

INTERNATIONAL MARITIME ORGANIZATION  
ORGANISATION MARITIME INTERNATIONALE  
ORGANIZACIÓN MARÍTIMA INTERNACIONAL



**Submission by the International Maritime Organization (IMO)**

**UNITED NATIONS CLIMATE CHANGE CONFERENCE – EIGHTH SESSION OF  
THE AD HOC WORKING GROUP ON LONG-TERM COOPERATIVE ACTION  
(AWG-LCA 8)**

**FIFTEENTH CONFERENCE OF THE PARTIES – COP 15**

**7 to 18 December 2009 - Copenhagen, Denmark**

**CONTROL OF GREENHOUSE GAS EMISSIONS FROM SHIPS ENGAGED IN  
INTERNATIONAL TRADE**

This submission consists of the following two documents:

- 1 Position note; and
- 2 Information note.

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## **Position note by the International Maritime Organization (IMO)**

### **FIFTEENTH CONFERENCE OF THE PARTIES – COP 15**

**7 to 18 December 2009 - Copenhagen, Denmark**

#### **CONTROL OF GREENHOUSE GAS EMISSIONS FROM SHIPS ENGAGED IN INTERNATIONAL TRADE**

Despite the inertia that characterized mankind's initial reaction to early warnings concerning global warming and ocean acidification, it is encouraging that, albeit belatedly, the world community has now come to acknowledge that increased concentration of greenhouse gases (GHGs) and resulting increases in global temperatures and pH values are altering the complex web of systems that allow life to thrive.

The International Maritime Organization (IMO) has, over the past 52 years, developed and enacted an impressive corpus of international legislation consisting of 51 treaty instruments, which regulate international shipping from the safety, security, efficiency of navigation and environmental protection perspectives; most of them are in force and are implemented by the vast majority of the Organization's 169 Member Governments, all of them also Parties to the UNFCCC.

#### **IMO's objectives at COP 15**

In accordance with article 59 of its constitutive Convention, IMO is recognized as the specialized agency of the United Nations in the field of international shipping and the effect of shipping on the environment and, as such, it has been entrusted by the world community to pursue safe, secure and efficient shipping on clean oceans.

To discharge its specific mandate of effectively protecting and preserving the global environment, both marine and atmospheric, the Organization will, at the Copenhagen Conference, seek to ensure that the community continues to entrust it with developing and enacting global regulations to control GHG emissions from ships engaged in international trade.

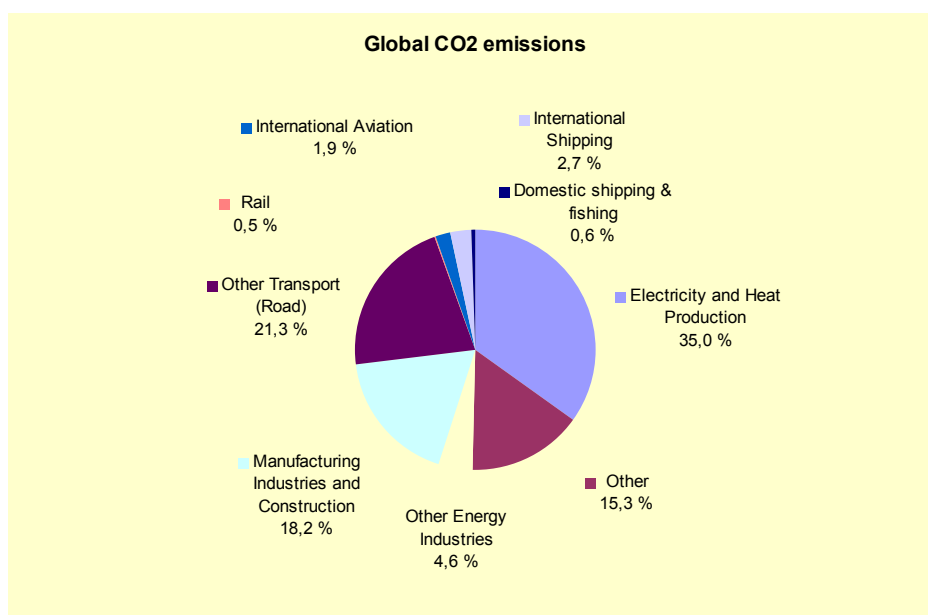
#### **Why should IMO continue to be entrusted with the regulation of shipping emissions?**

International shipping – unlike land-based industries, which are regulated mainly through national legislation – requires global regulations if it is to function, as it has done for centuries, as the principal vehicle for the movement of global trade. Indeed, shipping is perhaps the most international of all the world's major industries – and this is demonstrated by the diversity of national interests that may be involved in the design, building, ownership, operation and crewing of a typical ocean-going merchant vessel, not to mention the finance and insurance aspects, nor yet the cargo ownership. Most ships spend their working lives travelling between different continents and different legal jurisdictions, very often far away from the country of their registry, as they carry the raw materials, goods and products that underpin the global economy.

The overarching logic of the international shipping industry requires an international regulatory regime (with regard to safety, security, facilitation of traffic and protection of the environment), to enable this hugely diverse international mixture to function effectively and efficiently. It would clearly be absurd if, for example, the ship safety or environmental standards recognized and approved in one country were not similarly recognized in another. It would obviously be impossible to alter, mid-voyage, a ship's design, construction, equipment, manning levels or operational procedures to accommodate standards in the port of arrival that differ from those prevailing in the port of departure. World trade would simply grind to a halt.

It is this peculiarity of shipping, as a global industry requiring global standards, that makes it imperative that its regulation should, without exception, be the responsibility of an international body exclusively dealing with maritime matters, one that can understand how the industry operates and has the specialized knowledge, skills, track record experience and expertise to work out the best solutions to safeguard fundamental issues affecting international maritime transport, such as safety, security and environmental protection.

Since its creation, IMO has developed these skills and is uniquely placed to continue to service the world community from all its perspectives, including those within the objectives of the Copenhagen Conference. Indeed, the Organization's environmental credentials speak for themselves: 23 out of the 51 IMO treaty instruments directly address the prevention and control of pollution, a fact that bears testimony of the Organization's commitment, through its Marine Environment Protection Committee (MEPC), to the protection and preservation of our common environment – both marine and atmospheric – from any adverse impacts caused by shipping operations.



**Figure: Emissions of CO<sub>2</sub> from shipping compared with global total emissions**

Climate change is no exception and, to this end, a study on GHG emissions from ships, commissioned by IMO and originally published in 2000, was thoroughly updated in 2009\*, concluding that international shipping was responsible for the emission of 870 million tonnes, or only some 2.7 per cent of the global emissions of CO<sub>2</sub> in 2007. However small that contribution – deriving as it does from what is globally-recognized as the most energy-efficient mode of bulk transportation – the Organization has drawn up an **action plan** to effectively reduce international shipping's GHG emissions even further. The plan covers the development of **technical and operational measures** for new and existing ships, as well as **market-based instruments** to, *inter alia*, act as an incentive for the shipping industry to invest in more fuel-efficient technologies, and also serve other purposes such as raising funds for climate change mitigation and adaptation activities, research and development and the offsetting of emissions.

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\* The IMO Secretariat has submitted to COP 15/CMP 5 detailed information on the work the Organization has accomplished so far, including compilation of the Second IMO GHG Study of 2009. Copies of these documents and other related information material may be obtained from the IMO Secretariat at its booth in the exhibition area and during shipping-related side events or may be found at: [www.imo.org](http://www.imo.org)

As previously indicated, ships are competing in a single global market and must be regulated at the global level for the regulations to be effective. Accordingly, a future GHG regime for international shipping must not negatively affect sustainable development, especially in developing countries, and should not lead to distortion of international competition and create new barriers in international trade. To these ends, therefore, IMO has been energetically engaged in the development of a robust regime to control GHG emissions from ships that will regulate international shipping at the global level and thus contribute to the stemming of climate change and ocean acidification and, at the same time, contribute financially towards combating climate change in developing countries.

Based on these premises, the latest session of the MEPC (13 to 17 July 2009) concluded a package of technical and operational measures to reduce GHG emissions from international shipping, intended for voluntary application until the Committee's sixtieth session in March 2010, when their scope of application and enactment would be debated on the basis of the outcome of the Copenhagen Conference.

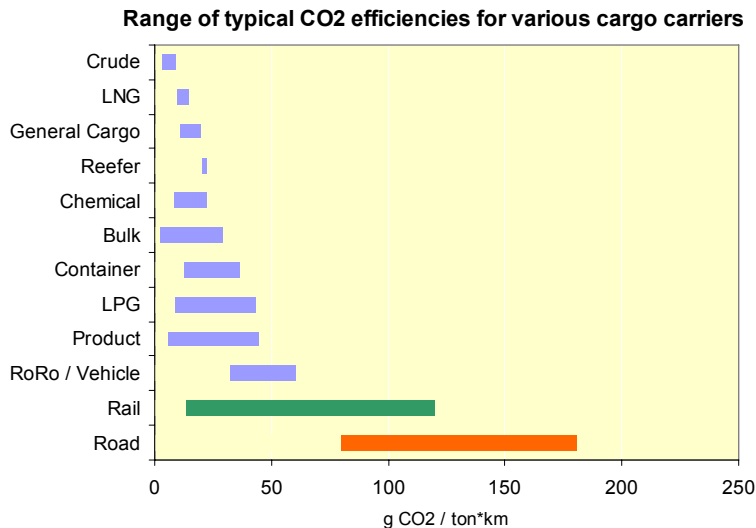
The Committee also “agreed that any regulatory scheme on GHG emissions applied to international shipping should be developed and enacted by IMO as the most competent relevant international body” with a global mandate to regulate all aspects of international shipping.

Furthermore, the Committee overwhelmingly agreed that “a market-based measure was needed as part of a comprehensive package of measures for the regulation of GHG emissions from international shipping”. With this in mind, the Committee “considered and agreed to a work plan for further consideration of market-based measures”, culminating in 2011, to complement the technical and operational reduction measures and to provide economic incentives for the shipping industry.

The outcome of the MEPC’s discussions on the foregoing matters has been reported to the twenty-sixth session of IMO’s Assembly (23 November to 4 December 2009) and the action taken by the Committee has been endorsed by the Organization’s senior-most body.

Accordingly, all the necessary mechanisms leading to a strong shipping-related anti-climate change infrastructure are in place or well underway and an agreement on their application is the only aspect pending before a robust and efficient GHG reduction regime for international shipping is agreed for the benefit of the global environment and future generations.

Therefore, as recognized by the Organization’s 169 Member Governments, the complex nature of the shipping industry and the peculiarities that accompany it makes it essential that any regulatory action be taken by IMO, the only global forum that has the required and demonstrated credentials as well as the necessary expertise and experience and, most importantly, the record of achievements, to deliver in the face of the new global challenge.



**Figure: Typical ranges of CO<sub>2</sub> efficiencies of surface cargo carriers**

### Concluding remarks

From the foregoing, it emerges that:

- IMO has an enviable track record of successfully addressing, resolving and promoting all issues within its competence and on its agenda;
- On environmental issues in particular, the Organization has performed excellently, being able to demonstrate a globally recognized contribution towards reducing pollution of the marine environment from all sources of shipping operations (oil spills, in particular) and tackling, head on, threats to the atmospheric environment, first through drastically reducing air pollutants and, now, through an impressive array of measures aiming at reducing GHG emissions from ships;
- With the firm support of its Member Governments and all its constituents in the industry, the Organization is determined to play, responsibly and effectively, its role as the global body entrusted with the regulation of international shipping and, as far as the Copenhagen Conference is concerned, to contribute its part to the global efforts to stem climate change and global warming.

It is for the strong reasons outlined above, undeniable as they are, that IMO participates in Copenhagen Conference expecting that, as the Kyoto Conference did twelve years ago, the global community will, once again, place its confidence, for an effective contribution, from the shipping point of view, to the objectives this Conference pursues, on the Organization. Once this is done, IMO will spare no effort to do its duty within any timeframe the present Conference decides.

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**Information note by the International Maritime Organization**

**FIFTHTEENTH CONFERENCE OF THE PARTIES – COP 15**

**7 to 18 December 2009 - Copenhagen, Denmark**

**CONTROL OF GREENHOUSE GAS EMISSIONS FROM SHIPS ENGAGED IN  
INTERNATIONAL TRADE IN A POST-2012 REGIME**

**Introduction**

1 Work on the prevention of air pollution and control of greenhouse gas emissions from ships started within the International Maritime Organization (IMO) in the late 1980s. The first regulatory steps were outphasing of ozone depleting substances both as refrigerant gases and in fire-fighting systems and later, prevention of air pollution in the form of oil cargo vapours and exhaust gases were targeted by, *inter alia*, adopting limits for nitrogen oxides and sulphur oxides in ship exhaust gases. In recent years the focus has been on control of greenhouse gas emissions from ships engaged in international trade.

2 Due to its close connection to global commerce, international shipping plays a vital role in the facilitation of world trade as the most cost-effective and energy-efficient mode of transport, making a significant contribution to global prosperity in both developing and developed countries. Shipping is probably also the most international of all the world's industries and the global character of shipping requires global regulation that applies universally to all ships. IMO, as the United Nation's specialized agency responsible for the global regulation of all facets pertaining to international shipping, has a key role in ensuring that lives at sea are not put at risk and that the environment is not polluted by ships' operations – as summed up in IMO's mission statement: **Safe, Secure and Efficient Shipping on Clean Oceans**.

3 IMO is regarded as the sole competent international organization with a global mandate to regulate all non-commercial aspects of international shipping, including reduction or limitation of GHG emissions. As shipping is a global industry and ships are competing in a single global market, it must be regulated at the global level for any control regime to be environmentally effective (avoid carbon leakage) and to maintain a level playing field for all ships irrespective of flag (nationality) or ownership. IMO's vision is to eliminate all adverse environmental impact from ships by developing robust and effective regulations that apply universally to all ships.

