CHAPTER 2

International Environmental Law Responsibility and its Application to the Issue of Greenhouse Gas Emissions from International Shipping

2.1 Introduction

Customary international law, general principles of law, and normative instruments have shaped and advanced the development of international environmental law, and with its evolution new norms and principles have emerged to meet new challenges.[1] One of these challenges is how to regulate greenhouse gas (GHG) emissions from international shipping. As the regulatory framework for GHG emissions from international shipping is still in the preliminary stages of its development, the application of the current or new principles of international environmental law to this issue will provide theoretical support for the further development of this framework.

This chapter examines the key principles and rules of international environmental law as reflected in treaties, binding acts of international organisations, State practice and soft law commitments, and applies them to the problem of GHG emissions from international shipping. This chapter is set out in six parts. The first part discusses the concept of 'pollution' and its relationship with GHG emissions from international shipping. The second part identifies the jurisdiction over this problem. The third part explores the environmental liability for transboundary harm caused by GHG emissions from international shipping. The fourth part examines the precautionary principle as it applies to the issue. The fifth part reviews the evolution and implications of the principle of 'Common but Differentiated Responsibility' (CBDR) and the 'No More Favourable Treatment' (NMFT) principle, and examines how to apply these principles to the problem under review. The last part seeks to identify the optimal allocation of responsibility among the relevant stakeholders in GHG emissions from international shipping in accordance with the 'Polluter-Pays' principle.

To better understand the nature of GHG emissions from international shipping and relate the problem to current treaties, the relationship between this

1 Alexandre Charles Kiss and Dinah Shelton, *International Environmental Law* (Transnational Publishers, 3rd ed., 2004) 175.

GHG emissions issue and 'pollution' will first be examined. Various law of the sea obligations will apply if the GHG emissions from international shipping come under the definition of 'pollution' in the *1982 United Nations Convention on the Law of the Sea* (*LOSC*).[2]

2.1.1 *The Concept of 'Pollution'*

There is no uniform definition of 'pollution' in international law.[3] The term 'pollution' is used with different meanings depending on differing contexts and purposes.[4] For the purpose of this book, a definition of 'marine pollution' or 'pollution of the marine environment' is examined. Treaty definitions of 'pollution', in particular 'marine pollution', have expanded over time. Among various definitions, two typically reflect a change of views over time by the international community. One example is the narrow definition of 'marine pollution' initially adopted by the Joint Group of Experts on Scientific Aspects of Marine Pollution (GESAMP) in 1969. Under the GESAMP definition, 'marine pollution' means

> the introduction by man, directly or indirectly, of substances into the marine environment (including estuaries) *resulting in* such deleterious effects as *harm to living resources*, hazards to human health, hindrance to *marine activities including fishing*, impairment of quality for use of sea water and reduction of amenities.[5] [emphasis added]

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2 *United Nations Convention on the Law of the Sea*, opened for signature 10 December 1982, 1833 UNTS 3 (entered into force 16 November 1994) ('*LOSC*').

3 See, e.g., V.S. Russell, 'Pollution: Concept and Definition' (1974) 6(3) *Biological Conservation* 157, 157; Timothy J. Sullivan, 'Environment and Enforcement: Regulation and the Social Definition of Pollution' (1984) 12(2) *Ecology Law Quarterly* 423, 423.

4 Patricia W. Birnie, Alan E. Boyle and Catherine Redgwell, *International Law and the Environment* (Oxford University Press, 3rd ed., 2009) 189; R.B. Clark, *Marine Pollution* (Oxford University Press, 5th ed., 2001) 8–9. Clark asserts that the word 'pollution' may be utilised broadly to refer to 'the environmental damage caused by wastes discharged into the sea ("inputs")', 'the occurrence of wastes in the sea ("contamination")', or 'the wastes themselves ("pollution")'. However, 'pollution' often means 'the wastes themselves' in the context of marine environment. There is also no generally accepted definition of pollution in municipal law. This issue is further discussed in next section.

5 Qing-nan Meng, *Land-based Marine Pollution: International Law Development* (Graham & Trotman, 1987) 4; Joint Group of Experts on Scientific Aspects of Marine Pollution (GESAMP), 'Report of the First Session (London, UN Doc.GESAMP 1/11, 1969)' (1969) 5.

This definition was adopted by the 1972 Stockholm United Nations Conference on the Human Environment and the *1976 Barcelona Convention for the Protection of the Mediterranean Sea against Pollution* but added the words 'or energy' after the word 'substances'.[6] The *1974 Paris Convention on Prevention of Marine Pollution from Land-based Sources* developed this definition by expanding the scope of harms to 'marine ecosystems and other legitimate uses of the sea'.[7] Generally the definitions of pollution in the above conventions encompass a comparatively narrow scope of harms to the marine environment.

