

Applying the Principle of Common but Differentiated
Responsibility to the Mitigation of Greenhouse Gases from
International Shipping

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Abstract

The report discusses options for reconciling the principle of *Common but Differentiated Responsibility* (CBDR) with IMO's principle of equal treatment of ships when creating a market-based measure for curbing CO₂ emissions from international shipping. Global application with revenues used for compensating the developing countries (*no net incidence*) is the most obvious option. Another possibility is to provide a grace period for emissions from ships on route to non-Annex I countries by restricting the application of a market-based measure to emissions caused by ships on journey to ports in the rich countries. The geographical coverage of such a scheme could gradually widen as non-Annex I countries become more economically advanced. Among the issues that need to be clarified are the exact grounds for compensation. The basic choice is between distinct categories (Annex I or non-Annex I) and parametric values such as CO₂/capita and GDP/capita. Another main issue is the duration of the compensation rules. Some non-Annex I countries have already passed the least developed Annex I countries in terms of GDP per capita and/or emissions per capita. It may be a good idea to establish an expert group, as proposed by China and India, to look into the details of how to apply CBDR to the reduction of emissions from international shipping, including the longer term implications.

Keywords: CBDR, shipping, IMO, climate change

Foreword

There is currently a dead-lock in the International Maritime Organization (IMO) over the interpretation of the principle of Common but Differentiated Responsibility, as expressed in the UN Framework Convention on Climate Change, and how to reconcile this principle with the IMO's principle of no discrimination. The third intersessional meeting of IMO's Greenhouse Gas Working Group noted that "progress should be made by exploring and identifying possible options to harmonize the two sets of principles in a Market Based Measure for international shipping under IMO".

This paper, drafted by an independent expert, is intended as a contribution to this process. Finished in May 2011, it reflects the situation between the third meeting of the Greenhouse Gas Working Group (GHG-WG 3) and the 62th meeting of IMO's Maritime Environmental Protection Committee (MEPC 62).

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Executive summary

The aim of this report is to analyse different options for global, regional or unilateral use of market-based instruments for curbing emissions from international shipping in light of the *Common but Differentiated Responsibility* (CBDR) principle. The issue of globally enforced technical standards, such as the *Energy Efficiency Design Index* (EEDI), is not a subject of this paper.

Conflicting views among IMO Parties on the interpretation of CBDR and its precedence over or subordination to IMO's principle of equal treatment of ships has caused a deadlock in the discussions on how to meet the UNFCCC's request for measures that can reduce emissions of greenhouse gases from international shipping.

However, given the unique characteristics of international shipping, obligations aimed only at ships that carry the flags of industrialized nations are not a viable option. Neither is there precedent in any of the fifty-one IMO international treaty instruments currently in existence where measures have been applied selectively to ships according to their flag. The conclusion is that ships compete in a global market and must be regulated at the global level for the rules to be environmentally effective.

Several ways of reconciling equal treatment and CBRD have been demonstrated. The most obvious is to use some of the revenues of a market-based instrument for compensating the developing countries (*no net incidence*). Another possibility is to provide a grace period for emissions from ships on route to non-Annex I countries by restricting the application of a market-based measure to emissions caused by ships on journey to ports in the rich countries. The geographical coverage of such a scheme could gradually widen as non-Annex I countries become more economically advanced. One can thus identify two possible ways of making equal treatment go hand-in-hand with CBRD:

1. Global application with economic compensation to non-Annex I Parties
2. Application limited to journeys to Annex I countries with or without compensation to third Parties

The chance to overcome the resistance among leading developing nations such as China and India to the idea of a world-wide market based scheme is crucially dependent on the ability among Annex I countries to agree on one market based measure and to make clear that substantial proceeds from that instrument will be allocated to the developing countries, and in particular to the least developed among them.

However, economic incidence impacts are complex and will depend on the relative elasticities of supply and demand for: a) exporters; b) importers; and c) freight service providers. Among the issues that need to be clarified are the exact grounds for compensation, i.e. a formula that can be applied to all countries or formulas to be applied to different categories of States. The

basic choice is between distinct categories (Annex I or non-Annex I) and parametric values such as CO₂/capita and GDP/capita.

Another main issue is the duration of the compensation rules. Some non-Annex I countries have already passed the least developed Annex I countries in terms of GDP per capita and/or emissions per capita. Others will in the near future catch up with them. Given that climate change mitigation and adaptation will be on the political agenda for at least the next half century, a decision in the near future on compensation would either have to include a differentiation based on objective principles or rules on when and how IMO should renegotiate the terms in order to take account of the development of individual nations since the first decision was made.

In the end, a decision on the CBDR will be the result of political negotiation. In order to make the Parties better prepared for decision making, it may be a good idea to establish an expert group, as proposed by China and India, to look into the details of how to apply CBDR to the reduction of emissions from international shipping, including the longer term implications.

In a situation where it shows impossible to reach an agreement on a global scheme, IMO could apply a phased-in approach by alternatively endorsing a scheme that is open to voluntary participation by states and ports or a scheme that covers all traffic to ports in Annex 1 countries. In the case of regional application, the need for compensating third Parties will be limited and depend on the extent to which emissions from journeys from them to the ports of participating Parties are subject to a cap or a levy. Most of the proceeds may in this case be used for other purposes than compensation.

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1. Introduction

According to the International Maritime Organization's second greenhouse gas study, shipping is estimated to have emitted in total 1,046 million ton carbon dioxide (CO₂) in 2007, of which 870 Mton originated from international shipping. These figures correspond respectively to 3.3 and 2.7 per cent of total global emissions. Mid-range emissions show that by 2050, in the absence of policies, ship emissions may increase by 150 to 250 per cent as a result of the growth of the industry. However, a significant potential for reduction of greenhouse gases (GHG) through technical and operational measures has been identified (Buhaug et al, 2009).

Perceived conflict between Common but Differentiated Responsibility (CBDR), a constitutive principle in the United Nations Framework Convention on Climate Change (UNFCCC), and the principle of Equal Treatment of Ships, which is fundamental in all treaties of IMO, has become a stalemate for future policy progress in vessel-based CO₂ reduction negotiations.

When requesting that the developed countries (belonging to Annex I of UNFCCC) should pursue limitation or reduction of emissions of greenhouse gases from international shipping, working through IMO, the drafters of the Kyoto Protocol clearly failed to foresee the complexity of implementing the CBDR principle in the maritime sector (Karim & Alam, 2011). Ironically CBDR has also another meaning, being the abbreviation for Constant Bearing Decreasing Range, a naval term for collision course!

The aim of this report is to analyse different options for global, regional or unilateral use of market-based instruments for curbing emissions from international shipping in light of the CBDR principle. It is intended as a contribution to the ongoing discussion on how to reconcile CBDR with the equal treatment of all ships, regardless of flag.

The issue of globally enforced technical standards, such as the Energy Efficiency Design Index (EEDI), is not a subject of this paper.

The references, listed at the end of the report, do not include submissions made by Parties to IMO meetings. They are instead referred to in the running text within brackets by their official IMO designation, e.g. MEPC 60/4/22 for a paper submitted as number 22 under session 4 of the 60th meeting of the Marine Environment Protection Committee (MEPC).

2. The CBDR principle

The principle of common but differentiated responsibility (CBDR) is formulated in Principle 7 of the Rio Declaration; "In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries

acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command."

A similar code was endorsed already in 1972 by the Stockholm Declaration of the United Nations Conference on the Human Environment that says international technical and financial assistance should be provided to developing countries to help them meet "any costs which may emanate from their incorporating environmental safeguards into their development planning". Consistent with the Stockholm Declaration, several international environmental agreements have provided different terms for developed and developing States. Among these are the 1987 Montreal Protocol to the Vienna Convention for the Protection of the Ozone Layer and the 1991 protocol to the 1979 Convention on Long-Range Transboundary Air Pollution (LRTAP). The Montreal Protocol gave less-developed countries a grace period for coming into compliance, and established a fund to provide them with the incremental costs of implementation (Stone, 2004).

The CBDR principle legitimizes asymmetry of commitments. Although asymmetrical rights and duties among States are not new in themselves, they do constitute a deviation from customary international law and multilateral conventions that generally have universal application (Rajamani, 2000).

Principle 7 of the Rio Declaration appears to recognise the notion of common but differentiated responsibility as having significant legal implications, though whether it is a legal principle or just a political guideline is still open to debate. What may argue in favour of seeing the CBDR as a guideline rather than a legal principle is its conflict with the customary obligation of all States to ensure that "activities within their jurisdiction or control" do not damage the environment beyond their own territory. As codified in both Principle 21 of the 1972 Stockholm Declaration on the Human Environment and Principle 2 of the Rio Declaration, the text of the "no harm" obligation makes no reference to the socio-economic situation of States (French, 2000). Another potential conflict is with the precautionary principle as expressed in the United Nations *World Charter for Nature*, adopted by the UN General Assembly in 1982, and in UNFCCC Article 3:3. Two principles cannot both be binding if in conflict with each other. It may therefore be an open issue whether it is the CBDR principle or the precautionary principle that is merely aspirational.

At Rio, the G77 Group of developing States actually asked for an even more stringent formulation of Principle 7. It was rejected but read, "... The major cause of the continuing deterioration of the global environment is the unsustainable patterns of production and consumption, particularly in developed countries. In view of their main historical and current responsibility for global environmental degradation and their capability to address this common concern, developed countries shall provide adequate, new and additional financial resources and environmentally sound technologies on preferential and concessional terms to developing countries to enable them to achieve sustainable development" (quoted in French, 2000).

The idea of a differentiated responsibility has been challenged. With reference to the Stockholm Declaration's principle 21, Stone (2004) argues that domestic environmental regulations do not hold marginally profitable polluters to lower standards than their wealthy competitors, and asks "Why should our posture be different, that is, why should we differentiate more liberally in the international arena?" However, what Stone disregards is the likely possibility that a sovereign State, when deciding on the stringency of its environmental standards, takes into account the difficulties that they may cause the weaker among its industrial firms. Stone goes on to say that no one proposes adjusting the international standards for radioactive emissions to account for a nation's difficulties in meeting them. Stone believes that laws of universal application are less costly both to organize and to enforce. "Scaling obligations may bring more players on board, but it also invites fracas over bad faith and rent seeking."

In any interpretation of the CBDR principle it is essential to note that it recognizes that States have a shared responsibility for the protection of common environmental resources. Rich or poor, they all share the burden of protecting and restoring the environment. The second sentence of Principle 7 of the Rio Declaration clearly puts most of the burden on the developed countries, which in light of their large historic contributions to environmental degradation and their huge technological and financial resources should take the lead. However, there is nothing in the way that Principle 7 is phrased that indicates that the developing countries should not contribute. On the contrary, the very essence and strength of the CBDR is that all States must participate in a common effort.