**Work on control of greenhouse gas emissions from international shipping**

4 IMO's Assembly resolution A.963(23) on IMO Policies and Practices Related to the Reduction of Greenhouse Gas Emissions from Ships urges the Organization's Marine Environment Protection Committee (MEPC) to identify and develop the mechanisms needed to achieve limitation or reduction of Greenhouse Gas (GHG) emissions from international shipping.

5 The Assembly resolution also called for MEPC to develop a GHG work plan with timetable to identify and develop of the needed mechanisms. Subsequently, an ambitious but realistic work plan was adopted by the Committee in October 2006 and a significant amount of work has been carried out in accordance with it, leading to the development of a set of robust technical and operational measures that will, when fully implemented, result in significant reductions of GHG emissions from ships. An account of the main events in IMO's GHG work is set out in annex 1.

### **Outcome of MEPC 59**

6 The GHG work plan culminated at the fifty-ninth session of IMO's Marine Environment Protection Committee (MEPC 59) where a package of specific reduction measures were agreed, together with a work plan for the further consideration and development of a suitable market-based instrument for international shipping. More than 900 delegates from all over the world attended MEPC 59, which was held in London from 13 to 17 July 2009, where control of greenhouse gases from international shipping was the paramount item on its agenda. The Committee noted that 2009 was a crucial year in the climate change negotiations, culminating at the United Nations Climate Change Conference in December, where it was expected that the 192 Parties to the UNFCCC of which 169 are also IMO Members would adopt a new and ambitious post-2012 agreement to combat climate change.

7 Leading up to MEPC 59, two intersessional meetings were held in addition to the three previous ordinary sessions. Hundreds of submissions by Member States and observer organizations, four reports by intersessional correspondence groups and a large number of scientific studies facilitated the work and made the expeditious progress possible. This progress would not have been possible without the active involvement and dedication of the world's maritime nations and the strong environmental commitment of a united maritime industry.

8 The technical and operational measures agreed by MEPC 59 are intended to be used for trial purposes until MEPC 60 in March 2010, with a view to facilitating decisions on their scope of application and enactment, taking into account the outcome of the Copenhagen Conference. The measures include:

- .1 interim guidelines on the method of calculation and voluntary verification of the **Energy Efficiency Design Index (EEDI)** for new ships, which is intended to stimulate innovation and technical development of all elements influencing the energy efficiency of a ship from its design phase. The index would cover 87% of emissions from new ships – the reduction level is not yet agreed upon and will be considered in detail by MEPC 60, but an initial relative reduction of 10% to 30% is possible depending on ship type and size; and
- .2 guidance on the development of a **Ship Energy Efficiency Management Plan (SEEMP)** for new and existing ships, which incorporates best practices for fuel-efficient ship operation, as well as guidelines for voluntary use of the **Energy Efficiency Operational Indicator** for new and existing ships. The indicator enables operators to measure the fuel efficiency of a ship in operation and to gauge the effect of any changes in operation, e.g. improved voyage planning or more frequent propeller cleaning, or introduction of technical measures such as waste heat recovery systems or a new more efficient propeller. The Second IMO GHG Study 2009 indicates that a 20% reduction on a tonne-mile basis by mainly operational measures is possible and would be cost-effective with current fuel prices. The SEEMP will assist the shipping industry in achieving this potential.

A more detailed description of the technical and operational measures is set out in annex 2 and more information may be found on at: [www.imo.org](http://www.imo.org).

### **Greenhouse gas Study 2009**

9 MEPC 59 was notably assisted in its work by the **Second IMO GHG Study 2009**, which is the most comprehensive and authoritative assessment of the level of greenhouse gas emitted by ships, including the potential for reduction. The Study also evaluates the different policy options for control of GHG emissions from ships currently under consideration within IMO and other organizations (see also annex 1 paragraphs 31 to 34). The Second IMO GHG Study 2009 is being submitted to the appropriate bodies of the UNFCCC and may be found at: [http://www.imo.org/home.asp?topic\\_id=1823](http://www.imo.org/home.asp?topic_id=1823)

### **Market-based mechanisms**

10 The Committee recognized that the technical and operational measures might not be sufficient to satisfactorily reduce the amount of GHG emissions from international shipping in view of the growth projections of human population and world trade and the urgent need for reductions identified by science (IPCC). Therefore, market-based mechanisms were considered in line with resolution A.963(23) and the GHG work plan. A market-based mechanism would serve two main purposes: off-setting of growing ship emissions and providing a fiscal incentive for the maritime industry to invest in more fuel efficient ships and technologies and to operate ships in a more energy-efficient manner by setting a price on CO<sub>2</sub> emissions.

11 It was agreed by overwhelming majority that a market-based instrument was needed as part of a comprehensive package of measures to regulate GHG emissions from international shipping. The Committee further agreed that any regulatory GHG regime applied to international shipping should be developed and enacted by IMO as the sole competent international organization with a global mandate to regulate all non-commercial aspects of international shipping.

12 MEPC 59 held an in-depth discussion on market-based measures and the Committee agreed on a work plan culminating in 2011. It was agreed to fully take into account discussions and submissions to date, as well as relevant outcomes of the United Nations Climate Change Conference (COP 15 and CMP 5) in December 2009. Summaries of the market-based measures under consideration within IMO are set out in annex 3.

13 The Committee noted that there was a general preference for the greater part of any funds generated by a market-based instrument under the auspices of IMO, to be used for climate change purposes in developing countries through existing or new funding mechanisms under the UNFCCC or other international organizations. Assessments have shown that a market-based instrument for international shipping may generate funds in the magnitude of billions of dollars annually if applied to all ships in line with other IMO instruments.

### **Endorsement of MEPC's actions by IMO's twenty sixth Assembly**

14 The action taken by and the outcome of MEPC 59 were endorsed by the twenty-sixth session of IMO's Assembly when it met from 23 November to 4 December 2009. The MEPC is the technical body of the Organization with the authority and mandate to develop the highest practicable standards to prevent and control pollution from ships. In the context of a control regime to achieve reduction or limitation in GHG emissions from international shipping, MEPC has its mandate in resolution A.963(23).



## **Regulation of international shipping – IMO’s role**

15 IMO was established by governments as a specialized agency under the United Nations to provide machinery for intergovernmental cooperation in the field of regulation of ships engaged in international trade and to encourage and facilitate the general adoption of the highest practicable standards in maritime safety, efficiency of navigation and prevention and control of marine pollution from ships. IMO is also empowered to deal with administrative and legal matters related to these purposes. IMO’s role is primarily to enact international legislation, while the Contracting Governments assume the responsibility for implementing and enforcing the legislation on ship flying their flag.

16 When an IMO instrument has entered into force, countries that have ratified it can apply it not only to ships of their own flag but also to all other ships as a condition of entering their ports or internal waters, regardless of flag. This is an important principle, commonly referred to as the principle of “no more favourable treatment”. Flag States are responsible for implementing and enforcing legislation on ships in their registries. Additionally, IMO’s most important conventions contain provisions to allow ships to be inspected through port State control, to ensure that they meet IMO requirements. Additional information on the international framework for regulation of international shipping may be found in the Second IMO GHG Study 2009 (see above) and a more detailed description of flag and port State control issues is set out in annex 4.

### ***How to measure progress through the IMO machinery***

17 A voluntary audit scheme has been adopted by IMO helping flag States to assess how effectively they are fulfilling their obligations under the various IMO conventions to which they are parties. The first audits took place in 2006 and there has been positive outcome from the process. To date, 37 Member States have volunteered for audit and 77 individuals have been nominated by Governments as auditors. The scheme is now being further institutionalized with the purpose of making it mandatory in the future.

18 The 51 IMO treaty instruments and hundreds of other measures, such as codes, guidelines and recommended practices, influence almost every non-commercial aspect of shipping and ship operations, including ship design, construction, equipment, operation, maintenance and manning. IMO has in recent years been successful in developing and adopting new conventions to protect the environment, e.g., the Organization has achieved the delivery of the BWM (Ballast Water Management) Convention in 2004; the revision of MARPOL Annex VI in 2007; the Ship Recycling Convention in 2009; and progress is currently being made on control of GHG emissions from international shipping.

19 These are significant examples of IMO’s most recent successes on the environmental front, highlighting, at the same time, the Organization’s, its Member States and the shipping industry’s concern and sensitivity about the environment, both marine and atmospheric. IMO’s strenuous work to protect and preserve the environment from all sorts of ship-sourced pollution are all credentials that IMO has the ability and will to put in place robust and efficient control regime targeting specific sources of ship pollution. For example, while seaborne trade increased by around 135% between 1985 and 2006, oil spills were reduced by 85% during the same period.

### ***Ship safety significantly increased due to IMO’s work***

20 The numbers of ships lost in maritime casualties has decreased due to the IMO regulations: between 1966 and 1985 there were no fewer than 300 ships lost annually. The number and percentage of losses began to dip significantly in 1980 and has continued on a downward curve ever since. In 1990, the number of annual losses dipped under 200, at 2.4 per thousand vessels. By 2000 the figure had decreased to 167, at 1.9 per thousand ships.

## **IMO's Integrated Technical Cooperation Programme**

21 IMO adopts international shipping regulations but it is the responsibility of Governments to implement those regulations. IMO has developed a Technical Co-operation Programme which is designed to assist Governments that lack the resources needed to operate a maritime administration successfully (for ships flying its flag (Flag State)) and control ships calling their ports or transiting their waters (port and coastal State). The emphasis of this programme is very much on training and capacity building, and perhaps the best example is the World Maritime University in Malmö, Sweden, which was established in 1983 and provides advanced training for the men and women involved in maritime administration, education and management. Also under the auspices of IMO are the International Maritime Law Institute in Malta and the International Maritime Academy in Trieste, Italy.

22 The aim of IMO's Integrated Technical Co-operation Programme is to help developing countries improve their ability to comply with international rules and standards relating to maritime safety and the prevention and control of marine pollution from ships, giving priority to technical assistance programmes that focus on human resources development and institutional capacity-building. IMO recognises that not all of its Members have the same capacity to fulfil their obligations as parties to the various conventions, often because they lack resources and expertise. The technical co-operation programme aims at redressing this resource imbalance by assessing the needs of countries and matching them to expertise, funding and training made available by the IMO regular budget, the IMO Printing Fund, donor countries and organisations.

### **The way ahead post-COP 15**

23 The 169 IMO Member Governments, all of which are also Parties to the UNFCCC, are heavily engaged in the fight to protect and preserve the environment – both marine and atmospheric. IMO's work on the limitation or reduction of GHGs from international shipping stems from the genuine concerns for the environment of our Member States in the pursuit of the Organization's objectives – Safe, Secure and Efficient Shipping on Clean Oceans. To that end, IMO is working towards a robust regime that will regulate shipping at the global level and thus contribute to the stemming of climate change and ocean acidification and at the same time contribute financially towards the efforts in combating climate change in developing countries.

24 Ships are competing in a single global market and must be regulated at the global level for the regulations to be environmentally effective (avoid carbon leakage). A future GHG regime for international shipping must not negatively affect sustainable development and should not lead to distortion of international competition and create new barriers in international trade.

25 There is no precedent in any of the fifty-one IMO international treaty instruments currently in existence where measures are applied selectively to ships according to their flag. On the other hand, there are several international environmental treaties which have a differentiated approach, such as the Montreal Protocol (on substances that deplete the ozone layer) and the Basel Convention (on transboundary movement of waste) yet, when IMO successfully dealt with the same issues at the request of the international community, the principle of a differentiated approach (according to flag) was not taken on board.

26 The principle of common but differentiated responsibilities (CBDR) is one agreed for the sharing of burdens between States and to place obligations for reductions in emissions principally on countries with historic responsibility for the current and projected climate effects. With most ships registered in developing country registers, historic emission responsibilities have another meaning for the global shipping industry compared with land-based industrial sources of GHG emissions.

27 Under IMO's regulatory framework, the individual ships of the world's fleet are the legal subject and the obligations for the flag State refer to implementation in their domestic legislation and enforcement through flag and port State controls in line with all other IMO instruments and regulations. It will not be the countries where ships are registered that bear the cost of more energy-efficient ships and ship operations, it will be the shipowners and ship operators as well as other stakeholders in the global shipping industry.

28 The interests of developing countries will be duly taken into account as is customary in relation with development of mandatory instruments as covered in IMO resolution A.998(25) 'Need for capacity-building for the development and implementation of new, and amendments to existing, instruments'. IMO has had, and continue to have, the special needs of developing countries, including in particular the Small Island Developing States and the Least Developed Countries, firmly in mind through the provision of technical co-operation and assistance under its Integrated Technical Co-operation Programme. The global efforts to control GHG emissions from ships are no exception and IMO is sparing no efforts to contribute its fair share.

29 Recognizing the fundamental importance of the principle of CBDR under the UNFCCC regime - consequent with its own philosophy of assisting developing countries - and at the same time conscious of its international obligation, enshrined in its constitutive Convention, to regulate ships without discrimination on account of the flag they fly, IMO and its Member Governments are working hard to address the special needs of developing countries and to satisfy the CBDR principle. Creative and innovative means are under consideration, which would see substantial funds, obtained from carbon offsetting or trading measures (market-based mechanisms) applied by shipping, being dedicated to climate change mitigation/adaptation in developing countries and may also include other ways to secure that a control regime for international shipping do not have unwanted implications for developing countries.