Subsequently, a broader definition of pollution was adopted by treaties such as the *1979 Geneva Convention on Long-Range Transboundary Air Pollution* (*CLRTAP*),[8] and the *1982 LOSC*.[9] Under this later definition, 'pollution (of the marine environment)' refers to

> the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which *results or is likely to result in* such deleterious effects as *harm to living resources and marine life*, hazards to human health, hindrance to *marine activities, including fishing and other legitimate uses of the sea*, impairment of quality for use of sea water and reduction of amenities.[10] [emphasis added]

Through the comparison of the above italicised parts, we can find that the second definition of pollution represents at least two improvements on the first one. In the first place, the definition in the *LOSC* also includes the risk of harm to ecosystems, endangered species and other forms of marine life while the first one only refers to actual harms. This approach is more consistent with the precautionary principle,[11] and can be deemed as an advance on the ground that it can better protect the environment or human health from

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6 *Convention for the Protection of the Mediterranean Sea against Pollution*, signed 16 February 1976, 15 ILM 300 (entered into force 12 February 1978) art. 2(a). See also, Daud Hassan, *Protecting the Marine Environment from Land Based Sources of Pollution* (Ashagate, 2006) 14.

7 *Convention for the Prevention of Marine Pollution from Land-based Sources*, opened for signature 4 June 1974, 13 ILM 352 (entered into force 6 May 1978) art. 1(1).

8 *Convention on Long-Range Transboundary Air Pollution*, opened for signature 13 November 1979, 18 ILM 1442 (entered into force 16 March 1983) art. 1(a) ('*CLRTAP*').

9 *LOSC* art. 1(4).

10 Ibid.

11 See below 2.4. The precautionary principle, also referred to as 'the precautionary approach', exhorts decision-makers, 'where there are threats of serious or irreversible damage', not to use 'lack of full scientific certainty . . . as a reason for postponing cost-effective

potential damage. In the second place, concerning the adverse effect of pollution, the second definition focuses on environmental conservation broadly while the first one is more anthropocentric, stressing the 'impact on resources or amenities useful to man' narrowly.[12] Generally the *LOSC* definition predominates in definitions favoured by the Organisation for Economic Cooperation and Development (OECD) and the International Law Association (ILA) in that it 'presents a much more clear environmental perspective'.[13] However, some scholars advocate that there are only 'slight amendments' between the two definitions.[14]

Several implications of the LOSC definition of marine pollution are notable. Firstly, 'introduction by man' indicates that pollution occurs only due to human activities. Secondly, 'directly or indirectly' 'into the marine environment' refers to the marine environment including all maritime zones (high seas, exclusive economic zone, continental shelf, contiguous zone, territorial sea and internal waters), water column, seabed and subsoil. Thirdly, the expression 'substances or energy' encompasses solid, liquid, gaseous materials objects, noise, vibrations, heat and radiation.[15] However, this scope may be adjusted and potential new pollutants may be added with advancing technology and amendments to international treaties.

Fourthly, the expression 'deleterious effects' indicates that the threshold for pollution is that human activity leads to 'significant' environmental impact, such as endangering human health or resources.[16] Based on the International Law Commission (ILC) First Report on the Legal Regime for Allocation of Loss in Case of Transboundary Harm Arising out of Hazardous Activities, 'significant' harm may be judged from two factors: one is that it is "more than *de*

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measures to prevent environmental degradation'. See also *Rio Declaration on Environment and Development*, 31 ILM 874 (14 June 1992) principle 15 ('*Rio Declaration*').

12 Birnie, Boyle and Redgwell, above n. 4, 188.

13 Ibid 189.

14 See, e.g., Meng, above n. 5.

15 Kiss and Shelton, above n. 1, 176.

16 Ibid 177. But see Birnie, Boyle and Redgwell, above n. 4, 186–188. Birnie, Boyle and Redgwell assert that it is very controversial to determine the threshold at which harm to the environment becomes a breach of obligation. Many treaties and cases impose 'significant' or 'serious or irreversible damage' to qualify reference to deleterious effects, while none of the relevant civil-liability conventions requires environmental harm to be serious or significant. Thus, they criticise that this difference may allow the utility of the activity to outweigh the seriousness of the harm (for instance, caused by pollution) and have the effect of converting an obligation to prevent harm (an absolute obligation) into an obligation of diligence or into a constraint on abuse of rights.

minimis, 'negligible', 'detectable', or 'appreciable' but need not be at the level of 'serious' or 'substantial'"; the other is that it "must lead to real detrimental effects on such aspects as human health, industry, property, the environment or agriculture in other states, measured by factual and objective standards".[17] Since 'pollution' falls into a category of environmental harm, it is arguable that if a type of transbounary harm is 'more than detectable' and has caused actual detrimental effects, this harm meets the threshold of being a type of pollution even though this harm is not 'serious' or 'substantial'.