Principle 7 divides the world into developed and developing countries without defining the border-line between them. Where that line should be drawn is an obstacle in any international treaty or protocol that tries to make the CBDR principle operational. Some industrial countries have contributed more to the degradation of common environmental resources than others, and all developed States are not equally capable of financing or implementing solutions. A particularly complicated situation exists in a case where abatement and restoration will take decades. Over such a long period of time some developing countries will advance into fully industrialised nations, the most successful among them may even surpass some of today's rich countries in terms of GDP per capita. When incorporating the CBDR into multilateral agreements, the differential obligations imposed on the parties, thus, should ideally take into account both current and historic differences but also offer a mechanism for how to gradually change each Party's liability as matters change.

3. Making a differentiated responsibility operational

Cullet (2003) identifies three forms of differentiated treatment. The first type refers to situations where treaties enforce different obligations on different groups of States. The second type concerns differential treatment by making use of measures that facilitate implementation in States which do not have the capacity to implement specific commitments. The multilateral Fund under the Montreal Protocol is one example, the Kyoto Protocol's Clean Development Mechanism another. Thirdly, Cullet recognizes that while differential treatment primarily

applies to inter-state relations, it may also be relevant with respect to the role of non-state actors. Ship owners could be one example.

Stone (2004) divides the CBDR into three possible versions. In the first, a proponent might simply be saying that some non-uniformities, resulting from rational bargaining, should be expected and welcomed as natural outcomes of mutually beneficial negotiations among States that pursue their own advantage in the most narrowly self-interested way. He thinks that one party contributing or receiving more than another could be supported as "efficient" in the sense of being Pareto-improving: they leave at least one party better off and no party worse off compared with status quo.

Stone calls his second version an equitable CBDR. It goes one step further by introducing constraints on unbridled bargaining, however, without departing from the commitment to Pareto-improve. In this case treaty terms tilt the cooperative surplus more favourably toward a designated group of parties, paradigmatically the Poor.

A third position is what Stone labels an inefficient CBDR. It goes a step still further in advantaging one group by carrying the differentiation beyond the point of awarding the Poor the entire net surplus of cooperation. "In the interests of 'righting' the inequity of the status quo ante, the Rich-Poor transfers would leave the Rich worse off than before negotiations began."

Rajamani (2006) identifies three boundaries in differential treatment: (i) it should not detract from the overall object(s) and purpose(s) of the treaty; (ii) it should recognize and respond to differences across predetermined political and other categories; and (iii) it should cease to exist when the relevant differences no longer exist.

Some scholars highlight that all developing countries are not equally poor. Attapattu (2009) asks, "Can the BASIC nations (Brazil, South Africa, India and China) be properly categorised besides the poorest of the world? In terms of greenhouse gas emission stocks (aggregate emissions since the industrial revolution) perhaps, but their flows (current annual emissions) have the character of the established economies of North America and Europe." Attapattu believes that the time has come to use the CBDR principle to differentiate within the broader categories of developing and developed countries.

In the years following the adoption of the Kyoto Protocol several proposals were made by academia for how to make developing countries take on emission commitments in the near term, among them Schmalensee (1998), Aldy et al (2001), Stewart and Wiener (2001). These proposals and those by Nordhaus (1998), and McKibbin and Wilcoxon (2002) recommend some form of graduation: an income threshold above which nations must take on emission commitments (Aldy et al, 2003). Ringius et al (2002) discuss various principles for burden sharing and fairness based on the Convergence of per capita emissions over time.

Winkler et al (2002) studied how the choice of model for differentiated responsibility may shape the acceptability of allocations. Results for six major developing countries (China, India, Brazil, South Africa, Argentina and Nigeria) show that the implications for developing

countries differ widely between liabilities being based on ability to pay, emissions intensity, or emissions per capita. They conclude that any single top-down, rule-based allocation scheme is unlikely to be suitable for all developing countries. Even for the six nations analysed, various schemes have different results, depending on the status of development, the primary energy structure, the structure of the economy, and other factors in those countries. Winkler et al (2002) thinks that understanding that developing countries differ from one another, and considering different kinds of targets, are pre-requisites for finding a way forward.

In conclusion, several arrangements can be used to allow States or groups of States a differing responsibility for the protection of the global environment. They include the setting of differential standards, permitting grace periods in implementation and/or providing flexibility by providing international assistance. However, all of these may not be equally easy to apply to the emissions from international shipping.

4. CBDR in the Framework Convention on Climate Change

The United Nations Conference on Environment and Development, held in 1992 in Rio de Janeiro, agreed on a Framework Convention on Climate Change (UNFCCC), which established as its ultimate objective the “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.”

The preamble of the convention acknowledges "that the global nature of climate change calls for the widest possible cooperation by all countries and their participation in an effective and appropriate international response, in accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions". It also notes “that the largest share of historical and current global emissions of greenhouse gases has originated in developed countries, that per capita emissions in developing countries are still relatively low and that the share of global emissions originating in developing countries will grow to meet their social and development needs.”

However, the preamble also recalls that States have, in accordance with the Charter of the United Nations and the principles of international law,” the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction”.

Concerning the needs of developing countries, the preamble affirms “that responses to climate change should be coordinated with social and economic development in an integrated manner with a view to avoiding adverse impacts on the latter, taking into full account the legitimate priority needs of developing countries for the achievement of sustained economic growth and the eradication of poverty.”

Article 3.1 clarifies the principles that shall guide the Parties in their efforts to combat climate change. It reaffirms the principle of common but differentiated responsibility, and states that "the developed country Parties should take the lead in combating climate change and the adverse effects thereof." Article 3.2 goes on to say that the specific needs and special circumstances of developing country Parties should be given "full consideration". However, Article 3.3 underlines that all Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects.

Article 4.3 states that the developed countries "shall provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties in complying with their obligations under Article 12, paragraph 1, which covers elements of information that each Party shall communicate to the Conference of the Parties. However, Article 4.3 goes on to say that the developed country Parties "shall also provide such financial resources, including for the transfer of technology, needed by the developing country Parties to meet the agreed full incremental costs of implementing measures that are agreed between a developing country Party and the international entity or entities referred to in Article 11". The latter defines a mechanism for the provision of financial resources on a grant or concessional basis, including for the transfer of technology.

It remains unclear both to what extent developing States should contribute and how much of the costs incurred by them shall be covered by contributions from the industrialized countries. The words underlined (by the author of this paper) in the above quotes do, when used in combination, point at possible contradictions. On the one hand, the convention emphasizes that "full account" should be taken of "the legitimate priority needs of developing countries for the achievement of sustained economic growth and the eradication of poverty", on the other it underlines "that all Parties should take precautionary measures".

On the sharing of costs, the convention declares that developed countries shall provide the financial resources, needed by the developing countries "to meet the agreed full incremental costs of implementing measures" that are "agreed" between a developing country Party and the international entity referred to in Article 11. Agreements appear to be needed both on what constitutes the "full incremental cost" and on the inclusion of that cost (or part of it?) in a deal between the individual country and the international financing entity.

The fact that the UNFCCC in Article 4.8 and 4.9 underscores the importance of assisting, in particular, the most vulnerable and the least developed countries nations may be taken as a sign that the degree of support from the developed countries may differ between different categories of developing States. However, Article 4.7 declares that "the extent to which developing country Parties will effectively implement their commitments under the Convention will depend on the effective implementation by developed country Parties of their commitments under the Convention related to financial resources and transfer of technology and will take fully into account that economic and social development and poverty eradication are the first and overriding priorities of the developing country Parties.

Clearly the key notion of the UNFCCC emphasizes that because the developed nations have contributed the bulk of the greenhouse gases to date and have benefited economically from the industrialization that caused those pollutants, they should take the lead in efforts to mitigate climate change. As a first step, pending the adoption of protocols under the convention, the UNFCCC imposed a non-binding goal of reducing greenhouse gas emissions by industrialized countries (the so-called Annex I countries) to their 1990 levels by the year 2000. Beyond this, the interpretation of the CBDR by the convention is vague.

5. CBDR and the Kyoto Protocol

The first Conference of the Parties (COP) in 1995 adopted the Berlin Mandate that specified that the process towards a first protocol should be guided by the UNFCCC's Article 3.1 (on the CBDR). **In December, 1997, some 160 countries negotiated the Kyoto Protocol to the Framework Convention.** The Protocol, which entered into force in 2005, is the Convention's primary tool for combating global warming and climate change. It **designates countries with emissions commitments as Annex B countries. With only a few exceptions, the Annex B countries are identical to the set of Annex I countries in the UNFCCC.**

The Kyoto Protocol maintains the principle of differentiated responsibilities, imposes targets and timetables for specific emissions reductions by 38 industrialized Annex B countries, and expands the opportunities for countries to achieve their commitments cost-effectively through three "flexible mechanisms"; emissions trading, Joint Implementation and the Clean Development mechanism. The Kyoto Protocol establishes general obligations of cooperation towards technology transfer, and provides for financial assistance for mitigation and adaptation to developing countries through the Global Environmental Facility (GEF). The GEF operates three funds, the Special Climate Change Fund, the Least Developed Countries Fund, and the Kyoto Protocol Adaptation Fund. They are all mechanisms aimed at operationalizing the CBDR. **The developing countries, however, have no specific obligations to abate greenhouse gas emissions under the Protocol, and it provides no mechanism for developing countries to adopt emissions commitments voluntarily (other than to voluntarily use the option provided in the UNFCCC's Article 4.2(g) to notify the Depository that it intends to be bound by the same commitments as the Annex I countries).**

The Kyoto Protocol does not specifically cover emissions from international bunkers but in its Article 2.2 requests the Parties included in Annex I to "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". The distinction between international and domestic emissions arises from the IPCC Guidelines, and the natural interpretation of Article 2.2 is that it refers to international emissions only.

The Kyoto Protocol does not add much to the Convention in terms of interpreting the CBDR principle. However, Article 10 of the Protocol states that “all Parties, taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances, shall without introducing any new commitments for Parties not included in Annex I”, inter alia, “formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to mitigate climate change and measures to facilitate adequate adaptation to climate change”.

6. Differing interpretations a dilemma for IMO

What has happened since the Rio Declaration and the Kyoto Protocol shows that the legal interpretation of CBDR is subject to dispute. The United States already in 1997 refused taking on binding obligations unless key developing nations also took similar steps. States such as China, Brazil, India, and Saudi Arabia, on the other hand, maintain that the Protocol restricts the enforcement of binding obligations to the developed countries. Similar to land-based CO₂ emissions, they argue that the lion’s share of CO₂ emissions from international shipping is the result of cumulative emissions related to the historical development of the industrialized countries. Consequentially China and India claim that the CBDR principle should be fully respected in the negotiation of an international legal instrument for the reduction of GHG emissions from shipping and that, thus, any such instrument should be applicable only to the ships of developed countries. They demand that CO₂ emissions from their ships should be deemed as “survival emissions” (MEPC 58/4/32).