## **Conclusions**

30 Being fully aware of the ultimate objective of the UNFCCC, which is to achieve stabilization of greenhouse gas concentrations at a level that prevents dangerous interference in the global climate system, IMO is seeking a win-win solution where a GHG control regime for international shipping, once enacted, will deliver real emission reductions and, at the same time, will contribute financially towards the wider efforts in combating climate change in developing countries. The interests of mankind and the global climate would be best served if the Parties to the UNFCCC at the Copenhagen Conference (COP 15 and CMP 5), most of which are also IMO Member States, decided to continue entrusting the Organization with the development and enacting of the global regulatory regime needed to limit or reduce greenhouse gas emissions from international shipping, based on the above premises.

31 Although no mandatory GHG regime for international shipping has been finalized so far, the technical and operational mechanisms needed for its efficient implementation are fully developed, well matured and ready for consideration as mandatory instruments, taking into account the outcome of the Copenhagen Conference. Further work is needed on market-based measures but the foundations are in place and a work plan, culminating in 2011, has been agreed. All the necessary mechanisms are thereby in place or well underway and an agreement on their application is the only aspect pending before a robust and efficient GHG regime, complementing IMO's regime of 51 international treaties regulating all non-commercial aspects of shipping, may be agreed to the benefit of the global environment and future generations.

32 IMO will continue its endeavours to reduce any environmental impacts from international shipping, a transport industry that is vital to world trade and sustainable development. IMO is ready to take technical and regulatory action as soon as a decision at the Copenhagen Conference is taken on a post-2012 regime to combat climate change.

## ANNEX 1

### **Main events in IMO's work on control of greenhouse gas emissions from international shipping**

#### **Introduction**

1 IMO's work on control of greenhouse gas emissions from ships is guided by Assembly resolution A.963(23) on IMO Policies and Practices Related to the Reduction of Greenhouse Gas Emissions from Ships, which was adopted in December 2003. The resolution urges the Marine Environment Protection Committee (MEPC) to identify and develop the mechanisms needed to achieve limitation or reduction of Greenhouse Gas (GHG) emissions from international shipping. It calls for MEPC to develop a GHG work plan with timetable to direct the identification and development of the needed mechanisms, and this plan was adopted by the Committee in October 2006. A significant amount of work has been carried out in accordance with the work plan and IMO has developed a set of robust and efficient technical and operational measures that will, when fully implemented, result in significant reductions of GHG emissions from ships.

2 The fifty-ninth session of MEPC 59 in July 2009 agreed to a package of technical and operational measures to reduce GHG emissions from international shipping and also agreed on a work plan for further consideration and development of suitable and efficient market-based instruments to complement the technical and operational reduction measures and to provide economic incentives for the shipping industry. MEPC 59 further agreed that any regulatory scheme to control GHG emissions from international shipping should be developed and enacted by IMO as the most competent international body.

3 The agreed measures are intended for voluntary application until the Committee's sixtieth session in March 2010, with a view to facilitating decisions on their scope of application and enactment and taking into account the outcome of the Copenhagen Conference.

#### **Prevention of air pollution**

4 In the late 1980s, IMO started work on prevention of air pollution from ships. These efforts were based on scientific information on adverse effects of emissions to air from a multitude of sources, ships being one of them, on human health and vulnerable ecosystems. This was something of a departure, as IMO's focus, along with that of national regulators and of the society as a whole, had previously been on more visible sources of ship-sourced pollution – for example, on oil spills resulting from major ship accidents. The harmful long-term effects of exhaust gases were not so immediately visible and had not earlier been fully recognized.

5 The seventeenth session of the IMO Assembly, in November 1991, recognizing the urgent necessity of establishing an international policy on prevention of air pollution from ships, considered and decided, in resolution A.719(17), to develop a new annex to the International Convention for the Prevention of Pollution from Ships (MARPOL Convention). Following development of the regulatory text by MEPC, an International Conference of Parties to the MARPOL Convention was held in London in September 1997. The Conference adopted the protocol of 1997 to the MARPOL Convention, which added a new Annex VI, Regulations for the Prevention of Air Pollution from Ships, to the MARPOL Convention (MARPOL Annex VI).

## The 1997 MARPOL Conference

6 With a view to addressing the issue of GHG emissions from international shipping, the 1997 MARPOL Conference adopted **Resolution 8 on “CO<sub>2</sub> emissions from ships”**, inviting:

- .1 the IMO Secretary-General to co-operate with the Executive Secretary of UNFCCC in the exchange of information on the issue of GHG emissions;
- .2 IMO to undertake a study of GHG emissions 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 emissions; and
- .3 the Marine Environment Protection Committee (MEPC) of IMO to consider feasible GHG emissions reduction strategies.

7 Following the entry into force of MARPOL Annex VI on 19 May 2005, MEPC 53 (July 2005) agreed to the revision of MARPOL Annex VI with the aim of significantly strengthening the emission limits in light of technological improvements and implementation experience. As a result, MEPC 58 (October 2008) considered and adopted the revised MARPOL Annex VI and the NO<sub>x</sub> Technical Code 2008, which are expected to enter into force on 1 July 2010 upon their deemed acceptance on 1 January 2010.

8 The main changes to Annex VI will see a progressive reduction in sulphur oxide emissions from ships, with the global sulphur cap finally reduced from the current 4.50% to 0.50 % effective from 1 January 2020. The limits applicable in Sulphur Emission Control Areas will be stepwise reduced to 0.10 %, effective from 1 January 2015, from the current 1.50%.

9 The revised Annex VI will allow for an Emission Control Area to be designated for sulphur oxides and particulate matter, or nitrogen oxides, or all three types of emissions from ships, subject to a proposal from a Party or Parties to the Annex which would be considered for adoption by the Organization, if supported by a demonstrated need to prevent, reduce and control one or all three of those emissions from ships. Progressive reductions in nitrogen oxide emissions from marine diesel engines were also agreed, with the most stringent controls on engines installed on ships constructed on or after 1 January 2016 operating in Emission Control Areas, with an 80% reduction compared with the current limit.

## 2000 IMO GHG Study

10 As a follow-up to resolution 8 (1997 MARPOL Conference), the first **IMO Study on Greenhouse Gas Emissions from Ships** was completed and presented to the forty-fifth session of the MEPC (MEPC 45) in June 2000 as document MEPC 45/8. This Study using data from 1996 estimated that ships emitted about 420 million tonnes of CO<sub>2</sub> and thereby contributed about 1.8% of the world's total anthropogenic CO<sub>2</sub> emissions that year.

11 The 2000 IMO GHG Study was undertaken by a consortium of internationally renowned research institutes and stated that there was no other mode of transport with a better energy-efficiency record than sea-transport on a tonne-mile basis. Nevertheless, the Study identified a number of areas with potential for reduction of CO<sub>2</sub> emissions that if combined could lead to a 40% reduction on a tonne mile basis. However, the Study stated that technical and operational measures have a limited potential for contributing to reduced emissions from ships. If the increase in demand for shipping services and market requirement for increased speed and availability continued, technical measures alone would not be able to prevent a total growth in emissions from ships.

## **Assembly resolution on GHG policy and practices**

12 In an effort to further address the issue of GHG emissions from ships, the IMO Assembly adopted (December 2003) **Resolution A.963(23) on “IMO Policies and Practices related to the Reduction of Greenhouse Gas Emissions from Ships”**, which:

- .1 URGES the MEPC to identify and develop the mechanism or mechanisms needed to achieve the limitation or reduction of GHG emissions from international shipping and, in doing so, to give priority to:
  - (a) the establishment of a GHG emission baseline;
  - (b) the development of a methodology to describe the GHG efficiency of a ship in terms of a GHG emission index for that ship. In developing the methodology for the GHG emission indexing scheme, the MEPC should recognize that CO<sub>2</sub> is the main greenhouse gas emitted by ships;
  - (c) the development of Guidelines by which the GHG emission indexing scheme may be applied in practice. The Guidelines are to address issues such as verification;
  - (d) the evaluation of technical, operational and market-based solutions;
- .2 REQUESTS the MEPC:
  - (a) to consider the methodological aspects related to the reporting of GHG emissions from ships engaged in international transport;
  - (b) to develop a work plan with a timetable;
  - (c) to keep this matter under review and to prepare consolidated statements on the continuing IMO policies and practices related to the limitation or reduction of GHG emissions from international shipping;
- .3 REQUESTS the IMO Secretariat to continue co-operating with the Secretariat of UNFCCC and the Secretariat of the International Civil Aviation Organization.

### **GHG work plan with timetable**

13 As follow-up to resolution A.963(23), MEPC 55 (October 2006) approved the Committee’s **“Work plan to identify and develop the mechanisms needed to achieve the limitation or reduction of CO<sub>2</sub> emissions from international shipping”**, inviting Member Governments to participate actively in the work.

14 The work plan contained a time table and, inter alia, requirements for the Committee to consider improvement of the CO<sub>2</sub> indexing method, establishment of CO<sub>2</sub> emission baseline(s), and consideration of technical, operational and market-based methods for dealing with GHG emissions from ships in international trade.

15 The work plan culminated at MEPC 59 (July 2009) with the Committee agreeing to a package of technical and operational measures to reduce GHG emissions from international shipping and also agreed on a work plan for further consideration and development of suitable and efficient market-based instruments to complement the technical and operational reduction measures and to provide economic incentives for the shipping industry.

### **Co-operation between the Secretariats of IMO and UNFCCC**

16 Following an invitation by UNFCCC, and as requested by the MEPC, there has been ongoing co-operation between the Secretariats of IMO and UNFCCC on the work of GHG emissions from international shipping concerning the use of bunker fuel oils since UNFCCC entered into force in 1994.

17 The issue of GHG emission has been considered by each session of the MEPC since 1997 and the outcome brought to the attention of the subsequent SBSTA session. Information regarding the deliberations within UNFCCC relevant to the work of IMO, and in particular within SBSTA, has been reported to the MEPC by the IMO Secretariat on a regular basis.

### **Voluntary Ship CO<sub>2</sub> Emission Indexing**

18 MEPC 53 (July 2005) approved IMO's "**Interim Guidelines for Voluntary Ship CO<sub>2</sub> Emission Indexing for Use in Trials**" (MEPC/Circ.471). The objective of the Interim Guidelines was to establish a common approach for trials on voluntary CO<sub>2</sub> emission indexing, enabling shipowners and operators to evaluate the performance of their individual ships and fleet with regard to CO<sub>2</sub> emissions. As the amount of CO<sub>2</sub> emitted from a ship is directly related to the consumption of bunker fuel oil, the CO<sub>2</sub> indexing also provides useful information on a ship's performance with regard to fuel efficiency.

19 Maritime administrations and the shipping industry were invited to promote the use of the Interim Guidelines in trials and report the outcome to the MEPC for consideration, taking into account operational experiences from trials of the index for different ship types, progress in ISO regarding ship's CO<sub>2</sub> performance, and any other relevant developments, as appropriate.

### **Reduction mechanisms**

20 IMO's GHG work contains three distinct components: the technical measures that will mainly be applied to new ships, the operational measures for all ships in operation (new and existing), and the market-based reduction measures providing incentives to the shipping industry by setting a price on the emissions.

21 Recognizing that technical and operational measures may not be sufficient to reduce the total amount of GHG emissions from international shipping, as global trade is projected to continue growing, market-based mechanisms have been considered by MEPC as called for by resolution A.963(23). A market-based mechanism would serve two main purposes; off-setting (in other sectors) of growing ship emissions and being an incentive for the industry to invest in more fuel efficient ships and to operate them more efficiently. In addition, the market-based mechanisms under consideration could generate funds that could be used in developing countries for different climate change purposes such as adaptation and transfer of technology.

## **GHG module in GISIS**

22 The outcome of CO<sub>2</sub> indexing trials from hundreds of ships has been submitted to IMO for information and MEPC 56 (July 2007) decided to establish a central database for the results of the voluntary Ship CO<sub>2</sub> Emission Indexing to make the data accessible for comparison and further studies. The Committee had observed that identical ships in seemingly similar trades produced different results and that the difference may result from different weather conditions or from operational differences concerning the specific utilization of individual ships involved in the trials. Issues such as the length of time spent waiting in port areas, the length of ballast voyages, whether the ship was fully laden during the trials or not, could all make a difference.

23 The central data base is established as a GHG module in IMO's Global Integrated Ship Information System (GISIS) and the IMO Secretariat is in co-operation with the member States having undertaken trials consecutively entering the received data. Member States were able to enter new data from early 2008 and the module is opened for public at [www.imo.org/GISIS](http://www.imo.org/GISIS).

## **Fundamental principles for regulation of GHG emissions from ships**

24 MEPC 57 (April 2008) acknowledged the importance of developing fundamental principles as a basis for future regulations and decided, by overwhelming majority, to take the below listed principles as its reference for further debate on GHG emissions from international shipping. A coherent and comprehensive future IMO framework should be:

- .1 effective in contributing to the reduction of total global greenhouse gas emissions;
- .2 binding and equally applicable to all flag States in order to avoid evasion;
- .3 cost-effective;
- .4 able to limit, or at least, effectively minimize competitive distortion;
- .5 based on sustainable environmental development without penalizing global trade and growth;
- .6 based on a goal-based approach and not prescribe specific methods;
- .7 supportive of promoting and facilitating technical innovation and R&D in the entire shipping sector;
- .8 accommodating to leading technologies in the field of energy efficiency; and
- .9 practical, transparent, fraud free and easy to administer.

25 A number of delegations expressed reservations on the principle of a binding regime applicable to all ships or all flag States. The Committee agreed to further reflect on the issue of the principles at future sessions with the intention to reach consensus, and encouraged Member States to submit their views to facilitate further discussions. Several Members have responded to the invitation and have submitted documents stating their views, highlighting certain elements and or proposing solutions. However, due to time constraint, the Committee has at its latter sessions been unable to fully consider this matter or to reach a final agreement on the contested principle, and the consideration will continue at MEPC 60 (March 2010).



