slow. It appears that the Secretariat and Member States have completely overlooked the specific recommendations and range of options for reducing carbon dioxide emissions contained in a study commissioned by IMO and published in 2000. The study concluded that CO_2 emissions from ships could be cut in half. Technical measures alone could provide a 28 per cent decrease. A fleet wide 10 per cent speed reduction would result in a 23 per cent decrease in CO_2. Specific measures included:

- optimizing hull and propeller design;
- modernizing power plants;
- utilizing cleaner fuels;
- slowing vessel speeds; and
- incorporating weather-routing procedures.

4.2 Instead of taking any action to further analyse or implement these measures IMO, in December 2003, adopted resolution A.963(23) **IMO Policies and practices related to the reduction of greenhouse gas emissions from ships**. Next, at its 52nd session in October 2004, the Marine Environment Protection Committee (MEPC) made progress on developing draft *Guidelines on the* CO_2 *Indexing Scheme*. In July 2005, MEPC adopted Interim Guidelines for Voluntary Ship CO_2 Emissions Indexing for Use In Trials (MEPC/Circ.471). Members were to carry out trials using the scheme and to report to the next session.

4.3 Since then several delegations and organizations have carried out trials in order to evaluate the GHG Index. Data has been collected from 364 ships covering 8 to 18 ship categories, according to the European Commission.[8] However, a number of inconsistencies were found in the indexing scheme and large gaps in the data remain, according to the analysis in the European Commission report. Among the EC's conclusions was that IMO index may be suited to report efficiency and calculate specific emissions related to the transport of goods if improved, but that use of IMO index for environmental management purposes was not promising because of significant variations in the results from one voyage to the next. To advance the efforts to quantify ship-specific emissions of carbon dioxide, the report recommended a compulsory reporting scheme as a first step.[9]

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[7] Stroeve, Julienne, et.al., Arctic sea ice decline, Faster than forecast, GRL, 5.1.07.

[8] Greenhouse Gas Emissions for Shipping and Implementation Guidance for the Marine Fuel Sulphur Directive, December 2006, CE Delft for European Commission.

[9] Ibid.

4.4 The same report concluded that indexing itself would not achieve reductions of greenhouse gas emissions from ships, and neither would any other type of voluntary indexing or CO_2 reductions programs based on IMO experience to date and those of other organizations including the Clean Cargo Group of Businesses for Social Responsibility and the Green Award program.

4.5 With the indexing scheme failing to produce any meaningful results or benchmarks, and no other efforts underway, real action at IMO to reduce GHG emissions from shipping is still far beyond the horizon. The current policy of IMO in respect to GHG emissions is entirely inadequate to the point of inaction and completely unacceptable to the global community. For this reason, action outside IMO may be inevitable without an immediate change in course.

5 Investigations into reducing ship GHGs outside IMO

5.1 Concerns about increasing ship emissions have prompted nations and states to conduct new inventories documenting the levels of carbon dioxide and other emissions from commercial vessels. These inventories are laying the groundwork for unilateral action in response to IMO inaction.

5.2 The European Commission in November 2002 presented an EU strategy to reduce atmospheric emissions from seagoing ships (COM (2002)595 final). It stated that if the IMO had not adopted a concrete, ambitious strategy by 2003, the Commission would consider taking action at the EU level to reduce ships' unitary emissions of greenhouse gases[10] Since the IMO has not acted adequately, the European Commission has begun to research strategies and produced a report in December 2006 that analyzes several policy options.[11] The report concluded that there were at least three promising policy options to reduce the climate impact of maritime transport: 1) inclusion of maritime transport in ETS 2) differentiation of harbour dues to reward increased transport efficiency and 3) a requirement for ships calling at EU ports to meet a unitary CO_2 index limit value, provided an adequate and accurate indexing system were proven.