However, given the unique characteristics of international shipping, obligations aimed only at ships that carry the flags of industrialized nations are not a viable option. There is no precedent in any of the fifty-one IMO international treaty instruments currently in existence where measures have been applied selectively to ships according to their flag.

In an assessment of the matter, the Sub-Division for Legal Affairs in IMO did not identify any potential conflicts between the CBDR in the Kyoto Protocol and Equal Treatment of ships under IMO (IMO, 2009)¹. Legal Affairs’ view is that any measures that are adopted by IMO in this context shall be applicable across the board in the same way as are other regulations adopted by the Organization. This view is based on the following analysis (quoted in extenso):

1) Legal Affairs has not identified any potential treaty law conflict between the Kyoto Protocol and the provisions that may be developed by the Committee on GHG emissions from the combustion of marine bunker fuels, with a view to their incorporation in an appropriate IMO instrument;

¹ Recently repeated in GHG WG 3/3/9.

2) treaties can only conflict with each other when they regulate the same subject matter in a contradictory way. This is not the case of the Kyoto Protocol *vis-à-vis* an appropriate IMO instrument in connection with GHG emissions. The Kyoto Protocol should be viewed as an agreement, elaborated under the framework of the UNFCCC, which sets out objectives to be achieved in relation to GHG emissions, but which, in doing so, does not preclude the application of specific technical requirements and obligations developed pursuant to particular treaty law areas, such as maritime law; indeed, this notion is inherent in the very language of Article 2.2 of the Kyoto Protocol through its implicit recognition that IMO is the “proper” forum in which to pursue limitation or reduction of GHG emissions from marine bunker fuels;

3) furthermore, the fact that the obligation contained in the Kyoto Protocol to “pursue” limitation or reduction of GHG emissions through IMO is addressed to some countries (i.e. Annex I countries) does not mean that, once measures to achieve these limitations or reductions are included in an appropriate IMO instrument, they should not apply to **all** Parties to such an instrument, irrespective of whether they happen to be Annex I countries under the Kyoto Protocol and UNFCCC. Article 2.2 of the Kyoto Protocol should be interpreted, rather, as an acknowledgement that the elaboration of provisions regulating GHG emissions from combustion of marine bunker fuels is a task which is properly within the purview of IMO. Any other interpretation would imply also that only Annex I countries should be involved in the negotiations within IMO;

4) Article 2.2 of the Kyoto Protocol restricts itself to imposing upon countries in Annex I the obligation to “work through” IMO to “pursue limitation or reduction of emissions of greenhouse gases”. This is not the same as limiting the outcome of IMO’s decision-making process to application to Annex I countries exclusively;

5) a general obligation imposed upon the countries included in Annex I to the Kyoto Protocol/UNFCCC to work through IMO cannot be interpreted as an instruction to IMO to restrict to these countries the application of maritime technical regulations, which, to be effective, must apply universally to all ships, as is the case of shipping regulations included in IMO treaties such as MARPOL. If this were not the case, shipowners, for example, could simply change flag to avoid the impact of any regulations which they might regard as too onerous, a result which would frustrate the objective not only of MARPOL (or other IMO treaties) but also of Article 2.2 of the Kyoto Protocol;

6) the Kyoto Protocol incorporates the UNFCCC principle of “common but differentiated responsibilities” in the context of addressing climate change. By comparison, IMO’s mandate, as derived from the IMO Convention and UNCLOS, is based on the understanding that technical regulations, aimed at ensuring the safety and security of commercial shipping as well as protecting the marine and atmospheric environment, will, of necessity, be developed on the basis of universal rules which should apply without discrimination to all ships engaged in international commercial navigation;

7) accordingly, concepts such as the “common but differentiated responsibilities and respective capabilities” have limited, if any, application in IMO-based conventions. By way of example, a ship belonging to a shipowner incorporated in a developed country, but registered or flagged in a developing country, cannot presumptively be considered as a source of emission coming either from the developing or developed country. It is simply a ship navigating across national boundaries and on the high seas. The objective of achieving reduction or limitation of GHG emissions from ships engaged on international voyages simply cannot be achieved if some ships are to be exempted from IMO regulations purely on the basis of the flag they fly; and

8) it is due to the complexities of the international shipping trade (i.e. the interaction of private and public law in connection with registration; the right and obligation to fly a flag; and the further interaction between flag, port and coastal State jurisdiction) that IMO shipping regulations are, as a matter of principle, and must be, as a practical matter, global in nature and applicable to all commercial ships, with appropriate differences, if any, to be based on factors such as their type, structure, manning and operational features, irrespective of the flag they are flying or the degree of industrial development of the flag State or the State of nationality of the owner or the operator.

In accordance with Lloyd’s Register Fairplay’s database, as of 1 March 2008, the distribution by flag of the world merchant fleet of registered ships above 400 GT shows that 74 per cent of the total tonnage belonged to Non-Annex I flag States (rising to 77% if measured as DW) (MEPC 59/4). This underlines the relevance of the view expressed by Legal Affairs on *no more favourable treatment*.

The developing countries do not concur with the views expressed by Legal Affairs, and disagree in particular with the conclusion made in paragraph 7. China and India do recognize the complexity of international shipping but call for an application of the CBDR principle based on the Genuine Control Approach, by which they mean mandatory abatement measures should only apply to ships that are genuinely controlled by owners domiciled in developed countries (MEPC 58/4/32). What China and India may have overlooked is the likely possibility that some ship owners would respond by changing their country of domicile, or creating subsidiary companies domiciled in developing countries to act as the legal owner of their ships. Such practices are common in certain industries to gain taxation benefits, and are notoriously difficult to control. Furthermore, the policy suggested by China and India may result in two ships competing for the same cargo on the same route, one subject to an MBM and one not. This would create a clear competitive distortion and violate the principle of equal treatment of ships (MEPC GHG-WG 3/3/3).

A scientific study commissioned by the IMO suggests that there is significant potential to achieve reductions of CO₂ emissions through the introduction of a market based instrument based on the no more favourable treatment principle, which the authors assume will result in 98 per cent of all ships and ship operations being covered. They suggest that the CBDR principle could be implemented through an appropriate distribution of revenues raised from the

market based mechanism. The study proposes that, in accordance with the UNFCCC, a higher proportion of revenue should be allocated to the least developed countries for climate change adaptation and mitigation purposes (University of Cambridge et al, 2009).

In an attempt to find a compromise, several submissions have been made to MEPC based on the International Maritime Emission Reduction Scheme (IMERS)², developed by Dr Andre Stochniol. The most recent among these submissions are by IUCN and WWF (MEPC 60/4/55, MEPC 61/5/33, and GHG-WG 3/3/11). According to IMERS, a Rebate Mechanism (RM) would compensate the developing countries for the financial impact of their participation in a global market-based scheme. A developing country's rebate would be calculated on the basis of its share of the global costs of the market-based measure, using data on each developing country's part of global imports from non-adjacent countries by value as a proxy. In principle, the Rebate Mechanism could be applied to any maritime market-based instrument which generates revenue. Developed countries would pay the bulk of reduction costs but only receive a limited amount of the proceeds. Developing countries would receive more than they generate. The largest shares would, in accordance with UNFCCC, be allocated to the least developed countries and small island developing countries. However, despite receiving more than they pay, countries such as Brazil, India, and China have not shown any interest in IMERS.

The UN Secretary General's High-Level Advisory Group on Climate Change Financing (AGF, 2010) recommends that market-based measures aimed at emissions from international shipping and aviation should have *no net incidence* on developing countries (i.e. zero cost burden). The report recommends pricing CO₂ emissions, with no net incidence on developing countries, thereby effectively implementing CBDR in international transport. The details are found in a technical report, which underlines that compensation should be provided through an objective, principles based, process, and suggests that a centralized fund for financing and distributing compensation may be appropriate. The technical report notes the difficulties in attributing emissions to particular countries and says that methods for measuring and taking account of incidence impacts need to be agreed amongst Parties. In this context, the issue of which countries should receive compensation (i.e. only small, remote and vulnerable developing countries or all developing countries) needs to be assessed (AGF technical report 2, 2010).

Faber et al (2010) show that if two thirds of the revenues raised by auctioning allowances under a global cap were used to compensate developing countries, based on value of imports, the average non-Annex I country would receive more than it paid. The least developed among them would receive more than twice the amount that the ships carrying goods for them had to pay.

The conclusion should be that ships compete in a single global market and must be regulated at the global level for the rules to be environmentally effective (avoid carbon leakage). It will

²www.imers.org

not be the countries where ships are registered that bear the cost of more energy-efficient ships and ship operations, it will be the ship owners and ship operators and their customers. As some of the latter are citizens or industries of developing countries, compensation needs to be considered and possible mechanisms for this have been demonstrated.

7. IMO and UNFCCC

IMO is a specialized agency under the United Nations for intergovernmental cooperation in the field of regulation of ships engaged in international trade. Its task is 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's role is primarily to enact international legislation, while the Contracting Governments assume responsibility for implementing and enforcing the legislation on ships flying their flag.

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 favorable treatment".

There has been ongoing cooperation between the Secretariats of IMO and UNFCCC on the work of greenhouse gas emissions from international shipping ever since UNFCCC entered into force in 1994. IMO's work on greenhouse gas emissions 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 emissions from international shipping.

In response to the Kyoto Protocol, the IMO in 2000 published a comprehensive report on greenhouse gas emissions from ships ("The first GHG report"), and the IMO Assembly subsequently in adopting Resolution 963(23), called upon Parties to adopt a mandatory market-based instrument (MBI) for the reduction of emissions from vessels (IMO, 2003).

MEPC 59 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. The outcome of MEPC 59 was endorsed by the twenty-sixth session of IMO's Assembly in late 2009 (MEPC 60/INF.9).

The MEPC has over the years discussed numerous submissions by Parties on various ways of achieving abatement of GHG in the shipping sector, among them an Energy Efficiency Design Index (EEDI) for new ships and an Energy Efficiency Operational Indicator (EEOI) for existing and new vessels. The Parties have also debated over 70 submissions on market-based instruments, most of them either on varieties of emissions trading or on different forms of charges and taxes.

However, despite ten meetings of the MEPC, three intersessional working group meetings devoted entirely to greenhouse gases, a new IMO GHG study (Buhaug et al, 2009) and an assessment by an expert group on market-based instruments (IMO, 2010), the organization has, ten years past its first GHG report and 13 years after the Kyoto Protocol, failed to come to agreement on measures aimed at combating CO₂ emissions from international shipping.³ The delay is to a large extent a result of the unresolved conflict over the interpretation of common but differentiated responsibility.