## **Application of GHG measures**

26 A recurring debate within IMO is how the wording of Article 2.2 of the Kyoto Protocol should be interpreted and if the principle agreed under UNFCCC of ‘common but differentiated responsibility’ should apply by flag to a GHG regime for international shipping rather than IMO’s basic principle of non-discriminatory regulation of all ships in international trade irrespective of flag and the principle of ‘no more favourable treatment’ of ships flying the flag of a non-party to any mandatory IMO treaty instrument.

27 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 Organization and the International Maritime Organization, respectively.”

28 A number of delegations have maintained the view that any GHG reduction measures to be adopted by IMO should only be applicable to ships flying the flag of Annex I parties to the UNFCCC in accordance with the principle of ‘common but differentiated responsibility’. This principle was adopted by the UNFCCC and should be upheld in all international negotiations regarding climate change. In view of the different contributions to global environmental degradation, States should have common but differentiated responsibilities based on the Rio Declaration from 1992. These delegations have been unable to agree to mandatory emission reductions measures applicable to all ships and reasoned that developing countries (non-Annex I countries) cannot take on emission reduction commitments related to international shipping and that such measures on the part of ships registered in developing countries should only be on a voluntary basis.

29 Other delegations have expressed the opinion that, given the global mandate of IMO, as regards safety of ships and the protection of the marine and atmospheric environment from all sources of ship pollution, the IMO regulatory framework on GHG emissions should be applicable to all ships, irrespective of the flags they fly. It has been stressed that, as three-quarters of the world’s merchant fleet fly the flag of developing countries not listed in Annex I to the UNFCCC, any regulatory regime on the reduction of GHG from shipping would become ineffective for the purpose of combating climate change, if applicable only to ships flagged in Annex I countries. IMO has its global mandate from the IMO Convention itself as well as from UNCLOS, and not from Article 2.2 of the Kyoto Protocol and that there is no precedence in any of the more than fifty IMO treaty instruments currently in existence where measures are applied selectively to ships according to their flag. On the other hand, there are several international environmental agreements which have a differentiated approach, such as the Montreal Protocol (on substances that deplete the ozone layer), yet when IMO has dealt with the same issues, the principle of differentiated approach (according to flag) has not been taken on board.

30 The IMO Secretary-General has emphasized that the Committee should debate the issues thoroughly so that, in the end, balanced decisions would be made – an approach that only IMO, with its global membership and global mandate, could make on a global issue of global dimensions. He is of the view that the Committee should address the issue from IMO’s global mandate and competence. He has queried what service would be rendered to the environment if the application of measures to eliminate or reduce greenhouse gas emissions was required of ships flying the flag of a developed country with a limited number of ships under its flag when ships flying the flag of developing countries with a large number of ships under their flag were not obliged to comply with the same measures.

## Second IMO GHG Study 2009

31 MEPC 55 (October 2006) agreed to update the first “IMO Study on Greenhouse Gas Emissions from Ships” that was issued in 2000 (see paragraphs 10 and 11) to provide a better foundation for future decisions and to assist in the follow-up to resolution A.963(23). MEPC 56 (July 2007) adopted the Terms of Reference for the updating. The work has been undertaken by an international consortium of renowned research institutes with particular expertise within their respective fields. The Study has been titled: **Second IMO GHG Study 2009** and was presented to MEPC 59 in July 2009.

32 MEPC 59 was notably assisted in its work by the Second IMO GHG Study 2009, which is the most comprehensive and authoritative assessment of the level of greenhouse gas emitted by ships, as well as its potential for reduction. The Study also evaluates the different policy options for control of GHG emissions from ships currently under consideration within IMO and other organizations. The Second IMO GHG Study 2009 will be submitted to appropriate bodies of the UNFCCC and may be found at: [http://www.imo.org/home.asp?topic\\_id=1823](http://www.imo.org/home.asp?topic_id=1823)

33 The Committee agreed that the “Second IMO GHG Study 2009” would constitute a significant document and become the paramount reference to the Committee for information in developing IMO’s strategy to limit and reduce GHG emissions from international shipping, in the same manner as the 2000 IMO GHG Study had been an authoritative assessment on the issue in the past.

34 The Committee noted that the Second IMO GHG Study 2009 came to the following main conclusions, as outlined in its executive summary:

- International shipping was estimated to have emitted 870 million tonnes, or about 2.7% of the global emissions of CO<sub>2</sub> in 2007.
- Exhaust gases were the primary source of emissions from ships. Carbon dioxide was the most important GHG emitted by ships. Both in terms of quantity and of global warming potential, other GHG emissions from ships were less important.
- Mid-range emissions scenarios showed that, by year 2050, in the absence of policies, ship emissions could grow by 200% to 300% (compared to the emissions in 2007) as a result of the growth in world trade.
- A significant potential for reduction of GHG emissions through technical and operational measures had been identified. Together, if implemented, these measures could increase efficiency and reduce the emissions rate by 25% to 75% below the current levels. Many of these measures appeared to be cost-effective, although non-financial barriers may discourage their implementation.
- A number of policies to reduce GHG emissions from ships were conceivable. The report analysed options relevant to the current IMO debate. The report found that market-based measures were cost-effective policy instruments with a high environmental effectiveness. Such instruments captured the largest amount of emissions under the scope, allowed both technical and operational measures in the shipping sector to be used, and could offset emissions in other sectors. A mandatory limit on the Energy Efficiency Design Index for new ships was a cost-effective solution that could provide an incentive to improve the design efficiency of new ships. However, its environmental effect was limited because it only applied to new ships and because it only incentivized design improvements and not improvements in operations.

- Shipping had been shown, in general, to be an energy-efficient means of transportation compared to other modes.
- The emissions of CO<sub>2</sub> from shipping lead to positive “radiative forcing” (a metric of climate change) and to long-lasting global warming. In the shorter term, the global mean radiative forcing from shipping was negative and implied cooling; however, regional temperature responses and other manifestations of climate change may nevertheless occur. In the longer term, emissions from shipping would result in a warming response as the long-lasting effect of CO<sub>2</sub> would overwhelm any shorter-term cooling effects.
- If the climate was to be stabilized at no more than 2°C warming over pre-industrial levels by 2100 and emissions from shipping continue as projected in the scenarios that were given in the report, then they would constitute between 12% and 18% of the global total CO<sub>2</sub> emissions in 2050 that would be required to achieve stabilization (by 2100) with a 50% probability of success.

### **Latest GHG considerations within IMO - Outcome of MEPC 59**

35 More than 900 delegates from all over the world attended the fifty-ninth session of IMO’s Marine Environment Protection Committee (MEPC 59), which was held in London from 13 to 17 July 2009. Leading up to MEPC 59, two intersessional meetings were held in addition to the three ordinary sessions, where hundreds of submissions by Member States and observer organizations, four reports by intersessional correspondence groups and a large number of scientific studies, facilitated the work and made the expeditious progress possible. This progress would not have been possible without the active involvement of the world’s maritime nations and a strong environmental commitment by a united maritime industry.

36 The Committee noted that 2009 is a crucial year in the climate change negotiations, culminating at the UN Climate Change Conference in December. It is expected that the Conference in Copenhagen will adopt a new, comprehensive and ambitious post-2012 treaty to combat climate change, a treaty that will be agreed by the 192 Parties to the UNFCCC of which 169 are IMO Members.

37 The Committee noted with appreciation a statement by the Executive Secretary of the UNFCCC Secretariat, Mr. Yvo de Boer, providing information on the ongoing UNFCCC negotiations and a clear indication on what was expected of IMO in its reporting to COP 15. He stated that - “Copenhagen is the moment when humanity has the opportunity to rise to the challenge and decisively deal with climate change.” Mr. de Boer noted that progress within IMO had been made on technical and operational reduction measures but that the overall ship emissions were still growing. He went on to say:

“One political difficulty is that the Convention is based on the principle of common but differentiated responsibilities. Industrialised countries must lead in reducing emissions, while developing countries need support to engage in mitigation actions. The IMO, on the other hand, is based on equal treatment for all ships. Innovative thinking is needed to reconcile these principles and it can be done. For example, raising funds for adaptation and mitigation in developed and developing countries through a global cap on bunker fuels and deploying revenues from auctioning emission rights mainly in developing countries have both been mentioned as ways to reconcile the principles of the UNFCCC and the IMO. A global cap on bunker fuels would be in line with the “equal treatment” principle of the IMO. Using the obtained revenues to assist developing countries in addressing climate change would be in line with the provisions of the climate change

Convention. The amounts that could be generated by maritime transport in reducing its carbon footprint are substantial with estimates over four billion US dollars per year.

I hope that this MEPC meeting can succeed in recommending a package of measures for international shipping that fits in with the proposals of governments in the negotiations. I hope that at the end of your meeting, you can agree a package of technical and operational measures to adopt that will result in a significant reduction of emissions with an implementation deadline. I hope you can also finalize work on developing a market-based mechanism for international shipping. Informing COP 15 on practical actions for regulating international bunker fuels would thus make a significant contribution to an effective agreed outcome in Copenhagen. Parties to the UNFCCC are looking forward to receiving input from the work of IMO. This week, there is no question that you can make a major step towards that.”

### *Agreed package of reduction measures*

38 MEPC 59 agreed to a package of technical and operational measures to reduce GHG emissions from international shipping and also agreed on a work plan for further consideration and development of suitable and efficient market-based instruments to complement the technical and operational reduction measures and to provide economic incentives for the shipping industry. The Committee further agreed that any regulatory scheme to control GHG emissions from international shipping should be developed and enacted by IMO as the most competent international body.

39 The agreed measures are intended for voluntary application until the Committee's sixtieth session in March 2010, with a view to facilitating decisions on their scope of application and enactment and taking into account the outcome of the Copenhagen Conference.

### *Technical and operational reduction measures*

40 MEPC 59 finalized a package of technical and operational measures to reduce GHG emissions from international shipping, aimed at improving the energy efficiency for new ships through improved design and propulsion technologies and for all ships, new and existing, primarily through improved operational practices.

41 The measures are intended to be used for trial purposes on a voluntary basis until MEPC 60 in March 2010, when they will be refined, as necessary, with a view to facilitating decisions on their scope of application and enactment, taking into account the outcome of the Copenhagen Conference. The measures include:

- .1 interim guidelines on the method of calculation and voluntary verification of the **Energy Efficiency Design Index (EEDI)** for new ships, which is intended to stimulate innovation and technical development of all elements influencing the energy efficiency of a ship from its design phase; and
- .2 guidance on the development of a **Ship Energy Efficiency Management Plan (SEEMP)** for new and existing ships, which incorporates best practices for fuel-efficient ship operation, as well as guidelines for voluntary use of the **Energy Efficiency Operational Indicator** for new and existing ships.

### ***Market-based mechanisms***

42 The agreed package of technical and operational measures is a very important step in ensuring that the shipping industry has the necessary mechanisms to reduce its GHG emissions. However, the Committee recognized that these measures would not be sufficient to satisfactorily reduce the amount of GHG emissions from international shipping in view of the growth projections of world trade. Therefore, market-based mechanisms have been considered by the Committee in line with its GHG work plan. A market-based mechanism would serve two main purposes: off-setting in other sectors of growing ship emissions and providing a fiscal incentive for the maritime industry to invest in more fuel efficient ships and technologies and to operate ships in a more energy efficient manner.

43 The Committee agreed by overwhelming majority that a market-based instrument was needed as part of a comprehensive package of measures for regulation of GHG emissions from international shipping. The Committee further agreed that any regulatory GHG regime applied to international shipping should be developed and enacted by IMO as the sole competent international organization with a global mandate to regulate all aspects of international shipping. As shipping is a global industry and ships are competing in a single global market, it must be regulated at the global level to be environmentally effective and to maintain a level playing field for all ships, irrespective of flag or ownership.

44 An in-depth discussion on market-based measures was held and the Committee agreed on a work plan culminating in 2011 for its further consideration of the topic. It was agreed to fully take into account discussions and submissions to date, as well as relevant outcomes of the United Nations Climate Change Conference (COP 15) in December 2009.

45 The Committee noted that there was a general preference for the greater part of any funds generated by a market-based instrument under the auspices of IMO, to be used for climate change purposes in developing countries through existing or new funding mechanisms under the UNFCCC or other international organizations.

### ***Message by the IMO Secretary-General***

46 Speaking at the close of the MEPC 59, IMO Secretary-General Efthimios E. Mitropoulos congratulated delegates for driving forward the Committee's agreed action plan on greenhouse gas emissions from ships, which "deserves to be recognized as compelling proof that IMO can, indeed, be entrusted with the regulation of international shipping on the issue of climatic change – an unequivocal message that needs to be heard, and fully understood, all over the globe. He went on to urge delegates to promote the successful outcome of the session, by briefing their colleagues and, through them, the competent Ministers in their home countries (e.g. of Transport, Mercantile Marine, Environment and Foreign Affairs), in particular those who will participate in COP 15, and by publicizing it widely among all concerned so that "the complexities of this most international of all industries are duly taken into account when shaping official policies and positions on the issue at hand – both at Copenhagen and at the post-Copenhagen rounds of consultations at IMO."

## **Shipping and sustainable development**

47 There is no doubt that shipping **is a clean, green, environmentally-friendly and very energy-efficient mode of transport**. Overall, it is only a small contributor to the total volume of atmospheric emissions while moving a considerable part of world trade (75 - 90%). Nevertheless, significant reductions in harmful emissions from ships and increases in fuel efficiency have been achieved over the past decades through enhancements in the efficiency of engine and propulsion systems and improved hull design. Larger ships and a more rational utilization of individual vessels have also contributed significantly to reducing the amount of energy needed to transport a given unit of cargo.

48 Shipping is a very positive force in sustainable development, making a massive contribution to global prosperity with only a marginal negative impact on the global environment. Both the poor and the rich benefit from seaborne trade. Moreover, due to the nature of shipping, developing countries can and do become major participants in the industry itself and, by so doing generate income and create national wealth.