The *LOSC* definition of marine pollution adopts a traditional approach, which relates pollution to 'a certain level of seriousness either in volume or in the context of their location'.[18] While this approach has been widely adopted by various treaties, the *1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972* (*1996 Protocol to London Dumping Convention*)[19] provided an alternative. This opposite approach is called the 'reverse listing' where all waste dumping is deemed as pollution unless it can be proved harmless.[20] It appears that the 1996 Protocol provides more stringent criteria on pollution. However, this Protocol adapts the *LOSC* definition of pollution by replacing the term 'substances or energy' with 'wastes or other matter'.[21] Therefore, it is vital to judge whether something is a 'waste or other matter' before putting it under the category of pollution in this treaty. The *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972* (*London Dumping Convention*) provides that,

17 Pemmaraju Sreenivasa Rao, *'First Report on the Legal Regime for Allocation of Loss in Case of Transboundary Harm Arising out of Hazardous Activities*, International Law Commission, 55th Session, 5 May–6 June and 7 July–8 August, 2003, UN Doc A/CN.4/531 (21 March 2003)' (2003).

18 Birnie, Boyle and Redgwell, above n. 4, 189.

19 *Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter*, opened for signature 7 November 1996, EMuT 972:96/D (entered into force 24 March 2006) ('*1996 Protocol to London Dumping Convention*').

20 Birnie, Boyle and Redgwell, above n. 4, 189.

21 *1996 Protocol to London Dumping Convention* art. 1(10). This article provides that, " 'pollution' means the introduction, directly or indirectly, by human activity, of wastes or other matter into the sea which results or is likely to result in such deleterious effects as harm to living resources and marine ecosystems, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities."

> The Contracting Parties pledge themselves to promote, within the competent specialised agencies and other international bodies, measures to protect the marine environment against *pollution caused by*:
> (c) *wastes generated in the course of operation of vessels*, aircraft platforms and other man-made structures at sea.[22] [emphasis added]

This provision indicates that wastes generated from shipping operations could cause pollution. In other words, these wastes could be regarded as pollution under the *London Dumping Convention*.

Finally, 'deleterious effects' should result from these 'substances or energy'. This cause-effect relationship, however, is sometimes difficult to measure in practice and relies heavily on scientific evidence.[23] It is arguable that these five factors could be utilised to judge whether a substance or energy is a type of marine pollution, if the *LOSC* definition of marine pollution is set as a criterion.

2.1.2 *'Pollution' and Greenhouse Gas Emissions from International Shipping*

As discussed in Chapter 1, GHG emissions from international shipping mainly include CO_2, CH_4, N_2O and HFC with CO_2 as the most important GHG. The question of whether GHG emissions from international shipping are a type of pollution is controversial and fiercely debated. It is also important to identify the nature of shipping GHG emissions as GHG emissions, being a type of pollution, may trigger the application of many pollution-related treaties to this issue. This section examines this issue from two perspectives, namely whether shipping GHG emissions meet the treaty definition of marine pollution, and using a comparative analysis of national legislations on the nature of shipping GHG emissions.

2.1.2.1 Legal Analysis of Treaty Definition of Pollution

The five factors drawn from the *LOSC* definition of pollution as discussed in the previous section can be summarised into three questions in the context of GHG emissions from international shipping. They are: (1) whether GHG emissions from international shipping are anthropogenic? (2) Whether they are 'substances or energy' or 'wastes or other matter' being brought into the

22 *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter*, opened for signature 29 December 1972, 18 ILM 510 (entered into force 30 August 1975) ('*London Dumping Convention*') art. XII.

23 For example, to identify the adverse effects from GHG emissions by international shipping is often difficult. This will be examined further in the following sections.

marine environment? And, (3) whether they lead to 'deleterious effects'? GHG emissions from international shipping can be treated as a type of pollution if they meet the three criteria incorporated in the three questions.

Firstly, are GHG emissions from international shipping all anthropogenic? According to the analysis in Chapter 1, GHGs consist of natural gases and anthropogenic sources of emissions and GHG emissions from international shipping include emissions of exhaust gases, emissions of refrigerants, cargo emissions and other emissions. Emissions of exhaust gases mainly come from engines, boilers and incinerators, and cargo emissions result from leakages of refrigerant and volatile compounds emissions from liquid cargo. Such emissions mainly come from engines, refrigerants and other equipment. Therefore it is axiomatic that GHG emissions from international shipping are human-induced.

Secondly, are GHG emissions from international shipping 'substances or energy' or 'wastes or other matter' being brought into the marine environment? Based on the above definition of 'substances or energy', gaseous materials including GHG emissions from international shipping are within this category. Indeed, GHG emissions from ships have been deemed to be a kind of 'substance', both theoretically and practically. Annex VI to *International Convention for the Prevention of Pollution from Ships* (*MARPOL 73/78*) provides that '[*e*]*mission* means any release of substances subject to control by this Annex from ships into the atmosphere or sea'.[24] The Australian Government and some Australian States and Territories have regulated carbon-based products in onshore underground storage areas in order to facilitate, promote and encourage the storage of GHG substances in geological formations.[25] Examples include *Greenhouse Gas Geological Sequestration Act 2008* (Victoria) section 1, *Greenhouse Gas Storage Act 2009* (Queensland) section 3, *Petroleum and Geothermal Energy Act 2000* (South Australia) section 3(a), *Barrow Island Act 2003* (West Australia), *Carbon Capture and Storage Act* (Commonwealth) section 3. GHG emissions are treated as 'substances' under *MARPOL 73/78* and the above national legislations.