The UNFCCC has been working on international shipping emissions in parallel to similar efforts by the IMO. The work began already prior to the Kyoto meeting of the Conference of the Parties. In the 1996 National Communication by the Subsidiary Body for Scientific and Technological Advice (SBSTA, 1996a), the UNFCCC proposed eight possible allocation options for international shipping emissions:

1. No allocation;
2. Allocation to Parties in proportion to their national emissions;
3. Allocation to Parties according to the country where the bunker fuel is sold;
4. Allocation to Parties according to the nationality of the transporting company, or to the country where the vessel is registered, or to the country of the operator;
5. Allocation to Parties according to the country of departure or destination of a vessel. Alternatively the emissions related to the journey of a vessel could be shared between the country of departure and the country of arrival;
6. Allocation to Parties according to the country of departure or destination of passenger or cargo. Alternatively, the emissions related to the journey of passengers or cargo could be shared by the country of departure and the country of arrival;
7. Allocation to Parties according to the country that owns the cargo or origin of the passengers;
8. Allocation to the Party of emissions generated in its national space.

Most of these options have been dismissed in the following debate as impractical or unfair. No allocation is essentially the track chosen by most Annex I States in their submissions to the MEPC.

Only in the case of option 2, that indiscriminately adds the shipping emissions to the grand total of national emissions as a fixed percentage for all countries, does the evasion of regula-

³ Though there is a chance that the Energy Efficiency Design Index (EEDI) may be adopted at MEPC 62 in July 2011.

tion have no effect on allocated emissions (Heitmann & Khalilian, 2010). However, this option would not provide any incentive to owners and operators of ships to undertake measures aimed at reducing fuel consumption and emissions.

A report by UNFCCC's Ad Hoc Working Group on Long-term Cooperative Action listed seven different options for how to deal with greenhouse gases from international shipping prior to COP15 in Copenhagen (UNFCCC, 2009). All of them recognize shipping emissions as being international and leave, with differing degrees of guidance, the matter to be resolved by IMO. However, option 2 exempts developing countries from any obligations in this sector. Option 4 asks the IMO to set emission reduction targets for marine bunker fuels equal to 20 per cent reduction below 2005 levels by 2020.

The working group also considered some proposed amendments to Article 2.2 of the Kyoto Protocol and proposals for mechanisms using international maritime transport as a source for funding. None of the matters related to international shipping were considered in any detail or concluded at COP 15, which failed to provide the clarifications that the IMO was hoping for.

The Copenhagen Accord does not deal specifically with emissions from the maritime sector. However, one objective of the Accord is to raise 100 billion US dollars a year by 2020 to address the needs of developing countries. Potentially, this could partially be achieved by contributions from market-based mechanisms in the maritime and aviation sectors (Kågeson, 2009, AGF, 2010). However, neither COP 15 nor COP 16 in Cancun has brought this issue any where near a final decision. The task of introducing a market-based instrument in the shipping sector remains primarily a matter for the IMO. However, its mandate would have been more distinct in the absence of the simultaneous work by UNFCCC's bunker group which is now carried out in parallel to the efforts made by MEPC.

8. The role of leading non-Annex I countries

China and India are the two leading developing countries by virtue of their large populations and rapid and sustained economic growth that is largely the result of successful ongoing industrialization, particularly in China. In the negotiations at the IMO, they play a central role, speaking on behalf of the developing nations, regularly backed-up by other fast-growing economies such as Saudi-Arabia, South Africa and Brazil. By taking a firm stand on the CBDR principle they have, supported by most developing country delegations, delayed the IMO from taking any decision on the introduction of market-based instruments.

China and India criticize that most of the proposals having been submitted to the MEPC "require the developing countries to assume the same responsibilities in emission reduction as the developed countries in accordance with the principle of 'no more favourable treatment'". They think this is "not fair play for the developing countries" as "these proposals weaken or circumvent historical responsibility and mandatory obligation of the developed countries to

reduce the emissions, and do not embody the mandatory obligations of the developed countries to provide adequate financing, technology and capacity-building to the developing countries” (MEPC 61/5/24).

As a second line of argument, India and China point at several remaining uncertainties concerning the effectiveness and the indirect impacts of market based measures. They conclude: “At present, only with some trial operation at regional level, a global carbon market has not yet come into being and to establish a global market is just a hypothesis. Furthermore, so far no proof has been provided that such regional carbon markets could be of sustainable effect for emission reduction. Therefore, the envisaged market-based measures based on this hypothesis lack rationality” (MEPC 61/5/24).

In a separate submission to MEPC 61, India underlines that “It will be highly unjustified to make consumers in developing countries, who have minimal per capita GHG emission, to bear the cost of Market-Based Measures at the same rate of the citizens of developed countries that emit higher per capita emission” (MEPC 61/5/19).

China and India accept that emissions from their territories are part of the climate problem and that they need to undertake measures to reduce them (or at least diminish their growth). China is implementing an ambitious national climate program (National Development and Reform Commission, 2007), and climate change mitigation is highlighted in its recent five-year plan. However, in line with the Kyoto Protocol, neither China nor India does as yet accept to commit to binding targets. Thus it is hard to envisage that they could view their responsibility for emissions from international shipping differently unless being fully compensated.

What China and India, as well as other countries that currently are industrializing their economies need to consider is the relative change that this process, if sustained, will bring in relation to the economic strength of other countries and regions. China has for 20 years enjoyed an annual economic growth of 8-10 per cent, and the cumulative effect can now be seen. Although the average Chinese standard of living still falls well below that of North America and Europe, the gap is rapidly closing. Both in terms of GDP per capita and GDP per capita at purchasing Power Parities (PPP) China had by 2009 passed Ukraine, an Annex I country. Per capita income at PPP takes into account that the cost of many goods and services differ between countries as a result of differing levels of salaries and wages. Some regions of China, notably Beijing and Shanghai, have average GDP per capita at PPP similar to those of some European countries.⁴

Table 1 shows GDP per capita at PPP for some of the leading advocates of CBDR in comparison with the levels enjoyed by some relatively poor developed countries in 1997, the year of the Kyoto Protocol, 2009 and (as a forecast) for 2015.

⁴ Economist.com/chinacompare

Table 1. GDP per capita at PPP in current international dollars for selected countries.

| Country | 1997 | 2009 | 2015 (forecast) |
|--------------|--------|--------|-----------------|
| China | 1,847 | 6,778 | 12,449 |
| India | 1,343 | 3,015 | 4,914 |
| Brazil | 6,846 | 10,499 | 14,429 |
| Saudi Arabia | 16,535 | 23,271 | 28,721 |
| Ukraine # | 2,982 | 6,330 | 9,149 |
| Poland | 8,548 | 18,050 | 24,811 |
| Bulgaria | 5,178 | 11,183 | 16,204 |
| Rumania | 5,923 | 11,869 | 15,396 |
| Portugal | 15,574 | 22,670 | 25,759 |

1997 was a bad year for Ukraine compared, for instance, with 1992 when GDP/capita at PPP was 5,130

Source: IMF, quoted from <http://www.econstats.com/weo/V011.htm>

Being based on current rather than constant international dollars, the figures of the table should only be taken as a rough indication of an ongoing convergence. Even so, the table indicates that China now enjoys an average standard of living which is getting close to the level of some Eastern European countries at the time when they accepted obligations under the Kyoto Protocol. However, the wealth is comparatively more unevenly distributed in the developing countries displayed in Table 1, particularly so in Brazil and Saudi Arabia. The Republic of Korea, Singapore and the United Arab Emirates are, perhaps, even more obvious examples of wealthy ‘developing’ countries. They already play a bridging role between developed and developing that could be a model for emerging economies.

The difference between the two groups of countries is greater when measured as GDP per capita in constant US dollars (without PPP), but even counted this way China is likely to exceed the 1997 level of Romania and Bulgaria within about five years.

Where Saudi Arabia, in particular, and Brazil are concerned it is questionable whether in future they shall be regarded as developing countries. Their current per capita income levels at PPP are respectively 23,271 and 10,499 international dollars. The typical level for poor developing States is between 1,000 and 2,000 (e.g. 1,487 for Bangladesh and 1,520 for Ghana in 2009). Saudi Arabia sits on \$440 billion in foreign reserves⁵, equivalent to \$ 18,000 per citizen and guest worker. Among the group of four countries strongly advocating the CBDR principle, only India has a genuinely low average GDP per capita.

⁵ The Economist March 5th 2011, p.44.

Interesting, in the Saudi Arabian context, is that the economic impact on most developing countries from the OPEC cartel's influence on crude prices is a great deal higher than that which could potentially result from a market based instrument for curbing emissions from international maritime transport.

When India (MEPC 61/5/19) says that "It will be highly unjustified to make consumers in developing countries, who have minimal per capita GHG emission, to bear the cost of Market-Based Measures at the same rate of the citizens of developed countries that emit higher per capita emission", it disregards the fact that many million inhabitants of developing nations enjoy a standard of living similar to that of middle class Europeans. Most of the finished goods imported by developing countries are either purchased by rich citizens or by the state (including military equipment). Citizens who subsist on one or two dollars a day rarely buy commodities produced abroad. However, they may partially depend on imported grain.

The developing countries do not only gain on the developed countries with regard to income, they gradually also get closer in terms of CO₂ emissions per capita. Table 2 shows the situation in 2008 for CO₂ emissions from fuel combustion. The averages for Annex I and non-Annex Parties was respectively 10.9 and 2.7 tons.

Table 2. Per capita CO₂ emissions from fuel combustion in selected countries.

| Country | Annex I Party | Ton CO ₂ per capita | % change 1990-2008 |
|----------------------|---------------|--------------------------------|--------------------|
| Australia | X | 18.5 | 22.0 |
| United States | X | 18.4 | -5.6 |
| Saudi Arabia | | 15.8 | 60.3 |
| Russia | X | 11.2 | -23.7 |
| Republic of Korea | | 10.3 | 92.8 |
| Germany | X | 9.8 | -18.3 |
| Japan | X | 9.0 | 4.7 |
| United Kingdom | X | 8.3 | -13.3 |
| Iran | | 7.0 | 111.8 |
| South Africa | | 6.9 | -4.2 |
| France | X | 5.7 | -5.2 |
| China | | 4.9 | 149.9 |
| Romania | X | 4.2 | -41.9 |
| Mexico | | 3.8 | 17.5 |
| Turkey | X | 3.7 | 61.0 |
| Thailand | | 3.4 | 145.6 |
| Brazil | | 1.9 | 46.2 |
| India | | 1.3 | 80.0 |
| Ethiopia | | 0.8 | 96.7 |
| Nigeria | | 0.4 | 12.1 |
| World average | | 4.4 | 10.3 |

Source: IEA (2010)

China and India, who think that the developed countries should take full responsibility for their historic and current emissions, may have overlooked the fact that what constitutes the imports of one country, are viewed as exports by another country. Thus, if, for instance, the United States is to take responsibility for shipping emissions caused by the import of goods from China, it will to a small (and in most cases insignificant) degree harm the Chinese export industry. However, if China takes this as an excuse for exempting these emissions from the obligations enforced on the developed countries by the Kyoto Protocol's Article 2.2, a substantial part of international shipping emissions related to economic activities in Annex I countries will be removed from the agenda.