### **The way ahead post-COP 15**

49 If the UNFCCC principle of ‘common but differentiated responsibility’ should apply to a GHG regime for international shipping rather than IMO’s basic principle of equal or non-discriminatory regulation of all ships engaged in international trade, irrespective of flag or ownership, has been the main obstacle for further progress. The Committee agreed therefore to defer this debate until the outcome of COP 15 is known and will consider application issues, as well as the legal aspects, in March 2010.

50 Although no mandatory GHG regime for international shipping has been agreed, the technical and operational mechanisms needed are fully developed, well matured and ready for consideration as mandatory instruments, taking into account the outcome of COP 15. Further work is needed on market-based measures but the foundation is in place and a work plan, culminating in 2011, has been agreed. All the necessary mechanisms are thereby in place or well underway, an agreement on their application is the only aspect pending before a robust and efficient GHG regime, complementing IMO’s regime of about 50 treaties regulating shipping, may be agreed to the benefit of the global environment and future generations.

51 The Committee agreed that any possible impacts on the shipping sector, including but not limited to, the overall impact of any of the mechanisms on the maritime sectors of developing countries, should be duly considered prior to making further decisions on the energy efficiency measures.

52 IMO will continue its endeavours to reduce any environmental impacts from international shipping, a transport industry that is vital to world trade and sustainable development. IMO is ready to take technical and regulatory action as soon as a decision at COP 15 is taken on a post-2012 regime to combat climate change.

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**ANNEX 2**

**DESCRIPTION OF THE PACKAGE OF TECHNICAL AND OPERATIONAL REDUCTION MEASURES FOR SHIPS AGREED BY MEPC 59**

1 The following circulars were issued (17 August 2009) following MEPC 59 and may be found on the IMO website: [www.imo.org](http://www.imo.org):

- .1 the EEDI formula was circulated as MEPC.1/Circ.681, Interim Guidelines on the method of calculation of the Energy Efficiency Design Index for new ships (annex 17 to MEPC 59/24);
- .2 the EEDI verification procedure was circulated as MEPC.1/Circ.682, Interim guidelines for voluntary verification of the EEDI (annex 18 to MEPC 59/24);
- .3 the SEEMP was circulated as MEPC.1/Circ.683, Guidance for the development of a SEEMP (annex 19 to MEPC 59/24); and
- .4 the EEOI was circulated as MEPC.1/Circ.684, Guidelines for voluntary use of the ship EEOI (annex 20 to MEPC 59/24).

**IMO’s Energy Efficiency Design Index (EEDI)**

2 MEPC.1/Circ.681, Interim Guidelines on the method of calculation of the EEDI for new ships was circulated on 17 August 2009.

**Background**

2.1 The maritime industries have continuously endeavoured to optimize ships’ fuel consumption, e.g. through the development of more efficient engines and propulsion systems, optimized hull designs and larger ships, and thereby achieved a noteworthy reduction in CO<sub>2</sub> emissions on a capacity basis (tonne-mile). Although ships are the most fuel efficient mode of mass transport, the Second IMO GHG Study 2009 identified a significant potential for further improvements in energy efficiency mainly by the use of already existing technologies. Additional improvements in hull, engine and propeller designs, together with reduction in operational speed, may lead to considerable reductions as illustrated in the figure below.

**Potential reductions of CO<sub>2</sub> emissions by using existing technology and practices**

<b>DESIGN (New ships)</b>	<b>Saving of CO<sub>2</sub>/tonne-mile</b>	<b>Combined</b>	<b>Combined</b>
Concept, speed & capability	2% to 50% <sup>+</sup>	10% to 50% <sup>+</sup>	25% to 75% <sup>+</sup>
Hull and superstructure	2% to 20%		
Power and propulsion systems	5% to 15%		
Low-carbon fuels	5% to 15%*		
Renewable energy	1% to 10%		
Exhaust gas CO <sub>2</sub> reduction	0%		
<b>OPERATION (All ships)</b>			
Fleet management, logistics & incentives	5% to 50% <sup>+</sup>	10% to 50% <sup>+</sup>	
Voyage optimization	1% to 10%		
Energy management	1% to 10%		

<sup>+</sup> Reductions at this level would require reductions of operational speed.

\* CO<sub>2</sub> equivalent, based on the use of LNG.

Source: Second IMO GHG Study 2009

### **Objectives of the EEDI**

2.2 IMO's Marine Environment Protection Committee (MEPC) has developed the Energy Efficiency Design Index for new ships (MEPC.1/Circ.681) to create stronger incentives for further improvements in ships' fuel consumption. The purposes of IMO's EEDI are:

- to require a minimum energy efficiency level for new ships;
- to stimulate continued technical development of all the components influencing the fuel efficiency of a ship;
- to separate the technical and design based measures from the operational and commercial measures (they will/may be addressed in other instruments); and
- to enable a comparison of the energy efficiency of individual ships to similar ships of the same size which could have undertaken the same transport work (moved the same cargo).

2.3 The EEDI provides a transparent basis for comparison of the energy efficiency for individual ships and, when made mandatory, will require ship designers and builders to produce intrinsically energy-efficient ships. The reduction level is not yet agreed upon and will be considered in detail by MEPC 60 in March 2010, but an initial reduction of 15 to 30% is possible depending on ship type and size. Once the baseline is set the EEDI value may be tightened incrementally, e.g. every five or ten year, to keep pace with the technological developments. The EEDI will facilitate shipowners to purchase the most fuel efficient ships for their fleets and charterers and cargo owners in choosing the most energy-efficient ships for their operations.

### **EEDI coverage**

2.4 The EEDI is developed for the larger segments of the world merchant fleet and would cover 87% of emissions from new ships covering the following ship types: oil and gas tankers, bulk carriers, general cargo and container ships, ro-ro carriers (roll-on-roll-off) and passenger ships. However, due to the long economic life of merchant ships, it would take about 20 years to reach this coverage without additional incentives. For ship types not covered by the current formula, suitable formulas will be developed in the future addressing the largest emitters first.

### **The EEDI formula**

2.5 The EEDI provides a specific figure for an individual ship design, expressed in grams of CO<sub>2</sub> per ship's capacity-mile (a smaller EEDI value means a more energy-efficient ship design) and calculated by the following formula based on the technical design parameters for a given ship:

$$EEDI = \frac{\left( \prod_{j=1}^M f_j \cdot \sum_{i=1}^{nME} P_{ME(i)} \cdot C_{FME(i)} \cdot SFC_{ME(i)} \right) + (P_{AE} \cdot C_{FAE} \cdot SFC_{AE}^*) + \left( \prod_{j=1}^M f_j \cdot \sum_{i=1}^{nPTI} P_{PTI(i)} - \sum_{i=1}^{neff} f_{eff(i)} \cdot P_{AEeff(i)} \right) C_{FAE} \cdot SFC_{AE}}{f_i \cdot Capacity_{ref} \cdot f_w}$$

That can be illustrated by the following simplified formula:

$$EEDI = \frac{CO_2 \text{ emission}}{\text{transport work}}$$



2.6 The CO<sub>2</sub> emission represents total CO<sub>2</sub> emission from combustion of fuel at design stage, including propulsion and auxiliary engines, taking into account the carbon content of the fuels in question. If shaft generators or innovative mechanical or electrical energy efficient technologies are incorporated on board a ship, these effects are deducted from the total CO<sub>2</sub> emission. If wind or solar energy is used on board a ship, the energy saved by such measures will also be deducted from the total CO<sub>2</sub> emissions, based on actual efficiency of the systems.

2.7 The transport work is calculated by multiplying the ship's capacity as designed (deadweight for cargo ships and gross tonnage for passenger ships) with the ship's design speed measured at the maximum design load condition and at 75 % of the rated installed shaft power. Speed is the most essential factor in the formula and may be reduced to achieve the required index.

### ***Status of the EEDI***

2.8 The EEDI is circulated for trial purposes to ensure its feasibility and for further improvement of the calculation method, as necessary. The EEDI is expected to be made mandatory for new ships on completion of this improvement work, most probably by 2010.

### ***Future developments***

2.9 The current EEDI formula is not suitable for all ship types or all types of propulsion systems, e.g. ships with diesel-electric, turbine or hybrid propulsion systems will need additional correction factors and MEPC will consider the matter in detail at future sessions. For ship types not covered by the current formula, suitable formulas will be developed in the future addressing the largest emitters first.

### ***Conclusions EEDI***

2.10 The EEDI will establish a minimum energy efficiency requirement for new ships depending on ship type and size and is a robust mechanism that may be used to increase the energy efficiency of ships step-wise to keep pace with technical developments for many decades to come. The EEDI is a non prescriptive mechanism that leaves the choice of what technologies to use in a ship design is leaved to the stakeholders as long as the required energy-efficiency level is attained enabling the ship designers and builders to use the most cost efficient solutions.

### **Voluntary verification of the EEDI**

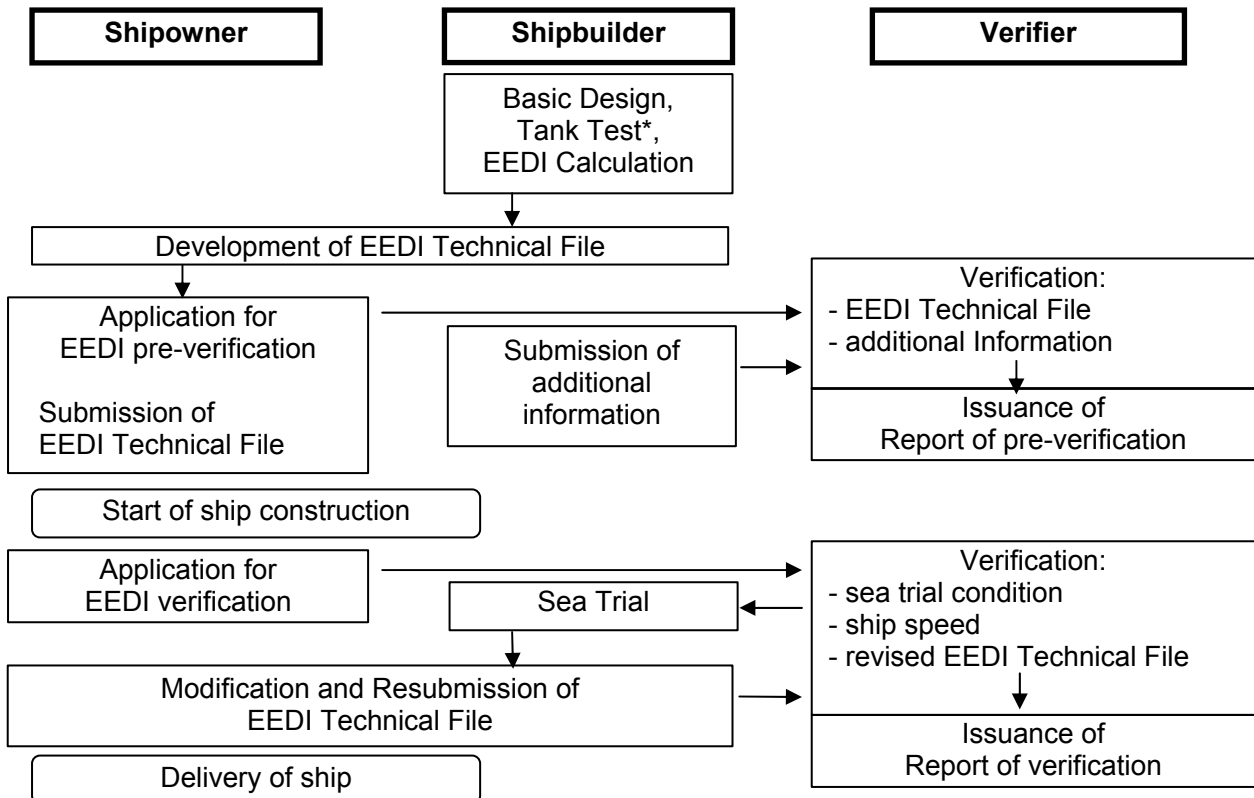
3 MEPC.1/Circ.682, Interim guidelines for voluntary verification of the EEDI was circulated on 17 August 2009.

### ***Background***

3.1 The purpose of the interim guidelines on voluntary verification of the EEDI, which was agreed by MEPC 59 as part of the package of technical and operational measures, is to assist verifiers of the EEDI in conducting the verification in a uniform manner. Uniform application of voluntary verification will capitalize on the experience from trials and will assist MEPC in its further consideration of possible mandatory application of the EEDI to new ships. The guidelines will also assist shipowners, shipbuilders as well as engine and equipment manufacturers, and other interested parties, in understanding the procedures of the voluntary EEDI verification.

### *Verification in two stages*

3.2 The attained EEDI should be calculated in accordance with the EEDI Guidelines (MEPC.1/Circ681). Voluntary EEDI verification should be conducted on two stages: preliminary verification at the design stage, and final verification at the sea trial, before issuance of the final report on the verification of the attained EEDI. The basic flow of the verification process is presented in Figure 1.



\* to be conducted by a test organization or a shipbuilder itself.

**Figure 1 – Basic Flow of Verification Process**

### *Preliminary verification at the design stage*

3.3 For the preliminary verification at the design stage, a shipowner should submit to a verifier (e.g. a Maritime Administration or a Classification Society) an application for the verification and an EEDI Technical File containing the necessary information for the verification and other relevant background documents as required by the guidelines.

### *Final verification of the Attained EEDI at sea trial*

3.4 Prior to the sea trial, a shipowner should submit the application for the verification of the EEDI together with the final displacement table and the measured lightweight, as well as other technical information as necessary. The verifier should attend the sea trial and confirm compliance in accordance with the guidelines and the EEDI guidelines.

