

The Environmental Cost of International Shipping.

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Introduction

The modern era has been marked by the phenomenon of globalisation, or rather the specialisation and decentralisation of the worlds industries, technologies and workforce. This transformation, driven by a broad range of social and technological changes, has attracted its fair share of critics², though it continues seemingly unabated³. However, while many of the more apparent issues associated with this change, both positive and negative are becoming increasingly well understood, there are many issues that have attracted scant attention from the worlds people. Of these issues, the huge and often external environmental costs associated with the physical transport of goods across the world’s oceans are shaping to become particularly significant. The following paper reviews the international legislation which currently governs shipping on the high seas and discusses a variety of methods and techniques essential to reducing environmental harm.

Part 1: The environmental impact of the international shipping industry

The worlds shipping industry has caused an array of environmental problems over the years. These range from oil spills, including the famous Exxon Valdez disaster in Prince William Sound in Alaska, to the introduction of exotic species including the Mnemiopsis Leidy (Comb Jellyfish) which has decimated the marine environment in the Black Sea⁴.

While these acute issues are readily apparent, other more chronic issues related to international shipping are more difficult to understand, identify and control. Of these issues, the atmospheric emissions from ships are particularly noteworthy, with estimated annual emissions of noxious gasses highlighted below in figure 1.

Annual Emission Totals of Particulate Matter and Trace Gases from Shipping in Tg/yr for the Three Different Inventories			
	Inventory A for 2002 (Corbett et al., 2007 (4))	Inventory B for 2001 (Eyring et al., 2005 (17))	Inventory C for 2012 (this study)
spatial ship traffic proxy	ICOADS	AMVER	ICOADS
fuel consumption in million tonnes	200 (cargo and passengers only)	280 (world fleet including auxiliary engines)	299 (cargo and passengers only)
NO _x	16.4	21.3	24.5
SO _x	9.2	11.7	13.7
primary SO ₄	0.35	0.77	0.50
CO	1.08	1.28	1.61
BC	0.07	0.05	0.10
POM	0.71	0.13	1.06

Figure 1: A summary of estimated annual shipping emissions in Tg/yr (Corbett, 2007).

These emissions, consistently dismissed and evaded because of the remote and international nature of shipping⁵, are now known to present serious health risks to the world’s people; a point aptly illustrated by a study published in 2007 entitled ‘Mortality from Ship Emissions: A Global Assessment’. In this study, it was determined that particulate emissions from ships alone directly cause 60,000 cardiopulmonary and lung cancer deaths annually amongst other serious environmental effects⁶.

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2 This can be seen in a variety of settings, though it is most visible in the anti globalisation rallies that accompany the G8 meetings.

3 This is reflected by the continued growth in global GDP since WW2, but has recently been brought into question by the Global financial Crisis and the recession in several of the world’s major economies.

4 Meinesz, A. 2003, *Deep Sea Invasion*

5 Emissions from Shipping have been excluded from both the Kyoto protocol and the European Carbon Trading Scheme for example.

6 Corbett, 2007. Mortality from Ship Emissions: A Global Assessment

In addition to noxious emissions international shipping activities also produce large quantities of greenhouse gas emissions. In 2007 international shipping contributed 870 million tonnes of carbon dioxide (CO₂) to the atmosphere, this equates to approximately 2.7 per cent of global CO₂ emissions (omitting domestic shipping and fishing)⁷. Over the seventeen years from 1990 to 2007 CO₂ emissions from international shipping doubled (see figure 2). These high levels of emissions are largely due to the fuel which cargo ships consume which is low grade, 'bottom of the barrel' bunker fuel, which is highly polluting.

In light of such serious conclusions, it must be understood that while the effects are significant now, they are expected to grow considerably as the world's demand for shipping increases over the years⁸.