Whether GHG emissions from international shipping are 'wastes or other matter' as defined under the *London Dumping Convention* is not so straightforward. The *London Dumping Convention* prohibits the dumping of all 'wastes and other matter' listed in Annex I and requires a prior special

24 *International Convention for the Prevention of Pollution from Ships* (*MARPOL 73/78*), signed 2 November 1973, 12 ILM 1319, as amended by the 1978 Protocol to the 1973 Convention, 1341 UNTS 3, 17 ILM 546 (entered into force 2 October 1983) annex VI reg 2(7).

25 Nicola Durrant, 'Carbon Capture and Storage Laws in Australia: Project Facilitation or a Precautionary Approach?' (2010) 18(4) *Environmental Liability Journal* 148, 155.

permit for the dumping of wastes listed in Annex II.[26] However, as the most important shipping GHG emission, CO_2 is not specifically referred to in either Annex I or Annex II. It was argued that CO_2 would fall under the 'industrial waste' category in Annex I if it is produced from a 'manufacturing or processing operation'.[27] Based on this understanding, CO_2 derived from fossil fuels has been regarded as an 'industrial waste' by the Scientific Group of the *London Dumping Convention*, as well as by the United Kingdom Government.[28] Furthermore, CO_2 streams from CO_2 capture processes for sequestration 'may be considered for dumping being mindful of the Objectives and General Obligations of the [1996] Protocol set out in articles 2 and 3'.[29] While shipping CO_2 may derive from a ship's 'manufacturing or processing operation', it is arguable that shipping CO_2 may fall within the category of 'industrial waste' and thus make it a type of pollution under the *London Dumping Convention*. The amended *1996 Protocol to London Dumping Convention* only treats CO_2 streams from CO_2 capture processes for sequestration as a type of dumping. Nevertheless, the fact that shipping CO_2 may dissolve into the seawater and be absorbed into the seabed[30] reveals that shipping CO_2 is of a similar nature to CO_2 from CO_2 capture processes for sequestration. Thus shipping CO_2 may also be treated as dumping, or pollution under the *London Dumping Convention*.

Thirdly, do GHG emissions from international shipping lead to 'deleterious effects'? As discussed earlier, the environmental harm caused by pollution needs to be 'more than detectable', but it need not be 'serious' or 'substantial'. GHGs are emitted during the whole voyage of a vessel. The amount of discharge depends on many factors such as engine and ship design, cargo volume, and shipping speed.[31] These features make GHG emissions from international

26 *London Dumping Convention* art. IV(1).

27 Yvette Carr, 'The International Legal Issues Relating to the Facilitation of Sub-seabed CO_2 Sequestration Projects in Australia' (2007) 14 *Australian International Law Journal* 137, 143; Ray Purdy and Richard Macrory, *Geological Carbon Sequestration: Critical Legal Issues* (January 2004) Tyndall Centre for Climate Change Research <http://www.tyndall.ac.uk/sites/default/files/wp45.pdf> accessed 1 May 2014, p. 21.

28 Purdy and Macrory, above n. 27. However, this view has not achieved consensus among various countries.

29 *1996 Protocol to London Dumping Convention* (as amended in 2006) annex 1, 1.8.

30 Duncan E.J. Currie and Kateryna Wowk, 'Climate Change and CO_2 in the Oceans and Global Oceans Governance' (2009) 3(4) *Carbon & Climate Law Review* 387, 391.

31 These can be inferred according to the categories of GHG emissions from international shipping as discussed in Chapter 1, 1.2.2.2. There are mainly four categories of GHG emissions from international shipping, namely emissions of exhaust gases (from sources

shipping cumulative, and indicate that not all such emissions bring about 'significant' environmental impact so as to be 'more than detectable'. However, in practice, the problem of how to measure whether GHG emissions are 'significant' is not straightforward. It needs to be assessed on a case-by-case basis. What is significant also depends on the specific context of each case, such as 'the nature of the harm in question, the risk it poses, the location of the harm in relation to natural features and human activity', and 'the particular capabilities of the state in question', and these factors may vary over time.[32] The inevitable subjective elements incorporated in these factors suggest that the judgement of 'deleterious effects' caused by shipping GHG emissions can never be totally objective.

It may be concluded that theoretically GHG emissions from international shipping meet the main characteristics reflected from the treaty definition of pollution and hence could be regarded as a type of pollution provided that these emissions engender 'deleterious effects' or lead to 'significant' environmental impact, or they could be treated as 'wastes' under the *London Dumping Convention*. Therefore, it is arguable that GHG emissions from international shipping are by their nature a type of 'conditional' pollution. In other words, GHG emissions from ships can be treated as pollution under certain circumstances. This view is also consistent with the regulatory practice within the International Maritime Organization (IMO). In July 2011 the reduction of GHG emissions from international shipping was regulated in the form of amendments of Annex VI to *MARPOL 73/78*, which relates to air 'pollution' from ships. However, this regulation does not clearly stipulate GHG emissions as air pollution, and it is still open to debate whether GHG emissions from ships are a type of pollution.