Countries that industrialized early have, no doubt, caused huge emissions of greenhouse gases and are responsible for most of the accumulated atmospheric concentration. The exact relevance of historical emissions may, nevertheless, become a matter of dispute. Even though the emissions caused by historical activities in different countries, based on trade statistics, can be estimated with some degree of certainty, the accumulated emissions may only partially be relevant for identifying their climate "debt" and for making international agreements on how to split the burden of reducing current and future emissions. Two aspects easily come to mind.

The first concerns national responsibility for historic mistakes. A significant part of the accumulated emissions caused by the developed countries were released in times when the risk of climate change was yet unknown. However, where emissions that happened after, say 1980, are concerned, the precautionary principle should apply. Particularly tricky in this context is how to view the large emissions caused by the Soviet Union and other planned economies as a result of mismanagement and lack of democratic institutions.

Leapfrogging is another aspect of this subject. Countries that currently are in a fast process of development build their industrialization to a large extent on technological innovation that took place in countries that developed early. As a result China, India and Brazil are today much more advanced than the United States or Great Britain were at the same stage of development (expressed as GDP per capita). This is particularly evident in many energy-intensive applications. Today's machinery, power stations, vehicles, computers, household appliances and light bulbs all require much less energy per unit of output than equipment of the same type did 40 or 60 years ago. Without access to technologies that were developed in the industrialized nations over many decades, growth and modernization in developing countries would take much longer and result in larger emissions.

The picture is further complicated by the fact that raw materials, intermediate products and finished goods that are traded across borders have required energy for processing and fabrication. The emissions caused in that process are registered as part of the inventory of the exporting country. By becoming the main factory of the world and a large exporter of consumer goods, China has relieved importing nations of large emissions of greenhouse gases. A study by the Tyndall Centre for Climate Change Research estimates that roughly 23 per cent of the

greenhouse gas emissions in China are generated in the production of goods exported to other countries (Wang & Watson, 2007). However, China is also a major importer of goods (and raw materials) so the net-effect is smaller.

China and India are not convinced that CBDR can be achieved by combining equal treatment of all ships (regardless of flag) with financial compensation to developing countries. By disregarding the positive effects from such transfers on the economies of the least developed countries they run the risk of creating a conflict among different groups of developing nations. According to University of Cambridge et al (2009), the impact of global emissions trading in the shipping sector on the export and import volumes of developing countries would be close to zero in most scenarios. Impacts on import prices on food and agricultural products would be small even at a relatively high emission allowance price. This picture is confirmed by Faber et al (2009), IMO's Intersessional Correspondence Group (MEPC 59/INF11), Vivid Economics (2010) and Faber et al (2010).

In their expert report on behalf of the IMO, University of Cambridge et al (2009) underline that compensation funded by a market based instrument for international shipping can have a positive impact on the economies of the Least Developed Countries (up to 2.46% increase in GDP). In addition the developing countries would benefit from the shipping industry's purchase of CDM credits, most of which will come from projects in China and India.

In addition, as noted by Faber et al (2010), the impact on developing countries may, for two reasons, be smaller than spontaneously anticipated. First of all, ship movements to developing countries are often in ballast. The most obvious example is crude tankers. In this case freight rates are set so that developed countries pay for both the transport and the return voyage. Secondly, when there is trade in two directions, it is often unbalanced. Freight rates in the direction where demand is highest are typically higher than rates in the opposite direction. This can be explained by Ramsey pricing. Container shipping between China and Europe is one example where the load factor is a great deal higher on trips from China than on journeys that originate in Europe.

As a responsible power, China today participates actively in the international legal system and has shown itself capable of balancing between rights, responsibilities and obligations (Wang and Hu, 2010). It would be highly surprising if China could not, in dialogue with other Parties, find the right balance with regard to CBDR and the equal treatment of all ships. China's and India's conclusion in the submission mentioned above is that, "Although the best approach to allocate or differentiate the emission from international shipping on a country-by-country basis are still not available, IMO should draw on its expertise to establish an expert group to study on how to apply the principle of "common but differentiated responsibilities" to the reduction of emissions from international shipping" (MEPC 61/5/24).

9. The role of leading Annex I countries

A problem in the context of finding common ground on market based measures is lack of consensus among the countries that are primarily responsible according to the Kyoto Protocol's Article 2.2. Some of the member states of the European Union favour emissions trading, while others prefer a levy that finances a fund with the objective to buy emission credits that can offset emissions above a certain baseline. The United States wants a "Ship Efficiency and Credit Trading" scheme, and Japan favours a particular variant of levy and fund where only substandard ships are subject to a fee (GHG-WG 3/3/2). In short summary (based on MEPC 61/5/39), the three main options are the following:

1. An International Fund for Greenhouse Gas emissions from ships (GHG Fund), proposed by Cyprus, Denmark, the Marshall Islands, Nigeria and IPTA (MEPC 60/4/8), would establish a global reduction target for international shipping, set by either UNFCCC or IMO. Emissions above the target line would be offset largely by purchasing approved emission reduction credits. The offsetting activities would be financed by a contribution paid by ships on every tonne of bunker fuel purchased. It is envisaged that contributions would be collected through bunker fuel suppliers or via direct payment from shipowners. The contribution rate would be adjusted at regular intervals to ensure that sufficient funds are available to purchase project credits to achieve the agreed target line. Any additional funds remaining would be available for adaptation and mitigation activities via the UNFCCC and R&D and technical co-operation within the IMO framework.

Among the members of the European Union, Greece has in a separate submission also declared its support for the Fund (MEPC 60/4/49).

Another type of fund has been suggested by Japan and World Shipping Council (WSC). In the Efficiency Incentive Scheme (EIS), fees would be paid only by ships that fail to meet a specific efficiency standard. The rate of the fee would be graduated for the degree to which the vessel's efficiency falls short of the standard. No credits would be provided to ships that meet the standard by a margin. Collected funds would go to an independent international fund and be allocated to further in-sector emission reductions through research and development projects (GHG-WG 3/3/2). No compensation would be provided to developing countries.

2. The Global Emission Trading System (ETS) for international shipping proposal by Norway (MEPC 61/4/22) – would set a sector-wide cap on net emissions from international shipping and establish a trading mechanism to facilitate the necessary emission reductions, be they in-sector or out-of-sector. The use of out-of-sector credits allows for further growth of the shipping sector beyond the cap. In addition the auction reve-

nue would be used to provide for adaptation and mitigation (additional emission reductions) through UNFCCC processes and R&D of clean technologies within the maritime sector. A number of allowances (Ship Emission Units) corresponding to the cap would be released into the market each year. It is proposed that the units would be released via a global auctioning process. Ships would be required to surrender one Ship Emission Unit, or one recognized out-of-sector allowance or one recognized out-of-sector project credit, for each tonne of CO₂ they emit. The Norwegian ETS would apply to all CO₂ emissions from the use of fossil fuels by ships engaged in international trade above a certain size threshold. The proposal also indicates that limited exemptions could be provided for specific voyages to Small Island Developing States.

The United Kingdom (MEPC 60/4/26) and France (MEPC 60/4/41) have submitted proposals for emissions trading that are very similar in most respects to the global ETS proposal by Norway. Germany has also made several submissions of a similar character (although not mentioned in MEPC 61/5/39), some of them jointly with France and Norway. Recently, the UK has submitted a proposal for implementation of an emissions trading system in two phases (GHG-WG 3/3/8), both of which would have global coverage.

3. The United States proposal to reduce greenhouse gas emissions from international shipping, the Ship Efficiency and Credit Trading (SECT) (MEPC 60/4/12), is designed to focus emission reduction activities just in the shipping sector. Under SECT, all ships, including those in the existing fleet, would be subject to mandatory energy efficiency standards, rather than a cap on emissions or a surcharge on fuel. As one means of complying with the standard, SECT would establish an efficiency-credit trading programme. The stringency level of these efficiency standards would be based on energy efficiency technology and methods available to ships in the fleet. These standards would become more stringent over time, as new technology and methods are introduced. Similar to the EEDI, these efficiency standards would be based on a reduction from an established baseline and would establish efficiency standards for both new and existing ships. The SECT is designed to achieve relative GHG reductions, i.e. reductions in emissions per tonne mile and not to set an overall target for the sector.

The obligations of the developed countries to provide adequate financing, technology and capacity-building to the developing countries (MEPC 61/5/24) is a key element in any attempt to bridge the current gap between the positions taken by developed and developing countries. In this respect the proposals made to MEPC from different Annex I countries are not equally promising. The schemes proposed respectively by the United States and Japan (jointly with WSC) would not generate any net revenue that could be employed in funds for assisting developing countries.

The levy and Fund proposed by Denmark et al would increase demand for CDM credits to the benefit of some developing countries but (unless a very high rate) create only a limited sur-

plus to be transferred to the least developed nations. However, the real rate of the levy could potentially be raised from time to time to compensate for increasing carbon prices and a growing need to offset emissions as the cap/baseline is lowered over the years. If the level of the levy is kept constant, based on the average expected cost of buying emission credits over a longer period of time, the excess revenue will initially be large but decline over time. It is also important to recognize that demand for fuel is likely to be much more affected by price than by the levy. High bunker fuel prices will depress demand and thus diminish the amount of emissions that need to be offset, while low prices (all else equal) will require more emissions to be offset by credits. The price of credits will, of course, also be affected by changes in overall demand and the price of fuel.

These uncertainties suggest that a carbon reduction system based on levy and fund has to be designed in an adjustable manner to allow incorporation of carbon market changes. On the other hand the designed scheme has to be transparent and predictable to enable long-term investment in low-carbon technology by the industry (University of Cambridge et al, 2009).

In the case of emissions trading it is somewhat easier to predict the amount of money that can be used for compensating the developing countries. University of Cambridge et al (2009) found that 100 per cent auctioning of allowances under a common cap covering 98 per cent of international shipping and a price in 2020 of \$56 per ton CO₂ would generate \$41 billion. In addition credits from the Clean Development Mechanism or its successor can be used to cover the demand for extra allowances, the majority of which would be purchased from China and India. The authors propose that 95 per cent of the grand total should be used for transfers to developing countries, and the remaining 5 per cent be set aside for the administration of the system (2%) and grants to international shipping R&D (3%).

Even if the CO₂ price would be only half of that suggested in University of Cambridge et al (2009), which is more likely in the short to medium term, the amount of revenue potentially being available for compensation would be significant. A positive aspect of emissions trading is that the need for compensating developing countries and the ability to do just that are both closely linked to the price of carbon. So long as the price of allowances is low, the negative effect on the developing countries is small, and as increasing prices put more pressure on these economies, the proceeds from auctioning the allowances will also grow. However, over time the net revenue may shrink as a result of the cap being gradually tightened, but this would only happen in a case when the increase in allowance price was too small to compensate for the loss of volume.