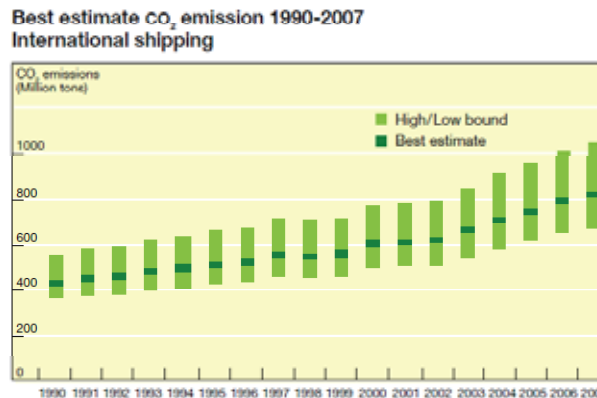


Figure 2: CO₂ emissions from 1990-2007 (million tons) (Second IMO GHG Study, 2009).

Part 2: International Shipping Regulatory Framework

Marine activities such as international shipping are regulated by a mixture of international law and the law of individual States. The legislative framework governing international shipping today consists of 50 conventions and protocols created by the International Maritime Organisation (IMO) (13 of which relate to marine environment, liability and compensation), and the relevant legislative measures of the International Labour Organisation (ILO) for seafarers⁹. Additional regional and national regulations apply to vessels travelling within areas of jurisdiction by coastal States.

The United Nations Convention on the Law of the Sea (UNCLOS)

The United Nations Convention on the Law of the Sea (UNCLOS) is the cornerstone of international maritime law¹⁰.

In 1967, after decades of international conflict and the heightening cold war, fears over security dominated international politics. To allow effective dialogue in this environment, the United Nations began talks to develop a treaty to govern international relations between nations in international waters. The primary concerns of the policy makers at this time were resources, trade and security. It was integral that the laws adopted could ensure safe passage across the seas, establish legal jurisdiction over resources and create measures to protect the marine environment from pollution.

The negotiations lasted fifteen years, and in 1982 the United Nations Convention of the Law of the Sea was adopted. UNCLOS endorsed the right of any sovereign State to have a ship register and thus become a flag State, and provided ships with the right to safe passage through territorial waters and economic zones¹¹.

The UNCLOS is a prime example of the complexity of international law. Talks, discussions, negotiations and decision making between countries is an extremely slow and delicate process. As we have seen more recently regarding

⁷ Second IMO GHG Study 2009

⁸ Estimates for the growth in world shipping vary, but it is commonly held that shipping will continue to grow for the foreseeable future.

⁹ Second IMO GHG Study 2009

¹⁰ UNCLOS, 1982

¹¹ *ibid*

NELR articles

climate change discussions, it can take years to get international parties to agree to discuss the issues, let alone make decisions or binding commitments.

Further to this, the writing and ratifying of international conventions and treaties is often postponed or interfered with due to other political issues between the parties. Not surprisingly few changes have been made to the UNCLOS since such time as it was adopted, particularly with regard to environmental protection.

Part XII of the UNCLOS addresses 'Protection and Preservation of the Marine Environment', however, there is no recognition of the contribution of the international shipping industry to environmental issues such as greenhouse gas emissions and climate change or of the health impacts associated with large ambient concentrations of particulate matter including toxic NO_x and SO_x emitted by ships annually.

The International Maritime Organisation (IMO)

The IMO is the United Nations' specialised agency responsible for improving maritime safety and preventing pollution from ships. The IMO is empowered to deal with administrative and legal matters related to these purposes.

After the United Nations was established in 1945 a number of international organisations were formed, each dealing with a different subject. In 1948 a Conference was held to establish a similar organisation for shipping. In March 1948 the Convention establishing the Inter-Governmental Maritime Consultative Organisation (IMCO) was adopted (the name was changed in 1982 to the International Maritime Organisation (IMO)).