2.1.2.2 National Legislation on the Legal Nature of GHG Emissions

Given that GHG emissions from ships are a type of 'conditional' pollution, different countries have adopted national legislation on the basis that GHG emissions, including those from international shipping, are pollutants. Some countries listed in Annex I to the *United Nations Framework Convention on*

such as engines, auxiliary engines, boilers and incinerators), emissions of refrigerants, cargo emissions and others.

32 Rebecca M. Bratspies and Russell A. Miller (eds), *Transboundary Harm in International Law: Lessons from the Trail Smelter Arbitration* (Cambridge University Press, 2006) 112. See also Birnie, Boyle and Redgwell, above n. 4, 142; Kiss and Shelton, above n. 1, 177.

Climate Change (*UNFCCC*) have regulated GHG emissions as pollutants,[33] whereas many non-Annex I countries to the *UNFCCC* leave GHG emissions unregulated.

The United States of America (US) is one of those countries that have regulated GHG emissions as air pollutants. The *Clean Air Act of the US* provides that,

> the Administration [Environmental Protection Agency (EPA)] shall conduct a basic engineering research and technology program to develop, evaluate, and demonstrate nonregulatory strategies and technologies for air pollution prevention. . . . Such program shall include the following elements:
> (1) Improvements in nonregulatory strategies and technologies for preventing or reducing multiple *air pollutants, including sulphur oxides, nitrogen oxides, heavy metals, PM-10* (*particular matter*)*, carbon monoxide, and carbon dioxide*, from stationary sources, including fossil fuel power plants.[34] [emphasis added]

As the most important GHG, carbon dioxide (CO_2) is regulated as an air pollutant in this Act. Although the above provision only regulates CO_2 from stationary sources, it appears that the legal nature of CO_2 as air pollution will not change when the CO_2 emissions are from mobile sources (e.g., ships). This can also be seen from the definition of 'air pollutant'. The *Clean Air Act of the US* defines 'air pollutant' as 'any air pollution agent or combination of such agents, including any physical, chemical, biological radioactive (including source material, special nuclear material, and by-product material) substance or matter which is emitted into or otherwise enters the ambient air'.[35] This definition indicates that whether CO_2 is from stationary or mobile sources will not change its legal nature. In 2009 the Environmental Protection Agency of the US announced that CO_2 and five other GHGs threaten public health and the environment, and thus should be treated as 'dangerous pollutants'.[36] In 2005, the New Jersey State Department of Environmental Protection, based

33 *United Nations Framework Convention on Climate Change*, opened for signature 9 May 1992, 31 ILM 848 (entered into force 21 March 1994) ('*UNFCCC*').

34 *Clean Air Act of the United States of America*, Pub L No 108–201, Stat, 42 USC §7401 et seq. (1970, as amended in 1977 and 1990) Sec 103(g)(1).

35 Ibid. Sec 7602(g).

36 Nicolas Loris, *EPA Formally Declares CO_2 a Dangerous Pollutant* (7 December 2009) <http://blog.heritage.org/2009/12/07/epa-formally-declares-co2-a-dangerous-pollutant/> accessed 1 April 2016.

on the authorisation conferred on by the *Air Pollution Control Act of New Jersey*, regulated CO_2 as a pollutant,[37] thereby allowing State regulators to cap CO_2 emissions in tackling climate change.

Case law has also played an important role in pushing and shaping this expansion of the pollution concept. In *Massachusetts v. Environmental Protection Agency* (*EPA*),[38] the US Supreme Court held that the EPA has the authority to regulate GHG emissions as a response to petitions filed by environmental groups and the California Attorney General. Some environmental groups petitioned the EPA to take actions to reduce marine emissions, and the California Attorney General requested that the EPA regulate GHG emissions from oceangoing vessels.[39] The Supreme Court's decision not only addressed similar petitions from other entities,[40] but also accelerated the regulatory process of the US on GHG emissions.

GHG emissions have not been explicitly regulated as air pollutants in Australia, but they have been treated as pollutants in some proposed schemes. The Carbon Pollution Reduction Scheme (CPRS) was a cap-and-trade emission trading scheme proposed by the Rudd Government to the Australian Parliament in 2009.[41] The aim of this scheme is to reduce GHG emissions through adding a price to emit carbon. It can be regarded as the predecessor of the Carbon Tax scheme in Australia.[42] Although the CPRS failed for lack

37 Centre for Climate and Energy Solutions, *New Jersey Classifies Carbon Dioxide as Air Contaminant* (18 October 2005) <http://www.c2es.org/us-states-regions/news/2005/new-jersey-classifies-carbon-dioxide-air-contaminant> accessed 1 April 2016.

38 *Massachusetts v. Environmental Protection Agency*, 549 U.S. 497 (2007).

39 Timothy Nast, 'The Reponse of the International Shipping Industry to Global Climate Change' (2013) 44(1) *Journal of Maritime Law and Commence* 29, 32.