### ***Issuance of the EEDI verification report***

3.5 The verifier should issue the Report on the Preliminary Verification of EEDI after it verified the Attained EEDI at design stage in accordance with the guidelines. Following the sea trial, the verifier should issue the final report on the verification of the attained EEDI after it verified the Attained EEDI at the sea trial in accordance with the guidelines.

### ***Status of the verification guidelines***

3.6 The guidelines should be applied on a voluntary basis to new ships for which an application for EEDI verification has been submitted to a verifier. If the EEDI is made mandatory in the future, the guidelines will form part of the regulatory framework governing the scheme.

### **Guidance for the development of a SEEMP**

4 MEPC.1/Circ.683, Guidance for the development of a SEEMP was circulated on 17 August 2009.

#### ***Introduction***

4.1 The purpose of the Ship Energy Efficiency Management Plan (SEEMP) is to establish a mechanism for a company and/or a ship to improve the energy efficiency of ship operations. Preferably, the ship-specific SEEMP is linked to a broader corporate energy management policy for the company that owns, operates or controls the ship, recognizing that no two shipping companies or shipowners are the same. It should also be recognized that the international fleet of merchant vessels comprises a wide range of ship types and sizes that differ significantly in their design and purpose, and that ships operate under a broad variety of different conditions.

4.2 Sea transport has a justifiable image of conducting its operations in an energy-efficient way, and in a manner that creates little impact on the global environment. It is nevertheless the case that enhancement in efficiencies can reduce fuel consumption, save money, and decrease the environmental impacts from ships. While the yield of individual measures may be small, the collective effect across the entire fleet will be significant. In global terms it should be recognized that operational efficiencies delivered by a large number of ships will make a valuable contribution to reducing global carbon emissions.

#### ***Practical approach***

4.3 Mandatory management plans are used to regulate a range of ship operations where traditional command and control regulations would not work, and is also the chosen option for reduction of GHG emissions from operation of ships engaged in international trade. To regulate ship operations by traditional prescriptive regulations (as is the customary practice for technical regulations) is not feasible, e.g. to determine the most energy-efficient speed, optimum ship handling practices or the preferred ballast conditions for all ships in a set of regulations could hardly be done and keeping it updated would not be possible. A management plan is a familiar tool for the shipping industry and provides a flexible mechanism where shipowners and operations can choose the most cost effective solutions for their ships and their operations.

4.4 The SEEMP provides an approach for monitoring ship and fleet efficiency performance over time and forces the responsible persons and entities at each stage of the plan to consider new technologies and practices when seeking to optimize the performance of the ship. The Second IMO GHG Study 2009 indicates that a 20% reduction on a tonne-mile basis by mainly operational measures is possible and would be cost-effective even with the current fuel prices, and the SEEMP will assist the shipping industry in achieving this potential.

4.5 The Circular provides guidance for the development of a SEEMP that should be adjusted to the characteristics and needs of individual companies and ships. The SEEMP is intended to be a management tool to assist a company in managing the ongoing environmental performance of its vessels and, as such, it is recommended that the plan be implemented in a manner which limits any onboard administrative burden to the minimum necessary.

***Ship-specific plan***

4.6 The SEEMP should be developed as a ship-specific plan by the shipowner, operator or any other party concerned, e.g., the charterer. The SEEMP seeks to improve a ship's energy efficiency through four steps: *planning, implementation, monitoring, and self-evaluation and improvement*. These components play a critical role in the continuous cycle to improve ship energy management. With each iteration of the cycle, some elements of the SEEMP will necessarily change while others may remain as before.

***Guidance on best practices for fuel-efficient operation of ships***

4.7 The Circular contains guidance on best practices related to voyage performance, optimized ship handling, hull and propulsion system maintenance, the use of waste heat recovery systems, improved fleet management, improved cargo handling and energy management. It also covers areas such as fuel types, compatibility of measures, age and operational service life of a ship as well as trade and sailing area.

***A sample form of a SEEMP is presented below for illustrative purposes***

Name of Vessel:		GT:	
Vessel Type:		Capacity:	
Date of Development:		Developed by:	
Implementation Period:	From: Until:	Implemented by:	
Planned Date of Next Evaluation:			

**1 MEASURES**

<b>Energy Efficiency Measures</b>	<b>Implementation</b> (including the starting date)	<b>Responsible Personnel</b>
Weather Routeing	<Example> Contracted with [Service providers] to use their weather routeing system and start using on trial basis as of 1 July 2012.	<Example> The master is responsible for selecting the optimum route based on the information provided by [Service providers].
Speed Optimization	While the design speed (85% MCR) is 19.0 kt, the maximum speed is set at 17.0 kt as of 1 July 2012.	The master is responsible for keeping the ship speed. The log-book entry should be checked every day.

**2 MONITORING**

- Description of monitoring tools

**3 GOAL**

- Measurable goals

**4 EVALUATION**

- Procedures of evaluation

**The Energy Efficiency Operational Indicator (EEOI)**

5 MEPC.1/Circ.684, Guidelines for voluntary use of the ship EEOI was circulated on 17 August 2009

***Introduction***

5.1 Although ships are the most fuel efficient mode of mass transport, the Second IMO GHG Study 2009 identified a significant potential for further improvements in energy efficiency by operational measures, such as fleet management, voyage optimization and energy management. The Study estimated that 10 to 50% reductions of CO<sub>2</sub> emissions are possible through the combined use of these measures. Saving energy at the operational stage is presently addressed by the Ship Energy Efficiency Management Plan (SEEMP) where the development of the Energy Efficiency Operational Indicator (EEOI) may be used as the monitoring tool.

***Objectives of the EEOI***

5.2 MEPC has developed Guidelines for voluntary use of the ship Energy Efficiency Operational Indicator to establish a consistent approach for measuring ships energy-efficiency at each voyage or over a certain period of time, which will assist shipowners and ship operators in the evaluation of the operational performance of their fleet. As the amount of CO<sub>2</sub> emitted from ships is directly related to the consumption of bunker fuel oil, the EEOI can also provide useful information on a ship's performance with regard to fuel efficiency.

5.3 The EEOI enables continued monitoring of individual ships in operation and thereby the results of any changes made to the ship or its operation. The effect of retrofitting a new and more efficient propeller would be reflected in the EEOI value and the emissions reduction could be quantified. The effect on emissions by changes in operations, such as introduction of just in time planning or a sophisticated weather routing system; will also be shown in the EEOI value.

#### ***EEOI coverage***

5.4 The EEOI can be applied to almost all ships (new and existing) including passenger ships, however it cannot be applied to ships that are not engaged in transport work, such as service and research vessels, tug boats or FPSO, as it is transport work that is the input value together with emissions (fuel consumed).

#### ***The EEOI formula***

5.5 The EEOI provides a specific figure for each voyage. The unit of EEOI depends on the measurement of cargo carried or the transport work done, e.g. tonnes CO<sub>2</sub>/(tonnes·nautical miles), tonnes CO<sub>2</sub>/(TEU·nautical miles) or tonnes CO<sub>2</sub>/(person·nautical miles) etc. The EEOI is calculated by the following formula, in which a smaller EEOI value means a more energy-efficient ship:

$$EEOI = \frac{\text{actual CO}_2 \text{ emission}}{\text{performed transport work}}$$

5.6 The actual CO<sub>2</sub> emission represents total CO<sub>2</sub> emission from combustion of fuel on board a ship during each voyage, which is calculated by multiplying total fuel consumption for each type of fuel (distillate fuel, refined fuel or LNG etc.) with the carbon to CO<sub>2</sub> conversion factor for the fuel(s) in question (fixed value for each type of fuel).

5.7 The performed transport work is calculated by multiplying mass of cargo (tonnes, number of TEU/cars, or number of passengers) with the distance in nautical mile corresponding to the transport work done.

#### ***Status of the EEOI***

5.8 The EEOI is circulated to encourage shipowners and ship operators to use it on a voluntary basis and to collect information on the outcome and experiences in applying the EEOI.

#### ***GHG module in GISIS***

5.9 To collect EEOI data and make them accessible to member States and the shipping industry, a GHG module was established in GISIS (IMO's central database) to enable further research work. A sample data in the GHG module is presented below. When fuel consumption data, cargo quantity and voyage distance are completed, the CO<sub>2</sub> emission and the voyage index will be calculated automatically:

HFO tonnes	LNG (tonnes)	MDO (tonnes)	Cargo unit	Distance (n.miles)	CO <sub>2</sub> emission	Voyage index
44.46	---	2	475.2	967	145	315
108.78	---	0.8	1051.2	1861	341	174

### ANNEX 3

#### Proposals on market-based measures under consideration within IMO

##### Background

1 IMO's Assembly resolution A.963(23) on IMO Policies and Practices Related to the Reduction of Greenhouse Gas Emissions from Ships, urges the Marine Environment Protection Committee (MEPC) to identify and develop the mechanisms needed to achieve limitation or reduction of Greenhouse Gas (GHG) emissions from international shipping.

2 IMO has developed a set of robust and efficient technical and operational measures that will, when fully implemented, result in significant reductions of GHG emissions from ships. The technical and operational measures would however not be sufficient to satisfactorily reduce the amount of GHG emissions from international shipping in view of the growth projections of human population and world trade. Therefore, market-based mechanisms have been considered in line with the GHG work plan.

3 The market-based measures under consideration within IMO are summarised in the appendices as follows:

- Appendix 1 Proposal by Denmark for an International Fund for Greenhouse Gas Emissions from Ships (MEPC 59/4/5);
- Appendix 2 Proposal by France, Germany and Norway for a Global Emission Trading System for International Shipping (MEPC 59/4/25 and MEPC 59/4/26);
- Appendix 3 Proposal by Japan on Market-Based Mechanism to Improve the Energy Efficiency of Ships Based on the International GHG Fund (MEPC 59/4/34); and
- Appendix 4 Proposal by the United States combining technical standards and market-based measures (MEPC 59/4/48).

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## Appendix 1

### Summary of the Danish proposal to MEPC 59 for an International Fund for Greenhouse Gas Emissions from Ships (MEPC 59/4/5)

#### Summary

*Denmark has proposed that a GHG contribution should be paid on all bunker fuel used by ships above a certain threshold in international trade. These contributions should be channelled to an international fund that will finance, among other things, mitigation and adaptation purposes in developing countries. In this way shipping will be able to offset some of its GHG emissions while at the same time ensuring that international shipping will not be penalized and therefore remain the primary driver of global trade. The GHG contribution should be set at a given level that ensures that the offsets will be equivalent to meeting a globally agreed reduction target. The fund will be easy to implement and administer as it builds upon already existing approaches in global shipping.*

The key elements of the proposal are:

- .1 Ships must buy fuel at a registered bunker fuel supplier;
- .2 Documentation through the Bunker Deliver Note that bunker fuel has been purchased from a registered bunker fuel supplier, and that the GHG contributions have been paid, must be kept on board the ship as evidence;
- .3 Mandatory registration of bunker fuel suppliers eligible to sell bunker fuel in compliance with the scheme will be introduced, and the registered bunker fuel suppliers are required to collect information and transfer GHG contributions to the GHG Fund Administrator; and
- .4 The GHG Fund Administrator must maintain a global registry of registered bunker fuel suppliers and of GHG contributions received, where each ship has its own account.

Revenues should be allocated for specific purposes consistent with the primary objectives in the United Nations Framework on Climate Change Convention (UNFCCC) and be compatible with the financial architecture of a future global climate change agreement within the UNFCCC. Revenues should be allocated to finance:

- .1 mitigation and adaptation purposes in developing countries and, in particular, in the most vulnerable developing countries being the Least Developed Countries, Land Locked Developing Countries and Small Island Developing States;
- .2 R&D projects on more energy efficient ships to the benefit of the shipping sector;
- .3 technical cooperation within the existing IMO framework; and
- .4 administrative expenses for operation of the GHG Fund.



The GHG Fund should be established as a separate legal entity responsible for allocating and monitoring revenues generated within the scope of the legal instrument, which most suitably would be a new convention under the IMO. The respective allocation of funds for these four purposes is to be decided by the Parties.

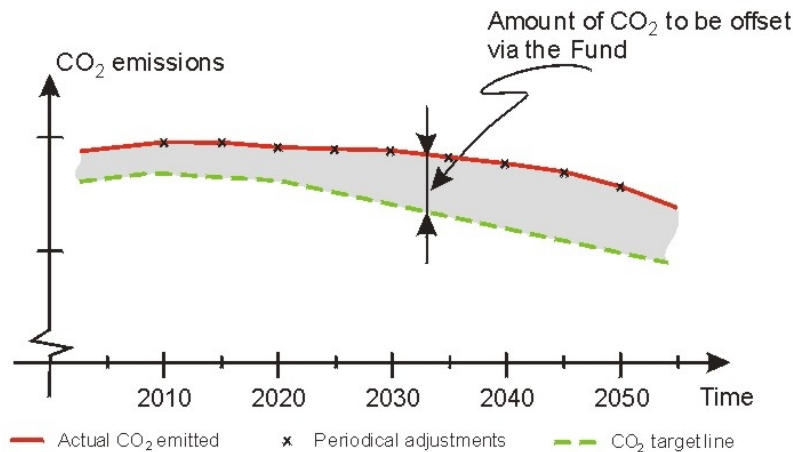
The scheme is consistent with *the nine fundamental principles for future regulations on GHG emissions from ships* established at MEPC 57, while at the same time respecting the IMO principle of *no more favourable treatment* of ships and embracing the UNFCCC principle of *common but differentiated responsibilities and capabilities* of States. The GHG Fund should be seen as part of a comprehensive IMO package to address GHG emissions from international shipping.

The GHG contributions are not to be conceived as a general tax/levy on international shipping. Taxes/levies are imposed by national Governments to cater for their financial needs. GHG contributions will never enter a national Government account and there is no link to the financial needs of national Governments. The GHG contribution is all about shipping offsetting some of its GHG emissions in order to contribute to reducing total global GHG emissions.