The third intersessional meeting of the IMO's GHG Working Group noted that some delegations indicated a preference for certainty in emission reduction whilst other delegations opted for certainty in price and cost (GHG-WG 3/WP.1)).

The chance to overcome the leading developing nations' resistance to the idea of a world-wide market based scheme is crucially dependent on the ability among Annex I countries to agree on one market based measure and to make clear that substantial proceeds from that in-

strument will be allocated to the developing countries, and in particular to the least developed among them. In the absence of an agreement among Annex I countries that clearly honours the CBDR principle, the current dead-lock will remain.

10. “Acting through the IMO”

As mentioned above, the Kyoto Protocol requests the Parties included in Annex I to pursue limitation or reduction of emissions of greenhouse gases from aviation and marine bunker fuels, working through respectively the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO).

To “work through” IMO is not the same as limiting the outcome of IMO’s decision-making process to application to Annex I countries exclusively (IMO, 2009). Important in this context is that when China and other developing countries underline that the high concentration of greenhouse gases is the result of cumulative emissions from activities related to the development of the Annex I countries, they clearly do not distinguish between goods carried by ships registered in industrialized countries and those carrying other flags.

Neither can the notion that Annex I countries should work “through” the IMO be taken to mean that non-Annex I States should be prevented from participating in the decision making process. Treaties adopted by the IMO apply to all Parties; even though the possibility exists that only Annex I countries would ratify a treaty on greenhouse gas abatement. Any other interpretation would imply that only Annex I countries should be allowed to be involved in the negotiations of greenhouse gas emission measures within IMO (IMO, 2009).

India claims that the IMO lacks the competence to decide on market based measures (GHG-WG 3/WP.1) but the way that Article 2.2 of the Kyoto Protocol is phrased does not indicate that the UNFCCC had the intention to restrict in any way IMO’s choice of measures or instruments.

In this context it is important to recall that IMO’s competence to initiate a global instrument for abatement of greenhouse gas emissions from ships does not derive from the Kyoto Protocol. IMO’s basic competence comes from the United Nations Convention on the Law of the Sea (UNCLOS) and the IMO Convention, which in no way exclude the organization from taking action on greenhouse gases. Protection of the sea is a main objective of UNCLOS and emissions of greenhouse gases are a threat to the ocean both directly and indirectly. Therefore, on objective ground, there would be cause for IMO to act even in the absence of a convention on climate change.

A significant part of the emissions caused by international shipping takes place on the high seas outside of the jurisdiction of any country. Here only UNCLOS and those IMO conventions that have been ratified by member States apply (Heitmann and Khalilian, 2010). This

must have been the main reason for UNFCCC to identify IMO as the proper forum and to request that the Annex I countries should work through the organization. The individuals that drafted Article 2.2 of the Kyoto Protocol and the Parties that ratified it certainly were aware of that the principle of no more favourable treatment applies to all actions taken by IMO. The fact that the IMO Convention went into force in 1958 and that UNCLOS was adopted in 1982 give those conventions precedence over UNFCCC unless clearly stated in the latter and its Protocol that new and different principles shall apply. Important in this context is also that most Parties to the Kyoto Protocol are also Parties to UNCLOS and IMO.

Although UNCLOS Article 207 specifically recognizes the CBDR principle in cases of pollution from land-based sources, it does not differentiate between ships of developed and developing countries in Articles 211 and 212, which deal with vessel-source marine pollution and marine pollution from or through the atmosphere. Unlike Article 207, Articles 211 and 212 do not take into account the economic capacity of developing states in establishing global rules and standards for the protection of the marine environment. This is a clear recognition of the fact that imposing different types of pollution standards on the basis of the nationality of ships is a technically impossible proposition in the international shipping arena (Karim and Alam, 2011).

The language of UNFCCC Article 3.5 is similar. It says that Parties shall cooperate to promote a supportive and open international economic system and that “measures taken to combat climate change, including unilateral ones, should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade”. Enforcing differing rules on ships depending on their choice of flag would clearly be regarded as an act of discrimination.

In summary, it is clear that any greenhouse gas obligation enforced by IMO must apply to ships regardless of flag. The CBDR principle cannot, in the context of UNCLOS and IMO, be taken to mean that a regulation should affect ships registered in Annex I countries only. A universal approach must be pursued to avoid free-riding. The meaning of the Kyoto Protocol must be that Annex I countries shall act through IMO and that Non-Annex I countries when exercising their rights under the IMO Convention shall support them rather than trying to prevent them from taking responsibility.

The Kyoto Protocol’s Articles 2.3 and 3.14 state that the Parties included in Annex I “shall strive to implement policies and measures” “in such a way as to minimize adverse effects, including the adverse effects of climate change, effects on international trade, and social, environmental and economic impacts on other Parties, especially developing country Parties and in particular those identified in Article 4, paragraphs 8 and 9, of the Convention, taking into account Article 3 of the Convention” (e.g. the least developed and the most vulnerable countries).

When CBDR cannot be implemented by applying differing rules on ships depending on their choice of flag, the Parties need to use other means for protecting the interests of the developing countries. In principle, two ways of achieving differentiated responsibility remain:

1. Global application with economic compensation to Non-Annex I Parties
2. Regional application with or without compensation to third Parties

Any scheme to be endorsed by IMO would have to be evaluated against the nine criteria that global policies should meet, as set by MEPC 57. These criteria state that market-based measures should be:

1. Effective in contributing to the reduction of total global emissions of greenhouse gases.
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 prescribing 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.

MEPC 57 decided by an overwhelming majority to take these nine principles as its reference for the continuing debate on GHG emissions from international shipping and also for further reflection when the nature and form of the measures to be taken were clearer (MEPC 57/21). However, there was significant debate on the second of these principles. While there was consensus on all other principles, the Committee could not achieve consensus on principle 2. At MEPC 58, Australia and eight other Parties, including Japan and the United States, tried to add to principle 2 that it should be applied “without this requiring States to accept similar regulations/standards in other fora” (MEPC 58/4/16).

11. CBDR under global application

Submissions by different Annex I countries, and assessment by experts and academia, show that global application is possible for all proposed market-based instruments, i.e. for Levy and Fund (Denmark et al), Maritime Emissions Trading (Norway et al) and Ship Efficiency and Credit Trading (USA). However, the latter does not produce any proceeds that can be used for compensating developing nations.

Applying CBDR to a global scheme requires compensation to all or some developing countries. IMERS, AFG (2010) and Faber et al (2010) have shown in principle how this could be done. These studies suggest that about one third of the proceeds of a globally applied levy or emissions trading scheme would suffice for compensation to all non-Annex I countries based on no net incidence. However, this is just a starting point. Economic incidence impacts are complex and will depend on the relative elasticities of supply and demand for: a) exporters; b) importers; and c) freight service providers. Furthermore, economic incidence will vary for different countries and for different goods depending on the industry structure in both the exporting and importing country (AGF technical report 2, 2010).

Among the issues that need to be clarified are the exact grounds for compensation, i.e. a formula that can be applied to all countries or formulas to be applied to different categories of States. The basic choice is between distinct categories (Annex I or non-Annex I) and parametric values (CO₂/capita, GDP/capita, etc). The three boundaries for differential treatment identified by Rajamani (2006) are relevant in this context (see section 3 above). The UNFCCC's Articles 4.8 and 4.9 may be taken as recognition of the need for some graduation.

Another main issue is the duration of the compensation rules. As highlighted in an earlier section of this paper, the non-Annex I countries are at differing stages of development. Some of them are quite advanced and have already passed the least developed Annex I countries in terms of GDP per capita. Others will in the near future catch up with them. Given that climate change mitigation and adaptation will be on the political agenda for at least the next half century, a decision in the near future on compensation would either have to include a differentiation based on objective principles or rules on when and how IMO should renegotiate the terms in order to take account of the development of individual nations since the first decision was made. As the latter alternative may turn out to cause new lengthy discussions and negotiations, it may be worth considering ways of achieving sustainable rules from the very beginning. If so, they need to take account of parameters that are relevant in the context of CBDR and for which reliable data are available or can become accessible at reasonable effort and cost. Parameters such as GDP per capita at PPP, emissions per capita, emissions intensity and accumulated GHG emissions may be considered. It may well be that the choice of one single parameter provides a too limited scope and that the outcome will be viewed as unfair by some stakeholders (Winkler et al, 2002).

Political acceptability will partly depend on the use and distribution of revenue. In this regard AGF divides the revenues into two broad categories: the first being transfers to compensate developing countries for incidence impacts; and the second transfers to enable action on climate change in developing countries. However, the submissions to MEPC made by the United States, Japan, the Republic of Korea and World Shipping Council highlight the need for support for technological renewal covering both new buildings and retrofitting of existing ships. One reason for this, and for a mandatory EEDI, is market failures caused by institutional barriers such as divided responsibility and split incentives between ship owners and charterers with regard to implementing fuel saving projects that require capital investment. Some of the

proceeds may thus be needed for the purpose of making optimal use of the technological opportunities as recognized in the seventh of the nine guiding criteria adopted by MEPC 57: “Supportive of promoting and facilitating technical innovation and R&D in the entire shipping sector”.

Having identified at least three worthy causes, there are grounds for asking whether the proceeds of respectively auctioning allowances and raising funds by a levy will suffice.

In the case of emissions trading, the revenues from auctioning will by definition exceed the cost of compensation so long as no allowances are given away for free. Based on the literature referenced above, no net incidence is not expected to consume more than a third of the proceeds. However, one should recognize that besides buying emission allowances and/or emission credits, ships may also pay for measures onboard so long as they are less expensive than buying additional credits. Even so, the revenues from auctioning should suffice by a margin. The amount of money that can be used for other purposes depends on the number of countries that will have to be compensated, the number of allowances auctioned and the price of CO₂. The price of allowances used in the EU ETS is currently around €15 per ton CO₂ but is expected to rise as the cap is gradually lowered (-21% by 2020). If a METS is linked to the EU ETS, the future price will depend on the marginal abatement cost in different sectors and the accessibility and cost of CO₂ credits from projects in developing countries. Lowering the caps will mean fewer allowances on sale but will at the same time contribute to rising prices. The overall revenue may not be much affected but the share needed for compensating developing countries will rise in line with increasing costs (as long as the number of countries and their share of world trade remains constant).

The case of a levy is more complicated to assess as the proceeds depend on the rate. For maximum carbon abatement efficiency, the rate of the levy should reflect the global price of CO₂ (AGF technical report 2, 2010). However, if most regions and sectors prefer levies or taxes to emissions trading, the global price will be set by the EU ETS, which is currently the only existing cap and trade system of size. In the case where the rate is set a level considerably below the price of carbon, which, judging from the examples provided in submissions to MEPC is what the proponents may aim for, then the system will not provide much surplus in the longer term. Initially, when the baseline or cap is only marginally exceeded, the proceeds will cover both the cost of offsetting excess emissions and providing compensation. However, when the cap is lowered and the price of carbon rises, the levy will have to be raised to cover both categories of expenditure.