5.3 In the United States, several states have taken independent inventories and begun action. In California waters in 2004, ocean-going vessels and cruise ships produced 8,000 tons of carbon dioxide per day. Without action to reduce these emissions, by 2020, this volume is projected to more than double to 17,000 tons per day. In response, the state has proposed several new measures as part of its polices for Early Action Measures to reduce greenhouse gas emissions under the Governor's initiatives and specifically the legislation, AB 32. The state has identified four vessel-specific measures in its Early Action Measures portfolio that offer the co-benefits of reducing carbon dioxide and criteria air pollutants for implementation by 2010: 1) shoreside power for ships when docked; 2) speed reductions; 3) marine distillate fuels requirements for main engines, and 4) emissions standards for harbour craft operating in state regulated waters.[12]

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[10] COM (2002) 595 final, p 17.

[11] Greenhouse Gas Emissions for Shipping and Implementation Guidance for the Marine Fuel Sulphur Directive, CE Delft, December 2006.

[12] California Air Resources Board, Proposed Early Actions to Mitigate Climate Change in California, April 20, 2007, http://www.arb.ca.gov/cc/042307workshop/early_action_report.pdf

5.4 In Washington State's Puget Sound region, ocean-going vessels in 2005 generated greenhouse gases equivalent to 78,000 tons of carbon dioxide. If all vessel types are considered out to 25 miles,[13] the Puget Sound regional total reaches 1.3 million tons of CO_2 equivalents per year. This estimate includes Puget Sound and the Port of Seattle, which is the ninth largest container port in the U.S. The State of Washington and neighbouring British Columbia, Canada, are beginning to deliberate on short-and-long term measures to reduce these emissions through regulation and voluntary policies. Programs for shoreside power for cruise ships and use of lower-sulphur fuels by cruise and cargo ships have been announced.

6 Annex VI revision to reduce shipping emissions of NOx, SOx and PM must not be delayed

6.1 FOEI wants to make one point very clearly – while IMO action to reduce greenhouse gas emissions from shipping is sorely needed, such action must proceed in a separate channel from the ongoing work on revisions to MARPOL Annex VI to reduce shipping emissions of NOx, SOx and particulate matter. IMO action on greenhouse gases must not be used as an excuse to delay reduction of shipping toxic air pollutants. We find it curious indeed that some industry groups that for years have denied the role of human activities in global climate change, profess suddenly, at the 11th hour of the MARPOL Annex VI negotiations, to be very concerned about the potential and speculative impacts on global warming from measures to reduce shipping emissions of pollutants that are causing and will continue to cause death, disease and environmental damage. The IMO must not fall for such a delaying tactic, and instead must press full steam ahead on MARPOL Annex VI reduction of NOx, SOx and PM.

7 Action requested of the Committee

7.1 With urgent action needed to prevent cataclysmic warming of the earth in coming decades, FOEI urges the Committee to immediately develop and propose regulations for reducing greenhouse gas emissions from ships. FOEI urges that IMO include the following actions:

.1 require the global fleet to slow speeds to achieve the quickest, most feasible, cost effective reduction in greenhouse gas emissions;

.2 require the installation and use of weather routing systems to optimise fuel efficiency;

.3 improve efficiency of logistics and voyage planning;

.4 establish guidelines for incorporating GHG-reducing measures in the design of new vessels or retrofit of existing vessels;

.5 develop fuel economy standards for ships;

.6 establish standards for implementing shoreside power in regions where greenhouse gas emissions can be reduced with installation;

.7 establish a strategy to reduce GHG emissions other than CO_2;

[13] Levelton Engineering Ltd. for Greater Vancouver Regional District and Environment Canada, "Marine Vessel Air Emissions in B. C. and Washington State Outside the GVRD and FVRD for the Year 2000," July 2002.

.8 include in the Working Group's Terms of Reference high priority to adoption of these measures;

.9 develop a panel of experts, including naval architects and engineers, to define specific recommendations for technical and operational measures for use on new and existing ships; and

.10 consider the adoption of the "Clean Ship concept", an integrated vision on the future of safe and clean shipping.

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