Although it was hoped that the Convention would enter into force relatively quickly, not everyone wanted to see IMO come into existence. To some countries, much of Article I of the convention was unacceptable. Some were afraid that the treaty would lead to interference with their own national shipping industries and laws. While others felt that the IMO Convention was written by and for the benefit of the handful of countries which dominated international shipping at that time.

By the mid-1950s the delay in ratifying the IMO convention was causing concern. New maritime problems were also beginning to emerge, among them oil pollution. In 1954 a conference in London adopted the International Convention for Prevention of Pollution by Oil and agreed that it would become the responsibility of the IMO once the new organization was established.

Gradually the number of Parties to the Convention increased. But many of them registered declarations or reservations which had the effect of greatly restricting the Organisation's area of activities.

The IMO Convention finally entered into force in 1959. But by the time the new Organisation met for the first time, so many reservations had been submitted that it was clear that it would not be able to engage in any activities that might be regarded as economic or commercial. The IMO would have to confine itself to mainly technical issues, especially those involving safety as defined in Article 29.

In the 1948 convention text, there was no reference to marine pollution nor the environment, which is now among the IMO's greatest concerns. Article I of the Convention describes the purpose of the IMO as:

"to provide machinery for cooperation among Governments in the field of governmental regulation and practices relating to technical matters of all kinds affecting shipping engaged in international trade; to encourage and facilitate the general adoption of the highest practicable standards in matters concerning maritime safety, efficiency of navigation, prevention and control of marine pollution from ships and to deal with legal matters related to the purposes set out in this Article."¹²

The primary role of the IMO is to adopt legislation, while enforcement lies with the contracting governments (the flag States). Governments independently decide whether or not to ratify legislation negotiated by IMO member States. When a government ratifies an IMO convention, the Government effectively agrees to make the regulation part of its national law.

Before a convention enters into force appropriate provisions stipulating conditions have to be met. Typically, entry into force is conditional on a number of countries, representing a certain share of the world fleet gross tonnage,

¹² IMO Convention, article 1(a).

ratifying the agreement. Interestingly the Annex I countries which have ratified the Kyoto protocol make up only a one third share of the world fleet gross tonnage¹³.

When an IMO instrument has entered into force, countries that have ratified the instrument can apply it not only to ships of their own flag, but to all ships, regardless of flag, which enter into their area of jurisdiction¹⁴. Therefore, ships wanting to enter the ports or waters under the jurisdiction of a country that has ratified an IMO instrument will have to abide by the convention, regardless of flag. This is an important principle in the international shipping industry and is commonly referred to as the principle of “*no more favourable treatment*”. It refers to port States enforcing applicable standards in a uniform matter to all ships in their ports regardless of flag.

On the other hand, there are no legal barriers to prevent a ship from not conforming to a given IMO regulation provided it operates solely outside of an area of jurisdiction of countries that have ratified the convention in question. Until international law and IMO conventions affect all international waters not just waters surrounding States which have ratified conventions, regulating and enforcing environmental law will continue to meet much difficulty.

UNFCCC, the Kyoto Protocol and shipping

The United Nations Framework Convention on Climate Change (UNFCCC) was signed in 1992, entered into force in 1994, and as of March 2009 has 192 Parties¹⁵. Under the Convention, parties gather and share data, launch national strategies to address emissions and co-operate for the adaptation to climate change.

The Kyoto Protocol was adopted in December 1997 and entered into force in February 2005. In March 2009, 184 parties had ratified the Protocol.¹⁶

While the Convention does not provide commitments to stabilise emissions, the Protocol sets binding targets for the Annex I countries. These countries agreed to reduce their overall emissions of six greenhouse gases by an average of 5.2 per cent below 1990 levels between 2008 and 2012.

Unfortunately, while emissions from aviation and maritime transport have been part of the UNFCCC agenda, these emissions were not included under the Kyoto Protocol.