40 Ibid. 33.

41 Parliament of Australia, *Carbon Pollution Reduction Scheme* (22 October 2010) <http://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/Browse_by_Topic/ClimateChange/Governance/Domestic/national/cprs> accessed 1 May 2014.

42 *Australian Clean Energy Bill 2011* (*Explanatory Memorandum*), adopted by the Parliament of the Commonwealth of Australia and House of Representatives (2010–2011), Policy Context, p. 12. Australia's carbon tax scheme, also called carbon pricing mechanism, is incorporated into the *Australian Clean Energy Bill 2011*. This scheme commenced on 1 July 2012 with a price that would be fixed for the first three years, and it was expected that on 1 July 2015 the carbon price would transition to a fully flexible price under an emissions trading scheme when the price would be determined by the market. However, this scheme was finally abolished by the Abbott Government on 17 July 2014.

of public support,[43] the title of the scheme reveals that GHG emissions were regarded as a type of pollution by Australian policy makers.

Compared with the US and Australia, China, as the largest developing country, has not regulated or limited GHG emissions in its domestic legislation. The definition and scope of air pollutants are not provided for in Chinese regulation such as its *Environmental Protection Law*,[44] and the *Air Pollution Prevention and Control Law*.[45] It is anticipated that GHGs will not be regulated as a type of pollution in Chinese legislation in the short term. It was argued that the regulation of GHGs (mainly CO_2) as air pollutants would slow down Chinese economic development and trigger the application of more international treaty obligations.[46] As a non-Annex I State to the *UNFCCC*, China does not have compulsory emissions reduction targets which justify China's deregulation of GHG emissions. Similar to China, other large developing countries such as India, Brazil and South Africa also have not regulated GHG emissions in their national legislation.

It is concluded that GHG emissions from international shipping can be regarded as a type of 'conditional' pollution. This theoretical assertion provides considerable scope for various countries to adopt differing legislative choices on the legal nature of GHG emissions. In practice some developed countries have regulated GHG emissions as pollutants while most developing countries have not regulated GHG emissions, which is consistent with their respective obligations under the *Kyoto Protocol* to the *UNFCCC*.[47]

See Lenore Tayor, *Australia Kills Off Carbon Tax* (17 July 2014) <http://www.theguardian.com/environment/2014/jul/17/australia-kills-off-carbon-tax> accessed 17 July 2014.

43 Parliament of Australia, above n. 41.

44 *Environmental Protection Law of the People's Republic of China*, adopted at the 11th Meeting of the Standing Committee of the Seventh National People's Congress on 26 December 1989, and amended on 24 April 2014.

45 *Air Pollution Prevention and Control Law of the People's Republic of China*, adopted in 1987 and amended in 1995, 2000 and 2015 respectively, entered into force on 1 January 2016.

46 李志文 [Li Zhiwen], '《船舶温室气体减排国际立法的新发展及其启示》[New Development of International Regulation in Reducing Greenhouse Gas Emissions from Ships and Enlightenments to China]' (2012) 152(6) 法商研究 *Journal of Studies in Law and Business* 141, 145.

47 *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, opened for signature 16 March 1998, 37 ILM 22 (entered into force 16 February 2005).

2.2 Jurisdiction over Greenhouse Gas Emissions from International Shipping

In international law, responsibility occurs when the legal interest of one subject of the law is invaded by another legal person.[48] To determine international environmental law responsibility and how it applies to specific areas, a good understanding of the principles of State jurisdiction is fundamental. Given that GHG emissions from international shipping can be regarded as a type of 'conditional' pollution, many treaties relating to marine environmental pollution, including the *1982 LOSC* and *MARPOL 73/78*, will apply to this GHG issue. The next part discusses the concept of jurisdiction, and examines State jurisdiction over GHG emissions from international shipping from three perspectives, namely flag State jurisdiction, coastal State jurisdiction and port State jurisdiction.[49]

2.2.1 *The Concept of 'Jurisdiction'*

As a fundamental concept of international law, State jurisdiction over a particular event is a key to analysing many international disputes. In the context of marine pollution regulation, 'jurisdiction' refers to 'the competence of states to prescribe and enforce legislation against vessels engaged in pollution'.[50] This definition indicates that there are two types of jurisdiction. One is 'prescriptive' or 'legislative' jurisdiction, which empowers a State to 'enact or promulgate substantive pollution control standards'.[51] These standards, especially those applying in zones beyond the internal waters and territorial sea of a State, should comply with 'generally accepted' international standards and are often consistent with 'internationally agreed' standards.[52] They are generally not beyond internationally accepted standards in order to ensure the freedom of navigation.[53] In the case of GHG emissions from international shipping, the IMO is the international organisation which drafts such standards. The second type of jurisdiction is 'enforcement' jurisdiction, which authorises a State

48 Ian Brownlie, *Principles of Public International Law* (Oxford University Press, 7th ed, 2008) 433.

49 Flag State control and the issue of 'Flag of Convenience', and port State control, are examined separately in Chapter 6 of this book.