#### *Definition of the level of the GHG contributions*

The GHG contributions should be established at a given amount of [x] USD per ton bunker fuel. The level of the GHG contributions should be set in the light of the actual future amount of GHG emissions in relation to the amount of GHG emissions to be offset via the GHG Fund according to a global emission target, cf. figure 1.

Figure 1. Reductions of GHG emissions from international shipping by offsetting



The figure is an illustration only. Technical and operational measures are likely to enable shipping to reduce CO<sub>2</sub> emissions per tonne-mile by 50 per cent for ships delivered in 2030 and by up to 70 per cent for ships delivered in 2050, compared to a 2008 baseline. However, even combined with an assumed low growth in shipping this will lead to an overall slight increase in fuel consumption. Hence, it will be difficult to deliver an absolute reduction in CO<sub>2</sub> emissions from international shipping by 2050. Only by offsetting some of the GHG emissions from international shipping, through financing mitigation and adaptation projects, future sustainable growth in shipping (and trade) is possible.

By considering and deciding upon the level of the GHG contributions for instance every four years, it is ensured that there is a connection between the global emission target and the GHG emissions.

For the shipping industry and the maritime community as such it is of utmost importance that shipping is credited for its contribution to addressing the climate change issue.

*Determination of the level of GHG contributions and its potential GHG offsetting impacts*

The GHG contributions should be set at a given amount of [x] US dollar per ton bunker fuel. Table 1 shows the potential GHG offsetting impacts of various possibilities.

The table illustrates that, if the GHG contributions are set at USD 45 and the price of CDM credits is USD 45, total emissions from international shipping will be offset by around 1/3. All things being equal, the emissions will be offset by around 11 per cent only if GHG contributions are set at USD 15.

Key figures (based on IMO study 2009):

Total emissions from international shipping:	approx. 847 million tons CO <sub>2</sub>
Consumed bunker fuel:	approx. 277 million tons
Actual price for a CDM credit:	approx. EUR 10-15 (approx. USD 15-22.5)
Expected future price for CDM credit:	approx. EUR 20-30 (approx USD 30-45)

<i>Contribution per ton bunker fuel (USD)</i>	<i>Collected contribution in million USD/year</i>	<i>CDM (million tons CO<sub>2</sub> eq.) at USD 15/year</i>	<i>CDM (million tons CO<sub>2</sub> eq.) at USD 30/year</i>	<i>CDM (million tons CO<sub>2</sub> eq.) at USD 45/year</i>	<i>Price increase per ton bunker fuel (per cent)<sup>1</sup></i>	<i>CO<sub>2</sub> offset impact (per cent) at CDM price of USD 15</i>	<i>CO<sub>2</sub> offset impact (per cent) at CDM price of USD 30</i>	<i>CO<sub>2</sub> offset impact (per cent) at CDM price of USD 45</i>
7.5	2,078	139	69	46	1.4	16	8	5
15	4,155	277	139	92	2.7	33	16	11
30	8,310	554	277	185	5.5	65	33	22
45	12,465	831	416	277	8.2	98	49	33

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<sup>1</sup> Estimated price per tonne bunker fuel approx. USD 550.

## Appendix 2

### Summary of the proposal by France, Germany and Norway to MEPC 59 for a Global Emission Trading System for International Shipping

#### Introduction

The Global Emission Trading System (ETS) for international shipping responds to the need for **precise emission control** through the establishment of a cap on total emissions from the sector, and at the same time provides for access to the most **cost-effective emission reduction measures to meet the cap**. Hence, more emission reductions can be achieved with the invested capital. The global system meets the principles of the IMO, as well as it provides for a **Fund** which will **assist developing countries** to address their needs in their response to Climate Change. **No allocation of emissions** to Parties, or to individual ships is needed. The proposal will allow shipping to continue to provide energy efficient services for the growing world trade.

#### Brief outline of the proposal

It is proposed that States develop the global ETS for international shipping in a **new legal mechanism under the auspices of the IMO**. A Cap on the total emissions of the sector will be part of the system, as well as a target year (commitment period.) **Ships**, to which the system applies, will get **clear and simple requirements**. They need to register and have an account in an international ETS registry and **acquire emission allowances (quotas)** when they operate. The amount of allowances will have to correspond to their bunker consumption, and be periodically surrendered.

The system follows the **traditional and robust way of regulating shipping**. Through a survey and certification regime the Flag Administration/RO will ensure that the ships comply at the time when the ship is required to be in a balance. The ships need to **keep record of their bunker consumption**, as well as of their emission account. Port State Control will be able to control both of these elements according to well established procedures.

The emission allowances will be auctioned, and put on the market by an international entity established in the instrument. **Ships will have easy access to the emission allowances at a market place**. They will in addition have access to auctioned quotas, to excess quotas from other ships, allowances of other sectors and to CDM projects in developing countries. Hence, shipping will always have access to emission allowances. At the same time the system ensures that the requirements for ships can be met through the cheapest reduction measures. While the shipping sector can contribute effectively to combat climate change with a tool that provides for control of the emissions it can still further grow and take advantage of the most cost effective measures.

It is proposed that the maritime ETS is **an open global system**, and therefore excess quotas in the shipping sector can be sold to others. The system will establish robust rules for auctioning and trading.

A **Fund** will be established by the auctioning of emission allowances. Since the quotas will be put on the market by an international entity, revenues will go directly to that entity. The Fund will be administered by the International entity which is under the control of the Parties to the system. The Fund can be used for **climate change mitigation and adaptation purposes in developing countries** as well as technical cooperation activities under the IMO, but the proposal acknowledge that this topic will need be thoroughly discussed among all states at the IMO.

### **Appendix 3**

#### **Summary of the Japanese proposal to MEPC 59 on Market-Based Mechanism to Improve the Energy Efficiency of Ships Based on the International GHG Fund**

##### **Introduction**

1 A market-based framework for reduction of GHG emissions from ships should aim at accelerating the improvement of the energy efficiency of ships.

2 The International GHG Fund scheme proposed by Denmark (MEPC 59/4/5), possibly with some modification, as explained in this document, is a good basis for the IMO to develop a market-based mechanism in order to achieve efficiency improvement.

3 Set out below are the main modifications from the International GHG Fund scheme proposed by Denmark.

##### **Direct payment**

4 Under the International GHG Fund scheme proposed by Denmark, a ship shall pay contributions to a fuel supplier, who shall transfer the contribution to the International GHG Fund. There may be another option for further consideration: a ship directly pays the contributions to the International GHG Fund through the established electronic accounts for individual ships (Figure 1).

##### **Refund to spur efficiency improvement**

5 In order to further spur efficiency improvement, the possibilities of making evaluations based on actual ship performance in terms of energy efficiency in a certain evaluation period, and of refunding a part of the collected revenues to those ships based on their performance should be explored.

6 The purpose of this scheme is to accelerate the energy efficiency improvement of ships by creating stronger economic incentives for investment in improving the efficiency of ships as well as for operational measures.

##### **Fair evaluation of the performance of individual ships**

7 To evaluate ship performance in terms of energy efficiency, there may be several available tools, such as:

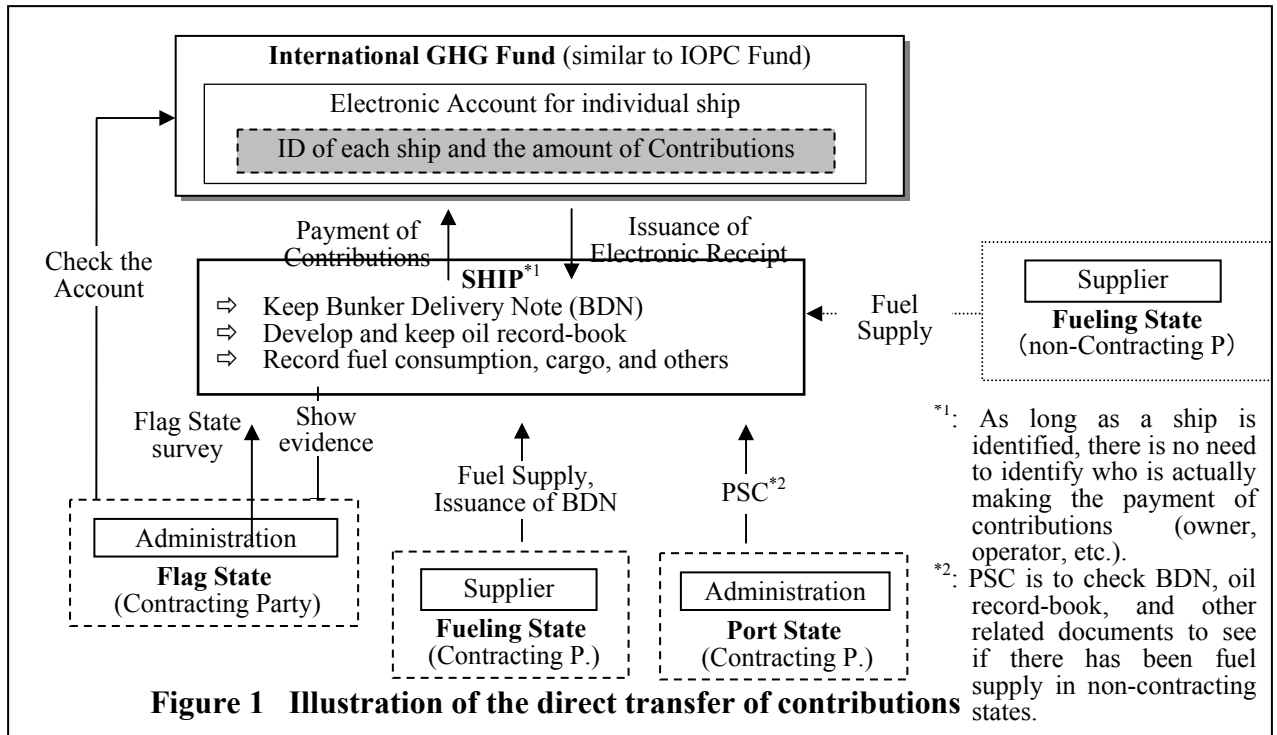
- .1 Energy Efficiency Operational Indicator (EEOI) developed by IMO (Figure 2);  
and
- .2 Energy Efficiency Design Index (EEDI) developed by IMO (Figure3).

8 The advantage of the concept mentioned above is that it has a vast potential to achieve the overall objective of controlling the CO<sub>2</sub> emissions from international shipping while enabling sustainable development of shipping activity which provides the essential services to global economy.

Annex

**Direct payment to International GHG Fund through the established electronic accounts for individual ships**

Direct payment can reduce administrative costs included in the contribution collection, and contribute to the establishment of a fraud-free system of transferring the paid contributions to the International GHG Fund.

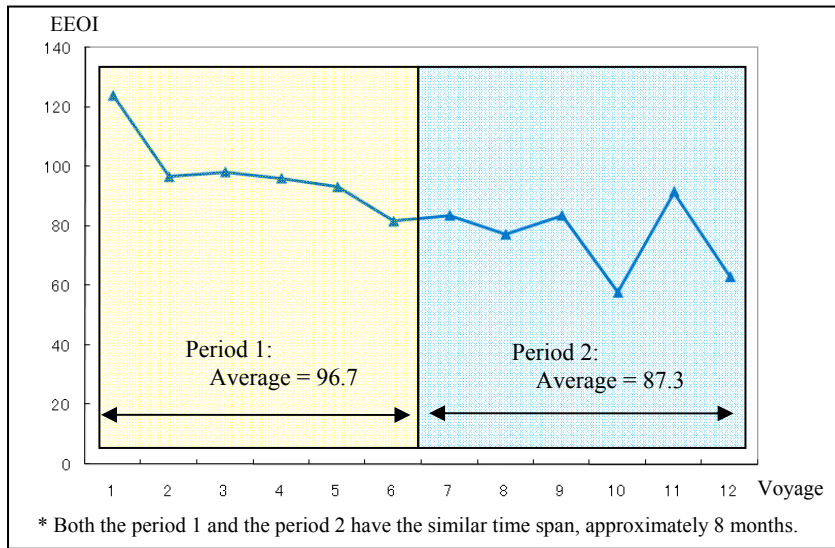


**Figure 1 Illustration of the direct transfer of contributions**

**Fair evaluation of the performance of individual ships by EEOI**

The evaluation using the Energy Efficiency Operational Indicator (EEOI), expressing the form of CO<sub>2</sub> emitted per unit of transport work, would be to assess the relative improvement of efficiency of the same ship over a reasonably long time span. All ships, even old ships with reduced energy efficiency, will be able to obtain the chance to be rewarded and to reduce CO<sub>2</sub> emission.

