Brief for GSDR2015

Estimations of the contribution of international shipping to greenhouse gas emissions

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Introduction

Maritime transport is the backbone of world trade and globalization. Twenty-four hours a day and all year round, ships carry cargoes to all corners of the globe. This role will continue to grow with the anticipated increase in world trade in the years to come as millions of people are expected to be lifted out of poverty through improved access to basic materials, goods and products. World trade and maritime transport are, therefore, fundamental to sustaining economic growth and spreading prosperity throughout the world, thereby fulfilling a critical social as well as an economic function.

Maritime transport will be indispensable in a sustainable future global economy, being the most energy efficient mode of mass cargo transport; in 2012 ships carried about 9.2 billion tonnes of cargo and over 2.1 billion passengers. Consequently, these environmental, social and economic dimensions of maritime transport are equally important and should be fully recognized in any strategy, policy, regulatory framework or action.

As a specialized agency of the United Nations, IMO is the global standard-setting authority for the safety, security and environmental performance of international shipping. IMO's regulatory framework covers all aspects of technical matters pertaining to the safety of ships and of life at sea, efficiency of navigation, and the prevention and control of marine and air pollution from ships. IMO also oversees the associated legal and administrative mechanisms for promoting co-operation among Member States and the availability of shipping services to world trade on a non-discriminatory basis — IMO conventions, on entry into force, cover all ships, regardless of the flag they fly, as ships of non-convention States entering the waters or ports of convention States are subject to the 'no more favourable treatment' principle.

IMO's commitment to provide the institutional framework necessary for a green and sustainable global maritime transportation system is reflected by the adoption of over 50 conventions and protocols, more than 1000 codes and recommendations concerning maritime security, prevention of pollution and related matters. Member States and various organizations, including non-governmental organizations in consultative status contribute to the work of the various organs and committees through the provision of expert technical and scientific advice and information.

The role of science in the adoption of measures to improve energy efficiency and address GHG emissions from international shipping

IMO became acutely aware of the constant rise in CO_2 concentrations in the atmosphere, as demonstrated by data coming in from various sources. While the shipping industry saw itself as being the lowest overall emitter per tonne mile of any transport mode, IMO in 1997 adopted resolution 8 on "CO_2 emissions from ships". This resolution invited the IMO to, inter alia, undertake a study of emissions of GHG from ships for the purpose of establishing the amount and relative percentage of GHG emissions from ships as part of the global inventory of GHG

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emissions. As a follow-up to the above resolution, the IMO "Study of Greenhouse Gas Emissions from Ships" was completed and presented to the Marine Environment Protection Committee (MEPC) in June 2000.

Recognizing the projected adverse effects of climate change and acidification of the world's oceans, IMO adopted, in December 2003, Resolution A.963(23) on "IMO Policies and Practices related to the Reduction of Greenhouse Gas Emissions from Ships", which urged MEPC to develop a GHG work plan to direct the identification and development of the needed mechanisms. The work plan, approved in October 2006, called for the consideration of technical (new ships), operational (all ships) and market-based measures (MBM) to deal with GHG emissions from ships in international trade and whereas the Organization has adopted mandatory technical and operational measures to ensure that the global shipping industry has the necessary mechanisms in place to reduce its carbon foot print, it has suspended its discussion on MBMs while it addresses further technical and operational measures for enhancing energy efficiency of international shipping.

During discussions on GHG within IMO at MEPC 55 in October 2006, further follow-up to resolution A.963(23) was considered and MEPC agreed to update the "IMO Study of Greenhouse Gas Emissions from Ships" from 2000 to provide a better foundation for future decisions. This report, the Second IMO GHG Study 2009, constitutes a significant scientific work undertaken at the global scale under the auspices of IMO and equipped IMO with scientific evidence to make informed decisions to address increasing levels of emissions.

One of the conclusions from the Second IMO GHG Study 2009 was that technical and operational measures could increase energy efficiency of ships by 25% to 75%, many of those measures being cost saving even after capital costs were taken into account.