However, in the case where the levy does not fund the purchase of emission allowances or credits to match any excess of a baseline or cap, more money will, of course, be available for other purposes. Under such circumstances, in theory an ETS and fuel levy can raise the same revenue for a given rate. However, in the longer term, the ETS may in practice raise less money, given declines in its cap over time. The fuel levy (set at the world offset price) and the ETS (capped at the same offset price) would raise the same up until the ETS cap is hit. After

this point the proceeds of the ETS would fall behind those of the levy, as the maritime sector will purchase any further permits necessary from the global carbon market, resulting in revenue leakage from the sector. By contrast, under a fuel levy, ships would pay the levy for all emissions from the sector (AGF technical report 2, 2010).

In the end, a decision on CBDR will be the result of political negotiation. In order to make the Parties better prepared for decision making, it may be a good idea to establish an expert group, as proposed by China and India (MEPC 61/5/24), to look into the details of how to apply CBDR to the reduction of emissions from international shipping, including the longer term implications.

12. CBDR under regional application

From the UNFCCC's preamble, that recognizes "the need for developed countries to take immediate action in a flexible manner on the basis of clear priorities, as a first step towards comprehensive response strategies at the global, national and, where agreed, regional levels that take into account all greenhouse gases, with due consideration of their relative contributions to the enhancement of the greenhouse effect", it is clear that a regional solution could be acceptable as a first step. A similar opportunity is provided in MARPOL, which grants Parties a possibility to nominate certain parts of the sea to be designated as an Emission Control Area (ECA) where particularly stringent standards apply (regardless of flag). This means that a second best option would be to create a scheme that is applied to certain countries or regions or to certain routes. CBDR is in this case achieved by the partial application in itself, possibly combined with a comparatively limited transfer of money to compensate third Parties.

One option could be to allow all transport by ship that is carried out on behalf of customers in Annex 1 countries to be subject to a levy or alternatively emissions trading or a special ship efficiency standard (with or without credit trading). If transport carried out for customers in developing countries is not affected there would be no absolute need for the scheme to raise funds that can be used for compensating them. However, problems may occur with regard to defining who the real customer is. As noticed above, import by one country is export viewed from the port of departure. To use this option probably would require a decision to legally characterize all goods imported by Annex I countries as being part of the obligations under the scheme and to regard all goods carried from an Annex I country to a developing country as not being subject to the scheme. A potential problem in this context is that some ships on a long journey may stop at intermediate ports.

An important difference between Levy/Fund and emissions trading on the one hand, and mandatory efficiency standards, on the other, is that the former two would take account of emissions during the entire journey while the latter focuses on the technical and operational standard of the ship. In practice this means that the proposals by the United States and Japan/WSC can only be implemented by ruling that ships that call at the ports of Annex I coun-

tries must comply. As it would be very expensive (and counter-productive in terms of GHG abatement) to use different ships for imports and exports, the scheme would in most cases apply not only to shipments between Annex I countries and to ships carrying goods to them from third countries but also to the shipping of goods from them to Non-Annex I countries. With almost universal coverage and no proceeds that can be used for compensating third Parties, these options are likely not to be acceptable to the developing nations.

The Levy and the Maritime Emissions Trading Scheme can more easily be geographically differentiated but they are, on the other hand, more vulnerable to evasion. The most apparent risk is that hubs are created in developing countries in the vicinity of a participating country. By calling at such ports a ship can shorten the leg of a longer journey that would be subject to a regional scheme. However, this is likely to happen at the expense of additional port cost and loss of time. Lack of suitable ports that can facilitate large tankers or container vessels may be another restraint. However, if a short stop at a quay somewhere along the Suez Canal would count as an intermediate port call, it may pay off.

It was to prevent or limit evasion of this kind that Kågeson (2007) suggested that in a scheme of only partial geographical coverage, it would be necessary to make ships liable for emissions from fuel bunkered up to three or six months prior to a call at a participating port. With this design, emissions from the return voyages of ships involved in intercontinental traffic would automatically be covered, and shipowners and operators would gain nothing by calling at ports just outside a participating country or region. The geographical scope would thus be global, albeit limited to ships that call at ports of the participating states. A problem, though, is that this model would provide equal treatment to export and import of goods from third Parties.

The huge impact on the costs of infrequent visitors is another obstacle. One way of getting around this problem would be to allow ships that make a single stop in a participating port an opportunity to declare its emissions for the trip (rather than a period of time) based on relatively high default values. In order to find a compromise that would be acceptable to all Parties there may be cause to try different varieties of the idea of a time-limit.

However, a time-limit may not be sufficient in the case of Levy and Fund as the levy applies to fuel purchased rather than to emissions caused. It would have to make fuel providers all over the world participate, in response to a market demand, and in a fraud-proof manner. To make a time limit work with limited risk of evasion, both emissions trading and a levy should reflect journey emissions rather than fuel bought. That implies a tax or charge on CO₂ rather than a levy per ton fuel.

An alternative to a time limit may be to rule that a ship calling at a participating port is liable for the emissions caused by the journey from the departure port where most of the cargo was laden. However, this could potentially create problems with regard to freight liners used on, for instance, a triangular route that involves ports in both developed and developing countries.

Yet another possibility would be to include emissions from all journeys between Annex I and non-Annex I countries but at half the nominated level that applies to emissions caused by traffic between Annex I countries. This would make extension of the scheme's geographical coverage easy and would limit the benefits of trying to evade the system by calling at intermediate ports.

12.1 A regional scheme that can expand gradually

As noted in earlier sections of this report, the practical meaning of CBDR will change over time as a result of diminishing differences in emissions per capita and increasing capacity among non-Annex I Parties to abate greenhouse gas emissions. Progressive industrialization will allow China, Brazil and other successful countries to take on new obligations.

Berk & den Elzen (2001) talk of a scheme of '*increasing participation*' when the number of Parties involved and their level of commitment gradually increase according to participation and differentiation rules such as per capita income or per capita emissions. The regime can be developed into a multi-stage approach by extending the number of stages or levels of participation for groups of countries. For domestic emissions Höhne et al (2006) propose a scheme in the form of *common but differentiated convergence* aimed at equal per capita allocation of emission allowances by 2050. All Annex I countries would participate from start and the individual non-Annex I countries would enter the convergence process from the date when their per capita emissions reach a certain percentage threshold of the (gradually declining) global average.

It may not be a task for IMO to decide which rules or thresholds shall apply for regarding a country candidate for a new stage of commitment; it is rather a matter for UNFCCC. However, even in the absence of such rules, IMO can create a scheme which is open for gradual expansion to new Parties.

Kågeson (2008) envisaged three possible stages of development when global coverage, for political reasons, cannot be achieved from the start:

1. A scheme endorsed by IMO and UNFCCC that is open to voluntary participation by states and ports;
2. An IMO/UNFCCC scheme covering all traffic to ports in Annex 1 countries;
3. An IMO/UNFCCC scheme covering traffic in all parts of the world.

If all Annex I countries can agree on a common scheme, the first of the three stages listed above would, of course, be superfluous.

During stage 1 and 2 ships sailing only to participating ports would have to make sure that they have always submitted allowances enough to match the fuel burnt. In the case of a time-based scheme, the same would apply to frequent visitors who regularly return to such ports. In the case of the Fund, the levy for such ships could be calculated on the basis of emissions emitted. Infrequent visitors would be allowed to call at participating ports after having regis-

tered the ship and surrendered CO₂ allowances or paid a levy equal to emissions caused during the prescribed number of weeks prior to the call.

In an alternative case when the liability is limited to emissions caused on the journey from the port where most of the goods were laden, all ships that sail from non-participating States, would have to calculate and declare emissions on each arrival at a participating port.

With universal coverage (the final stage) there would be no need to distinguish between emissions caused on different voyages or part of voyages as the liability would cover traffic to all ports of the world.

The issue of compensating the third countries for the effect on their economies is, of course, less relevant in a scheme limited to Annex I countries than to a scheme of global coverage. It is therefore an open issue to what extent, if at all, the revenues should be used for abatement and adaptation in developing countries. However, it may nevertheless be in the interest of the developed countries to allocate most of the proceeds to funds under UNFCCC as the revenue is money without an obvious owner and many of them suffer from huge budget deficits that may make it difficult for them to honour their pledge under the Copenhagen Accord to provide \$100 billion per year to the developing countries.

The system could over the years be gradually extended to include ports in advanced developing countries. To facilitate the entry of new participants, it is essential to design the scheme in a way that makes it easy to include additional countries and ports. When this happens the system must be able to adjust the cap accordingly and allow newcomers a proportional influence over the scheme and its proceeds.

12.2 Endorsement by IMO

If IMO has to consider a second best option and try to establish a scheme where CBDR is achieved through regional application, it is most likely the result of not having been able to agree on the first best solution, i.e. a global scheme. In such a case IMO may have to depart from taking a unanimous decision. All IMO treaty instruments have so far been adopted by consensus. However, Article 57 of the IMO Convention allows the Assembly and all other bodies of the organization to take decisions by majority vote. As each member has one vote, there is a possibility for Annex I States and the least developed countries to jointly enforce a global market based scheme designed as to make the latter net-beneficiaries. However, China and India may have only two votes in the IMO, but they do represent nearly 40 per cent of the world's population, and they are supported by a number of other developing countries.

12.3 Agreement among Annex-1 countries and other advanced economies

As already high-lighted, the developing countries are by no means the only hindrance for an IMO consensus decision. Differing views and degree of commitment among the Annex I countries is another hurdle to overcome.

Among the three options considered by major Annex I countries, Davidson et al, (2010) conclude that an emissions trading scheme is the most effective and the most cost-effective global MBM. It also scores well on most of the other criteria. The GHG fund is slightly less effective and less cost-efficient, because it does not incentivise the shipping sector to implement all cost-effective abatement options. The Baseline-and-Credit Scheme is less effective because it does not have an emissions cap, and less cost-effective because it does not incentivise all cost-effective abatement options and is closed to trade with other sectors and the CDM.

The final conclusion in the expert report by University of Cambridge et al (2009) for the IMO is that the modeling estimates derived from their study provide support to Kågeson (2007) and show that an international emissions trading scheme can be implemented in line with the coverage of IMO's main treaties (no more favorable treatment) covering both Annex I and non-Annex I countries. At the same time the scheme can meet the UNFCCC (Article 3) principle of common but differentiated responsibilities (CBDR) through distribution of revenues raised". Faber et al (2010) arrive at a similar conclusion in an assessment on behalf of the German Environment Protection Agency.