50 Alan Khee-Jin Tan, *Vessel-Source Marine Pollution: the Law and Politics of International Regulation* (Cambridge University Press, 2006) 176.

51 Ibid.

52 *LOSC* arts. 211(2), 212(1). See also ibid. Tan asserts that under certain circumstances, international law may endorse the prescription of national standards.

53 See *LOSC* arts. 17, 58.

to 'prevent or punish the actual violation of the relevant standards'.[54] Some scholars have raised another so called 'adjudicative' or 'judicial' jurisdiction, referring to 'the power of national courts or tribunals to adjudicate prosecutions against a vessel or a person for transgressions of prescribed standards'.[55] In this book 'enforcement' jurisdiction is interpreted as encompassing the 'adjudicative' or 'judicial' authority of States consistent with the interpretation of jurisdiction adopted in international agreements such as the *LOSC* and IMO instruments[56] and the approach that has been adopted by some scholars.[57]

A flag, coastal or port State of a particular vessel has different prescriptive or enforcement jurisdiction.[58] Historically, in order to gain an equitable balance between coastal and navigational interests, the jurisdiction reallocation between different State actors was eventually formed with the joint effort of the whole international community.[59] Among the international achievements, the *LOSC* and *MARPOL 73/78* form the current jurisdiction regime in the context of vessel-source pollution.[60] Jurisdiction under the *LOSC* and *MARPOL 73/78* regime, however, should also apply to the GHG emissions from international shipping due to the nature of such emissions being a kind of pollution. Thus, jurisdiction over GHG emissions from international shipping is examined from the perspective of flag, coastal and port States respectively in the following parts of this section.

54 Tan, above n. 50, 176.

55 Ibid. See also R.R. Churchill and A.V. Lowe, *The Law of the Sea* (Manchester University Press, 3rd ed., 1999) 344. Churchill and Lowe subdivide enforcement jurisdiction into the competence to arrest (arrest jurisdiction) and the competence of courts to deal with alleged breaches of the law (judicial jurisdiction).

56 For instance, in section 6 (enforcement) of *LOSC*, art. 217(4) and art. 218(1) stipulate that the flag State and port State may institute proceedings under certain circumstances, which are of the nature of adjudicative or judicial jurisdiction. See also *LOSC* art. 62.

57 See, e.g., Malcolm N. Shaw, *International Law* (Cambridge University Press, 6th ed., 2008) 572; Tan, above n. 50, 177.

58 Churchill and Lowe, above n. 55, 344.

59 Tan, above n. 50, 177; Churchill and Lowe, above n. 344–353. Through three United Nations Law of the Sea Conferences, coastal and port State jurisdiction expanded; flag State jurisdiction diminished but still remained prominent.

60 See, e.g., Churchill and Lowe, above n. 55, 344–352; Tan, above n. 50, 184–222; Donald Rothwell and Tim Stephens, *The International Law of the Sea* (Hart Publishing, 2010) 353–358.

2.2.2 *Flag State Jurisdiction*

A flag State refers to 'the State whose nationality a particular vessel has',[61] or in other words, 'the State in which the vessel is registered or whose flag it is entitled to [fly]'.[62] In customary law, the flag State enjoys the primary jurisdiction over the ship flying its flag, and it is the only subject which has jurisdiction to enforce regulations applicable to ships on the high seas.[63] This form of jurisdiction is reflected in the provisions of *MARPOL 73/78* and the *1982 LOSC*.

Under the *MARPOL 73/78* regime, the flag State enjoys both prescriptive and enforcement jurisdiction. Regarding prescriptive jurisdiction, flag States are required to adopt laws to ensure that the regulatory provisions of *MARPOL 73/78* are applied to ships on their registries.[64] Any violation of *MARPOL 73/78* is to be prohibited wherever it occurs, and sanctions shall be established under the law of the flag State.[65] Additionally, the penalties specified under flag State law shall be adequate in severity to discourage violations of *MARPOL 73/78*, and shall be equally severe irrespective of where the violations occur.[66] As for enforcement jurisdiction, flag States have three obligations under *MARPOL 73/78*. Firstly, flag States are obliged to institute proceedings against any of their ships suspected of having violated *MARPOL 73/78*.[67] In order to facilitate flag State prosecution of such offences, all parties to *MARPOL 73/78* are required to report incidents at sea involving harmful substances,[68] no matter where the offence is committed. Secondly, flag States shall act appropriately to either inspect, investigate, or detect the ship on suspected violation of *MARPOL 73/78* when informed of suspected violations by other parties, or impose penalties when such violations have been proved.[69] Thirdly, flag States are to conduct

61 Churchill and Lowe, above n. 55, 344.

62 Birnie, Boyle and Redgwell, above n. 4, 400.

63 Ibid 401. For instance, in the *Lotus Case* (*Lotus Case* (*France v Turkey*) (1927) PCIJ Series A, No. 10), the Permanent Court of International Justice cited the principle that 'no state may exercise any kind of jurisdiction over foreign ships on the high seas', which indicated that foreign ships should not be arrested or detained while they are on the high seas. However, the flag State still exercises its jurisdiction over the ships flying its flag no matter where it is operating.