Article 2.2 of the Kyoto Protocol reads:

“The Parties included in Annex I shall pursue limitation or reduction of emissions of greenhouse gases not controlled by the Montreal Protocol from aviation and marine bunker fuels, working through the International Civil Aviation Organisation and the International Maritime Organisation, respectively.”¹⁷

As previously mentioned, the Annex I countries which have ratified the Kyoto protocol make up only a one third share of the world fleet gross tonnage. Therefore even if there were binding targets set for emissions from marine industries this would only effect a small group which does not include the largest of the flag States.

Flag States and Registration

International law, such as the UNCLOS, regulates affairs between States, but does not apply directly to individual ships¹⁸. Individual ships are regulated by applicable laws and regulations of the country in which the ship is registered, or, their ‘flag State’. This includes any conventions and protocols of the IMO which the flag State has ratified. An issue of concern is related to registration, and a growing trend towards ships being registered under a foreign flag. The United Nations Conference on Trade and Development (UNCTAD) indicates that the percentage of foreign flagged ships grew from 41.50 per cent in 1989 to 66.35 per cent in 2007¹⁹.

According to the IMO the motivations for owner States to register vessels under a foreign flag may include; more favourable tax regimes, conditions to finance ships and the possibility of employing foreign seafarers²⁰. Additionally,

¹³ Second IMO GHG Study 2009

¹⁴ *ibid*

¹⁵ United Nations Convention Framework on Climate Change, 2009

¹⁶ *ibid*

¹⁷ *ibid*

¹⁸ Morgan, N, 1990

¹⁹ UNCTAD, 2008

²⁰ Second IMO GHG Study 2009 (p 29.)

NELR articles

registration under a foreign flag removes responsibility of a ship's compliance with the law from the owner State, as it is the Contracting Government's, or flag State's, responsibility to transpose international law into their national legislation and enforce it upon their registered ships.

To reduce opportunistic owners from taking advantage of flag States some countries may require specific criteria to be fulfilled before granting a ship access to the registry. Such criteria could be that the ship is built in their territory, that the ship owning company is registered in the country, or that the owners are citizens of the country. Other countries have few or no restrictions on access, and are commonly referred to as "open registries". If a ship is to engage in international shipping (i.e. entering foreign or international waters) the flag State is obliged to ensure that the ship complies with the regulations set down in the IMO Conventions and agreements to which the flag state is party. States must also ensure that foreign flagged ships entering their ports also comply with these.

Many of the IMO's most important technical conventions contain provisions to allow ships to be inspected when they visit foreign ports, to ensure that they meet IMO requirements. This is referred to as "Port State Control" (PSC). Ships that fail to meet the standards when subjected to PSC can be detained until repairs are carried out and the ship is released from detention.

Part C: Analysing the effectiveness of the regulation and legislative framework governing international shipping.

The IMO conventions and protocols which are currently in place to control the negative environmental aspects of international shipping (such as prevention of pollution from ships) are managed mainly through a 'cat and mouse game' of common law claims in the absence of effective, binding legislation and preventative solutions.

For the UNFCCC and IMO to succeed in reducing the emissions contributed by international shipping there needs to be a platform by which reduction targets can be introduced into future protocols and conventions which can then set binding targets for emission reductions. Currently no such platform exists in the international shipping law framework, though there is a growing consensus that one needs to be developed. However, the dilemma is not in determining a preferred level of emissions reduction; it is in determining the right strategy to reduce emissions equitably.

International policy makers seeking to incorporate shipping emissions into the global climate framework need to respect both the UNFCCC and its Kyoto Protocol principle of "*Common but Differentiated Responsibilities*" and the IMO principle of "*No More Favourable Treatment*"²¹.

The principle of "common but differentiated responsibility" recognises the differences in the contributions of developed and developing countries in addressing global environmental issues, such as the emissions of greenhouse gases. On the basis of equity, and in accordance with their respective capabilities, the developed countries should take the lead in combating climate change and the adverse effects²².