Recognizing the significant potential for reduction of GHG emissions through adoption of energy efficiency measures, this report has greatly supported IMO's work to assess how to address GHG emissions from the sector and has laid the foundation for further regulatory work under MARPOL, the International Convention for the Prevention of Pollution From Ships. This IMO Convention is the most important global treaty for the prevention of pollution from the operation of ships. It governs the design and equipment of ships, establishes a system of certificates and inspections and requires States to provide reception facilities for the disposal of oily waste and chemicals. It covers all technical aspects of pollution from ships, except the disposal of waste into the sea by dumping, and applies to ships of all types, although it does not apply to pollution arising out of the exploration and exploitation of sea-bed mineral resources. Regulations covering the various sources of ship-generated pollution are contained in six annexes that are all in force and updated regularly.

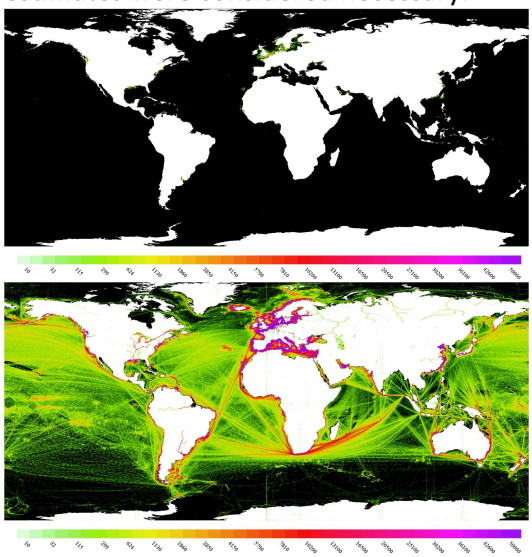
Annex I	Oil
Annex II	Chemicals in bulk
Annex III	Chemicals in packaged form
Annex IV	Sewage
Annex V	Garbage
Annex VI	Air emissions

In July 2011, the mandatory measures mentioned above to improve energy efficiency from international shipping were adopted by contracting Parties to MARPOL Annex VI, representing the first ever mandatory global energy efficiency standard for an international industry sector, and the first legally binding instrument to be adopted since the Kyoto Protocol that addresses greenhouse gas emissions. The adopted measures add to MARPOL Annex VI a new Chapter 4 entitled "Regulations on energy efficiency for ships", making mandatory the Energy Efficiency Design Index (EEDI) for new ships and the Ship Energy Efficiency Plan (SEEMP) for all ships. The regulations apply to all ships of 400 gross

tonnage and above, irrespective of flag and ownership, and entered into force on 1 January 2013. Since then IMO has adopted guidelines aimed at supporting implementation of the mandatory energy efficiency, paving the way for the regulations on EEDI and SEEMP to be smoothly implemented by Administrations and industry.

Improving the information base further

Sea transport is fuel-efficient. However, in order to provide a meaningful baseline to illustrate the steadily on-going improvement in fuel efficiency due to improved hull design, more effective diesel engines and propulsion systems and more effective utilization of individual ships resulting from the introduction of mandatory technical and operational measures, updated emissions estimates were considered necessary.



Geographical coverage in 2007 (top) and 2012 (bottom), coloured according to the intensity of satellite AIS messages received per unit area. This is a composite of both vessel activity and geographical coverage; intensity is not solely indicative of vessel activity (Corbett, Smith, Anderson 2014).

MEPC 67 (October 2014) approved the Third IMO GHG Study 2014, providing updated estimates for GHG emissions from ships, according to which, international shipping emitted 796 million tonnes of CO_2 in 2012, which accounts for no more than about 2.2% of the total CO_2 emission volume for that year. By contrast, in 2007, before the global economic downturn, international shipping is estimated to have emitted 885 million tonnes of CO_2, which represented 2.8% of the global emissions of CO_2 for that year. These percentages are all the more significant when considering that shipping is the principal carrier of world trade, carrying as much as 90% by volume and therefore providing a vital service to global economic development and prosperity.

New high-quality emission inventories and updated scenarios for the sector's future emissions were calculated using a "bottom-up" (activity) model by which fuel consumption and emissions are estimated from individual ship movements. Availability of improved data (in particular the use of satellite AIS data for estimating shipping activity) since 2010 has enabled the uncertainty of inventory estimates to be reduced (relative to previous years' estimates). Furthermore, advancement in the methods used in this study provides insight and produces new knowledge and understanding of the drivers of emissions within sub-sectors of shipping (ships of common type and size).

Note:
The full text of the Third IMO GHG Study 2014 can be found at http://docs.imo.org, document MEPC 67/6 (Executive Summary) and MEPC 67/INF.3 (full report), with their respective corrigenda.

For more information and references, see www.imo.org