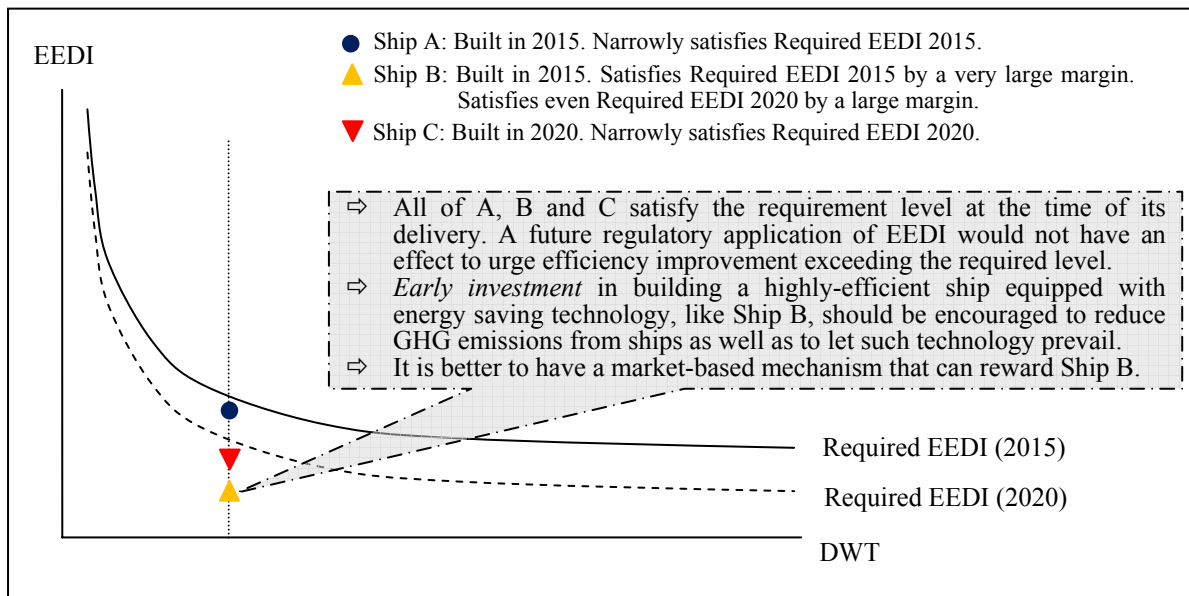
The rating should be conducted within the same categories to be established depending on ship types and sizes.



**Figure 2 EEOI of Pure Car Carrier**

**Fair evaluation of the performance of individual ships by EEDI**

The Energy Efficiency Design Index (EEDI), expressing the energy efficiency expected at design and building stage, may be used as an evaluation criterion and as an incentive to promote *early investment for improvement* by rewarding those ships which have achieved higher efficiency by utilizing advanced energy saving technology.



**Figure 3 Image of a future framework on EEDI**

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## Appendix 4

### **Summary of the United States' proposal to MEPC 59 combining technical standards and market-based measures (MEPC 59/4/48)**

Recognizing the dynamic within the IMO, the United States has provided an approach that combines technical standards and market-based measures in order to take the necessary action of reducing greenhouse gas emissions from the international maritime sector. The United States proposal builds off the traditional strengths of the IMO by employing technical standards that will create a pragmatic and cost-effective solution. The proposal combines IMO's excellent work on efficiency standards with efficiency trading by:

- .1 Creating a technical efficiency baseline for various ship types and sizes;
- .2 Gradual improving efficiency from that baseline; and
- .3 Allowing for the possibility of trading efficiency credits amongst the shipping community.

The United States believes that the world fleet can be made more efficient by using this model of explicit and mandatory efficiency benchmarks for various ship types and sizes and efficiency trading. Doing so will produce significant improvements across the world's fleet at a faster pace than normal fleet turnover rates, reduce GHG emissions and save money in reduced fuel costs. The proposal best ensures long term sustainability of international shipping, especially in the face of rising fuel costs. This approach, with some new additional innovative thinking, is an approach that has been used in many countries in the creation of efficiency standards for cars and appliances.

The United States believes the proposal provides IMO with a simple and well-known solution to reduce greenhouse gas emissions from new and existing ships in the most expedient manner possible.

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## ANNEX 4

### Regulation of shipping – IMO’s role

1 The International Maritime Organization was established 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 and prevention and control of marine pollution from ships. IMO is also empowered to deal with administrative and legal matters related to these purposes.

2 IMO’s role is thus primarily to adopt legislation, while enforcement lies with the Contracting Governments (the flag States). Governments 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 own national law and sometimes delegates survey activities to classification societies, which then act on behalf of the flag State. Classification societies are companies who deal with the technical aspect of shipping and sometimes also conduct surveys on behalf of the flag State. In this case, they are often called a “recognized organization”. Classification societies also play an important role for the construction of vessels, since ships are normally constructed according to classification rules.

3 Each convention includes appropriate provisions stipulating conditions which have to be met before it enters into force. Typically, entry into force is conditional on a certain number of countries, representing a certain share of the world fleet gross tonnage, ratifying the agreement. When an IMO instrument has entered into force, it is considered to be generally accepted international rules or standards, and UNCLOS no longer prohibits rules applying to the design, construction, manning or equipment of foreign ships in innocent passage.

4 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. 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 that convention, regardless of flag. This is an important principle, commonly referred to as the principle of “no more favourable treatment”. It refers to port States enforcing applicable standards in a uniform manner to all ships in their ports, regardless of flag.

5 Due to this principle and the international nature of shipping, an IMO regulation affects, *de facto*, most ships, regardless of flag, once it has entered into force. 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 the area of jurisdiction of countries that have ratified the convention in question.

6 Flag States are responsible for implementing and enforcing legislation on ships in their registries. Additionally, many of 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. In order to ensure a harmonized and coordinated approach for PSC inspections, many countries have organized themselves into groups, based on memoranda of understanding (MOUs), and are therefore grouped in regional PSC regimes.



7 There are currently nine port State control regimes, covering most coastal States, as follows:

- .1 Europe and North Atlantic (Paris MoU), signed in 1982;
- .2 Asia and the Pacific (Tokyo MoU), signed in 1993;
- .3 Latin America (Acuerdo de Viña del Mar), signed in 1992;
- .4 Caribbean (Caribbean MoU), signed in 1996;
- .5 West and Central Africa (Abuja MoU), signed in 1999;
- .6 Black Sea (Black Sea MoU), signed in 2000;
- .7 Mediterranean (Mediterranean MoU), signed in 1997;
- .8 Indian Ocean (Indian Ocean MoU), signed in 1998; and
- .9 Arab States of the Gulf (Riyadh MoU), signed in 2004.

8 The United States Coast Guard (USCG) has a well established foreign vessel inspection service which is not part of any of the MOUs and that served as a model for the development of the other PSC regimes.

9 In addition to inspections carried out by port State control officers, the industry also carries out vetting inspections, primarily for tankers and dry bulk carriers. These vetting inspections are driven by cargo interests or shipowners, depending on the scheme.

### **How to measure progress through the IMO machinery**

10 Any IMO Member State can propose a new regulation or amendment to existing one. It might arise from an incident, or simply from an idea or technical development. The Member State first puts its proposal to the relevant IMO Committee. The Committee would then discuss the proposal and, if it was considered to have merit, might decide to refer it to a sub-committee for more detailed consideration. For more complex issues, a working group or correspondence group might be established to work on the issue at an even more intense technical level.

11 After appropriate discussion in these fora, a detailed draft – whether it for a new measure, an amendment to an existing measure, a code of practice, guidelines or a circular – is drawn up, ready for consideration and approval at the appropriate level. This explains the process in the simplest of terms. Depending on the complexity of the issue, some measures can be quickly agreed and adopted while others require more time.

12 IMO Member States use the Organization to agree standards covering all aspects of maritime safety, security and pollution prevention for international shipping. The responsibility for implementing the standards agreed and adopted by IMO rests with the Member states themselves. They undertake to ensure that ships flying their flag comply with provisions of the IMO Conventions to which they are party. Many of them choose to delegate the survey and inspection of vessels to so-called “recognised organisations” such as classification societies.

13 IMO has adopted a voluntary audit scheme that will help flag States to assess how effectively they are fulfilling their obligations under the various IMO Conventions to which they are party. The first audits took place in 2006 and that there has been positive outcome from the process. To date, 37 Member States have volunteered for audit and 77 individuals have been nominated by Governments as auditors.

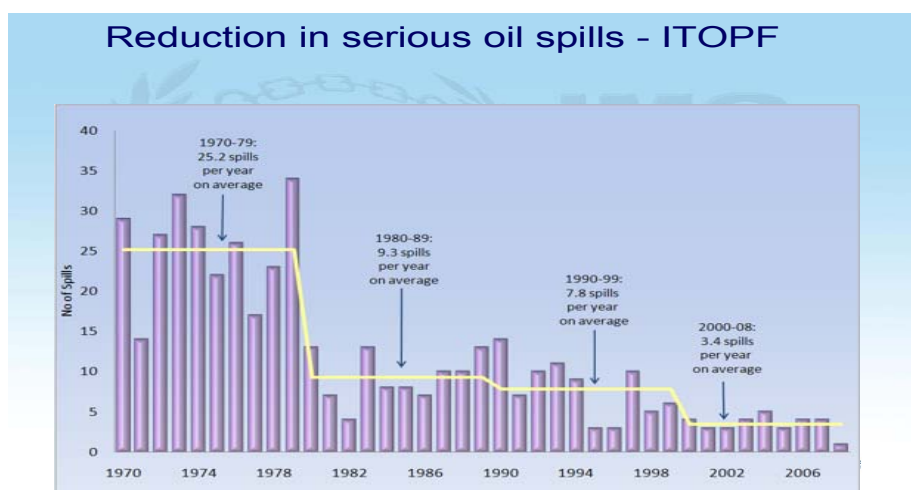
14 Today there are 51 IMO treaty instruments and hundreds of other measures such as guidelines and recommended practices. Between them, they influence almost every aspect of shipping and ship operation, including ship design, construction, equipment, maintenance and manning. IMO's Marine Environment Protection Committee (MEPC) has been very successful in developing and adopting conventions e.g. the Committee has achieved the delivery of the BWM (Ballast Water Management) Convention in 2004; the revision of MARPOL Annex VI in 2007; the Ship Recycling Convention this year; and progress is currently being made on GHG emissions.

15 These are significant examples of IMO's most recent success on the environmental front, highlighting, at the same time, the Organization's and the shipping industry's concern and sensitivity about the environment and all the issues associated with it. Of the **51 treaty instruments IMO has adopted so far, 21 are environment-related** – 23, if we consider the environmental aspects of the Salvage and Wreck Removal Conventions.

16 These are strong environmental credentials for the IMO and proof of the record of IMO's concern over, and work on, the environment – both marine and atmospheric. For example:

- Seaborne trade increased by around 135% between 1985 and 2006; and
- Oil spills reduced by 85% during the same period.

The figures in the table below are from the Independent Tanker Owners' Pollution Federation (ITOPF) and shows a decade-on-decade reduction in serious oil spills. The major reduction at the end of the 1970s coincides with the entry into force of the MARPOL Convention. Despite a constantly growing fleet and volume of oil carried, the number of incidents involving the accidental spills of oil has fallen steadily over the past 25 years. Figures compiled by the International Tanker Owners Pollution Federation show that there was an average of 25.2 accidental spills exceeding 700 tonnes per annum in the 1970s, 9.3 in the 1980s, 7.8 in the 1990s and 3.7 in the 2000-2005 period. During 2006 tankers safely delivered approximately 2.35bn tonnes of crude oil and 700m tonnes of refined products. Less than 10,000 tonnes of this total escaped through accidents.



Source: ITOPF 2007

17 Application of IMO's main conventions to world tonnage as at July 2009

- SOLAS 159 Parties 99.04% of the world tonnage
- Load lines 159 99.02%
- MARPOL 150 99.14%
- COLREGS 153 98.36%
- STCW 153 99.01%

18 IMO's mandatory instruments and related non-mandatory instruments as at July 2009

- 51 treaty instruments
- 21 directly environment related
- 23 if environmental aspects of the Salvage and Wreck Removal Conventions are included
- Hundreds of codes, guidelines and recommendations
- Almost every aspect of shipping is covered: design, construction, equipment, maintenance and manning (including training and certification)

19 IMO instruments to protect the marine environment from ship-sourced pollution include:

<b>Treaty</b>	<b>Title</b>
1. AFS 2001	International Convention on the Control of Harmful Anti-Fouling Systems, 2001 (ANTI-FOULING)
2. BUNKERS 2001	International Convention on Civil Liability for Bunker Oil Pollution Damage, 2001 (Bunkers Convention)
3. BWM 2004	International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004
4. CLC 1969	International Convention on Civil Liability for Oil Pollution Damage, 1969 (CLC 1969)
5. CLC PROT 1976	Protocol to the International Convention on Civil Liability for Oil Pollution Damage, 1969 (CLC PROT 1976)
6. CLC PROT 1992	Protocol of 1992 to amend the International Convention on Civil Liability for Oil Pollution Damage, 1969 (CLC PROT 1992)
7. FUND 1971	International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971 (FUND 1971)
8. FUND PROT 1976	Protocol to the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971 (FUND PROT 1976)
9. FUND PROT 1992	Protocol of 1992 to amend the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971 (FUND PROT 1992)

10. FUND PROT 2000 Protocol of 2000 to the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971
  11. FUND PROT 2003 Protocol of 2003 to amend the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1992
  12. HNS 1996 International Convention on Liability and Compensation for Damage in connection with the Carriage of Hazardous and Noxious Substances by Sea, 1996 (HNS 1996)
  13. Hong Kong SRC 2009 International Conference on the Safe and Environmentally Sound Recycling of Ships
  14. INTERVENTION 1969 International Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969 (INTERVENTION 1969)
  15. INTERVENTION PROT 1973 Protocol relating to Intervention on the High Seas in Cases of Pollution by Substances other than Oil, 1973, as amended (INTERVENTION PROT 1973)
  16. LC 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972, as amended (LC (amended) 1972)
  17. LC PROT 1996 Protocol of 1996 to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and other matter, 1972
  18. MARPOL PROT I-V Protocol of 1978 relating to the International Convention for the Prevention of Pollution from ships, 1973, as amended (MARPOL PROT)
  19. MARPOL PROT Annex VI Protocol of 1997 to amend the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL PROT 1997) (Annex VI on the prevention of air pollution from ships)
  20. OPRC 1990 International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC 1990)
  21. HNS – OPRC Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances, 2000 (HNS-OPRC)
  22. WRC 2007 Nairobi International Convention on the Removal of Wrecks, 2007 (WRC 2007)
  23. SALVAGE 1989 International Convention on Salvage, 1989 (SALVAGE 1989)
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