The IMO principle of "no more favourable treatment" aims to ensure that all international ships adhere to the conventions and protocols ratified by the State which they are registered to, and the State whose waters the vessel is travelling in. Under this principle, no vessel despite its flag, will be exempt from the law of the State they travel in. This principle allows port States to enforce applicable standards in a uniform manner to all ships in their ports regardless of flag. In order to maintain each of these principles, the choice of policy mechanism for emissions allocation must recognise the differences between developed and developing countries. If the principle of "no more favourable treatment" is undermined by exemptions made for ships based on flag, ownership, or shipping route, perverse effects may result.

Part D: Legal Remedies to Turn the Tide

As it currently stands, there are few specific conventions or protocols regarding the airborne emissions from ships²³ though there several legal avenues for control that are being actively considered by the international community.

²¹ Second IMO GHG Study 2009

²² UNFCCC, 2009

²³ There is currently a convention that limits sulphur output from ships exhaust

These legal remedies will have to recognise the previously discussed principles of equity and fairness amongst international shipping interests. Using the mechanisms from the Kyoto Protocol, such as Joint Implementation and Clean Development Mechanisms (CDM) that are based on the definition of nations as either Annex I (developed) or non-Annex I nations (developing), it is possible to fairly distribute emission allocations to different shipping groups.

In order to allocate the emissions produced by ships to Annex I and non-Annex I countries, there are several methods which may be able to be employed. According to Lockley these include allocation by flag, ownership and route²⁴. Allocation by flag gives pollution rights to the country that the ship is registered to. There are numerous issues with this method of allocation though the principal concern is that over 77 per cent²⁵ of the world's shipping fleet are registered in non-Annex 1 countries.

In contrast to allocation by flag, allocation by nationality of ownership is much more concentrated in Annex I countries. There is a problem however, because it is not always possible to specify the nationality of the ship's owner. In many cases assumptions have to be made about which country is the domicile country of the ship's owner. The allocation by nationality is open to evasion with owners able to change their domicile country to that of a non-Annex I country.

Route based allocation is the method that allocates emissions allowances based on the route that the ships take. Pollution on particular routes can be allocated to Annex I ports with the use of ships logs, ports of call and fuel usage volumes to determine emission outputs. This system has potential, although there is the risk of perverse effects; either causing ships to take longer routes to avoid emissions limits or having ships drop cargo in non-Annex I ports to be transported by other means to the destination²⁶.

The aforementioned legal remedies, as noted, are of varying effectiveness and have each their own shortcomings and benefits. While some may be more effective than others, all of these remedies fail insofar as they are 'tailpipe' solutions; solutions that deal with the problem's outcome, not its cause. To be truly effective, legal remedies need to focus on the fact that shipping is a technological phenomena best fixed through technological solutions; for instance cleaner, more efficient technology.

An IMO convention ratified uniformly by member States to manage the technological efficiency of shipping could provide an emissions reduction solution which recognises the IMO principle of "no more favourable treatment" and the UNFCCC principle of "common but differentiated responsibility". If the structural changes were implemented using the Kyoto Protocol's CDM this would allow developed countries to earn saleable certified emission reductions (CER) for facilitating emission-reduction projects in developing countries. In this case, assisting in the retrofitting or building of cleaner, energy efficient ships.

Such technology can include retrofits to existing vessels, upgraded designs in new ships, or cleaner, purer fuel; so long as the result is a cleaner industry. To achieve such technological, upstream solutions, legal remedies need to be focused on those who build and maintain ships, and those who produce the fuel that they use.

This focus also has the benefit of reducing the number of States who must cooperate in the effort to reduce pollution from ships, a point illustrated by the fact that South Korea and China together produce the vast bulk of the world's ships²⁷. By reducing the number of States that need to ratify international agreements, it is easier to achieve swift action, and in this case quick reductions in the amount of GHG emissions from ships.

²⁴ Lockley P, *International Shipping in a post-2012 climate deal*, 2008

²⁵ *ibid*

²⁶ *Ibid*

²⁷ Lu, 2005