However, these are conclusions by experts and academia. In order to find common agreement, Parties to the IMO may have to consider second or third best options. Emissions trading may be less convincing in a regional context. When a scheme is limited to Europe, Davidson et al (2010) conclude that the inclusion of shipping emissions in the EU ETS and a European tax on shipping emissions would be equally effective and cost-effective. However, as unanimity amongst EU Member States is required for a harmonised tax, they believe that inclusion in the EU ETS may be politically more feasible. Assessments by Faber et al (2009) on behalf of the European Commission, and Bäuerle et al (2010) for the German government, show emissions trading to be the most efficient option for the European Union, even in a case when having to act alone.

For reasons provided in an earlier section of this report, a Baseline-and-Credit Scheme would not work on a regional level, and would not provide any proceeds that, if enforced globally, could be used for compensation. The same is true for the EIS proposed by Japan and WSC. That essentially leaves the Annex I Parties with three options for a regional model if they want this model to gradually expand into global coverage:

1. A Maritime Emissions Trading Scheme (METS);
2. A Cap and Fuel Levy scheme;
3. A charge on carbon emitted from ships.

In designing a scheme intended for gradual expansion, the Parties need to consider the practical consequences of new participants entering the system. Expansion may have consequences beyond having to alter the cap (if there is one). The redistribution of revenues is also likely to be affected. In order not to complicate expansion, the scheme should ideally be designed to automatically, without additional decisions by the Parties, adapt to the new situation.

In order to convince the developing countries to endorse the scheme and to accept their future accession, the Annex I Parties will have to present a key for the redistribution of revenues, perhaps along the lines proposed by IMERS, and make sure that enough money is raised to satisfy the needs of the developing countries (in combination with other sources). A problem in this context is that the proceeds of auctioning emission allowances can only be estimated based on uncertain assumptions, and it is even more difficult to predict the net-flow from a levy that primarily aims at financing the purchase of emissions credits that offset any overstepping of a cap.

A charge on CO₂ is more straightforward as it is predictable not only as a cost-element for the industry but also as source of revenue. Another advantage is that it could, potentially, be geographically differentiated. The down-side, of course, is that a charge would not cap the overall emissions from shipping. However, if the charge is set sufficiently high, this drawback would be of limited importance. When comparing the different options one should also be aware that the presence of a cap on shipping emissions may not be water-tight. Leaks may appear if projects from which carbon credits have been bought are not clearly additional to measures that would have been taken also in the absence of flexible mechanisms. A problem in this context is that no decision has been taken by UNFCCC on the future of the CDM.

All three options require the Parties to consider what they regard as an acceptable cost per ton CO₂ emitted. In the case of emissions trading in an open system, the cost is influenced by the size of the cap and the marginal abatement cost in the entire system. With a levy, the cap becomes even more decisive as it determines the amount of emissions that has to be offset. However in order to generate a substantial long-term net-revenue, the rate would have to be relatively high (or alternatively adjusted upwards year-by-year). In order for a charge to become as efficient as emissions trading its size should reflect the marginal abatement cost in sectors that are subject to trade.

Currently there is globally only one regional emissions trading scheme of size, the EU ETS, that in 2012 caps emissions from land-based sources and aviation at respectively 1,859 and 213 Mt. If emissions from shipping were to be included, the cap would have to be raised accordingly, and the price of carbon may be slightly affected. As long as land-based sources and aircraft are being allocated some of their allowances for free, the shipping sector may argue that it should be given a grace period as well. However, in Europe, electric trains are fully affected by the cost enforced on power producers when having to buy allowances matching their CO₂ emissions. The shipping industry has not called for grandfathering under an ETS, perhaps understanding that this would be less feasible than for land-based sources (or even aviation). A better way of compensating the shipping industry would be to allocate part of the revenue for investment in measures that reduce substantially the emissions from existing and new ships.

The risk of evasion would be much higher in a regional scheme than in a system of global coverage. This is a fact that developing countries must consider when requesting Annex I countries to take responsibility for emissions from international shipping. In the context of

differentiated responsibility, the least that developing countries, and in particular the most advanced among them, should do is to assist the developed countries in their effort to introduce a market-based instrument under the auspices of IMO.

In order to become environmentally effective, a journey carried out on behalf of customers in Annex I countries must be subject to the requirements of the regional scheme for the full length of the trip. In order to prevent evasion by ships making short stops at intermediate ports on their way to a country listed in Annex I, a regional scheme would, as already explained, need to cover emissions caused within a certain period of time prior to calling at a participating port or alternatively the emissions emitted on the journey where most of its goods were laden.

Agreeing with such an arrangement would be the developing countries contribution to curbing GHG emissions from international shipping. In return they will receive compensation, graduated for their degree of development, even ahead of themselves fully entering the scheme. However, before its accession, a developing country would only be compensated for the limited impact on its economy of ships carrying cargo to Annex I countries.

The time of a developing country's individual accession would depend on when it reaches a certain level of development, which should preferably be specified by UNFCCC or in the IMO's treaty on GHG. In this context one may observe that the Republic of Korea, Taiwan, Singapore, Saudi Arabia and the Emirates already enjoy a GDP per capita (at PPP) on par with or higher than the average of the Annex I countries.

Faber et al (2009) analyse how global shipping emissions are allocated based on departure or destination of vessels on voyages to or from certain regions. Their analysis, based on ship movement data from Lloyd's Marine Intelligence Unit, reveals little difference in emissions from ships arriving in and departing from a region. Only in the case of the EU, the amount of CO₂ emissions caused by departing ships is slightly higher than that caused by arriving ships. Comparing the regions in the case of arrival shows that Europe has the lion share with 27 per cent with North East Asia (19%), North America (12%), and Far East Asia (12%) coming next in order.

Faber et al (2010) takes this analysis a step further by distinguishing between trade to and from Annex I countries. They show that ships on route to Annex I countries account for 47 per cent (469 out of 1006 Mton) of global emissions. If non-Annex I countries with income per capita similar to those of the Annex I countries were to be included, the group of industrialized countries would clearly account for more than half of global emissions.

According to UNCTAD (2009), Annex I countries account for 69 per cent of the world fleet of commercial vessels by ownership. Adding ships owned by companies in rich countries such as the Republic of Korea, Hong Kong, Taiwan, Saudi Arabia, the United Arab Emirates and Bermuda raises the share belonging to rich countries to a total of 84 per cent.

In order to avoid unfair competition and evasion, the emission factor used (for the length of the entire journey) should be based on a satisfactory high default value unless the ship by use of a reliable and fraud-free monitoring instrument is able to show that real emissions were lower.

In order to honor their commitment to UNFCCC and the Kyoto Protocol the Annex I countries should lead the effort to find mechanisms for reducing emissions from international shipping working through the IMO. The developing countries should refrain from preventing them from undertaking this responsibility, and full participation of the more advanced among them need not be taken as a sign that they should also accept binding commitments with regard to domestic emissions. Maritime transport and aviation is a special case, where full participation of developing countries or, as a minimum, their acceptance of Annex I countries going ahead is a prerequisite for success.

13. Summary and conclusions

Conflicting views among IMO Parties on the interpretation of the principle of Common but Differentiated Responsibility (CBDR) and its precedence over or subordination to IMO's principle of equal treatment of ships has caused a deadlock in the discussions on how to meet the UNFCCC's request for measures that can reduce emissions of greenhouse gases from international shipping.

However, given the unique characteristics of international shipping, obligations aimed only at ships that carry the flags of industrialized nations are not a viable option. Neither is there precedent in any of the fifty-one IMO international treaty instruments currently in existence where measures have been applied selectively to ships according to their flag.

IMO's competence to initiate a global instrument for abatement of greenhouse gas emissions from ships does not derive solely from the Kyoto Protocol. IMO's basic competence comes from the United Nations Convention on the Law of the Sea (UNCLOS) and the IMO Convention, which in no way exclude the organization from taking action on greenhouse gases.

The conclusion is that ships compete in a global market and must be regulated at the global level for the rules to be environmentally effective (avoid carbon leakage). Several ways of reconciling equal treatment and CBRD have been demonstrated. The most obvious is to use some, most or all of the revenues of a market-based instrument for compensating and supporting the developing countries, and in particular the least developed among them. Another possibility is to provide a grace period for emissions from ships on route to non-Annex I countries by restricting the application of a market-based measure to emissions caused by ships on journey to ports in the rich countries. The geographical coverage of such a scheme could gradually widen as non-Annex I countries become more economically advanced. One can thus identify two possible ways of making equal treatment, regardless of flag and ownership, go hand-in-hand with CBRD:

3. Global application with economic compensation to non-Annex I Parties
4. Application limited to journeys to Annex I countries with or without compensation to third Parties

The chance to overcome the resistance among leading developing nations such as China and India to the idea of a world-wide market based scheme is crucially dependent on the ability among Annex I countries to agree on one market based measure and to make clear that substantial proceeds from that instrument will be allocated to the developing countries, and in particular to the least developed among them. Cap and trade appears to be the first best option for a market-based measure aimed at contributing to reduced emissions of CO₂. However, the difference in efficiency and effectiveness between emissions trading and other candidates, notably cap and levy, and CO₂ taxation, is not large enough to justify a deadlock among the Annex I countries. In this case it would be unwise to make the best an enemy of the good. In the absence of an agreement among Annex I countries that clearly honours the CBDR principle the current deadlock will continue.

Applying CBDR to a global scheme requires compensation to all or some developing countries. IMERS, AFG (2010) and Faber et al (2010) have shown in principle how this could be done based on no net incidence. However, this is just a starting point. Economic incidence impacts are complex and will depend on the relative elasticities of supply and demand for: a) exporters; b) importers; and c) freight service providers. Among the issues that need to be clarified is the exact ground for compensation, i.e. a formula that can be applied to all countries or formulas to be applied to different categories of States. The basic choice is between distinct categories (Annex I or non-Annex I) and parametric values such as CO₂/capita and GDP/capita.

Another main issue is the duration of the compensation rules. Some non-Annex I countries have already passed the least developed Annex I countries in terms of GDP per capita. Others will in the near future catch up with them. Given that climate change mitigation and adaptation will be on the political agenda for half a century or more, a decision in the near future on compensation would either have to include a differentiation based on objective principles or rules on when and how IMO should renegotiate the terms in order to take account of the development of individual nations since the first decision was made.

In the end a decision on the CBDR will be the result of political negotiation. In order to make the Parties better prepared for decision making, it may be a good idea to establish an expert group, as proposed by China and India (MEPC 61/5/24), to look into the details of how to apply CBDR to the reduction of emissions from international shipping, including the longer term implications.

In a situation where it becomes impossible to reach an agreement on a global scheme, IMO could apply a phased-in approach by alternatively endorsing a scheme that is open to volun-

tary participation by states and ports or a scheme that covers all traffic to ports in Annex 1 countries (provided, of course, that these States are able to come to a joint decision). Any regional scheme to be endorsed by IMO would have to be evaluated against the nine criteria adopted by MEPC 57. In the case of regional application, the need for compensating third Parties will be limited and depend on the extent to which emissions from journeys from them to the ports of participating Parties are subject to a cap or a levy. Most of the proceeds may in this case be used for other purposes than compensation.

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