64 *MARPOL 73/78* art. 3.

65 *MARPOL 73/78* art. 4(1).

66 *MARPOL 73/78* art. 4(4).

67 *MARPOL 73/78* art. 4(1).

68 *MARPOL 73/78* arts. 4(2), 6(3).

69 *MARPOL 73/78* art. 8.

surveys, to issue or authorise other parties to issue certificates, to ensure the compliance of their ships with the convention.[70]

It is primarily the responsibility of flag States to regulate the issue of GHG emissions from international shipping. For instance, flag States that have ratified amendments of Annex VI to *MARPOL 73/78* shall incorporate the energy efficiency requirements for ships as specified in amended Annex VI into their domestic legislation, and, if violations occur, institute proceedings in relation to such offences. When informed of a suspected violation of *MARPOL 73/78*, the flag State is obliged to cooperate with relevant parties in detecting, inspecting or investigating the violation. Furthermore, flag States that are parties to *MARPOL* Annex VI shall conduct regular surveys, issue or empower other parties to issue the International Energy Efficiency Certificate (IEE Certificate) so as to comply with IMO standards.[71]

The jurisdictional competence of flag States under *LOSC* is consistent with *MARPOL 73/78*. Flag States are obliged to pass pollution control laws for their ships under *LOSC* provisions.[72] Article 211(2) requires flag States to adopt laws and regulations to prevent marine pollution that 'at least have the same effect' as that of generally accepted international rules and standards.[73] Since *MARPOL 73/78* has been regarded by some scholars as representing 'generally accepted international rules and standards [in the context of regulation of vessel pollution]', it was argued that Article 211 of the *LOSC* has made *MARPOL 73/78* and 'other relevant international standards' 'an obligatory minimum'.[74] Another similar view is that *MARPOL 73/78* and all of its annexes 'which have entered into force, and have attracted high participation' could be treated as 'generally accepted international standards'.[75] However, how to judge 'high participation' remains unclear. It is arguable that both views should not apply to the 2011 amendments of Annex VI to *MARPOL 73/78*. This is because the 2011

70 *MARPOL 73/78* art. 5.

71 *MARPOL 73/78 Annex VI* regs 5–9.

72 See, e.g., *LOSC* art. 94(1). This article reads that, 'Every [flag] State shall effectively exercise its jurisdiction and control in administrative, technical and social matters over ships flying its flag [on the high seas].'

73 *LOSC* art. 211(2). This article stipulates that,

> 'States shall adopt laws and regulations for the prevention, reduction and control of pollution of the marine environment from vessels flying their flag or of their registry. Such laws and regulations shall at least have the same effect as that of generally accepted international rules and standards established through the competent international organization or general diplomatic conference.'

74 Birnie, Boyle and Redgwell, above n. 4, 413.

75 Rothwell and Stephens, above n. 60, 355.

amendments to *MARPOL* Annex VI were adopted by a majority vote rather than a consensus, and some major shipping nations, such as China, Brazil, Kuwait, and Saudi Arabia, voted against the amendments.[76] The participation was still high (49 out of 59 parties to Annex VI voted yes), and the 2011 amendments entered into force on 1 January 2013. However, it is less persuasive for the 2011 amendments of Annex VI to *MARPOL 73/78* to be 'generally accepted' although the amendments may fall within the 'internationally agreed rules' as specified in Article 212(1) of the *LOSC*.[77] Based on Article 31 of the *Vienna Convention on the Law of Treaties* in 1969,[78] Article 212(1) of the *LOSC* might be interpreted as meaning that rules adopted at the international level could be treated as 'internationally agreed rules'.[79] Nevertheless, Article 212(1) of the *LOSC* only requested States to 'take into account internationally agreed rules, standards and recommended practices and procedures' when they adopt laws and regulations to prevent, reduce and control marine pollution from or through the atmosphere. This provision imposes a very weak obligation on flag States.[80]

Concerning the enforcement jurisdiction of flag States, *LOSC* requires flag States to take necessary measures for the implementation and enforcement of international rules and standards.[81] These measures include the investigation of pollution offences, inspection, certification, and instituting proceedings under certain circumstances.[82] In fact, these measures are exactly what *MARPOL 73/78* demands and are thus 'nothing novel in principle'.[83]

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76 *Report of the Marine Environment Protection Committee on Its Sixty-Second Session*, MEPC 62nd Session, Agenda Item 24, IMO Doc MEPC 62/24 (26 July 2011) para. 6.110.

77 James Harrison, 'Recent Developments and Continuing Challenges in the Regulation of Greenhouse Gas Emissions from International Shipping' (2012) *University of Edinburgh Research Paper Series* <http://ssrn.com/abstract=2037038> accessed 6 June 2014, pp. 20, 22–23. The rules incorporated in Articles 211(1) and 212(1) of the LOSC are so-called 'rules of reference', which require parties to the LOSC to comply with rules and standards as specified in other international instruments.

78 *Vienna Convention on the Law of Treaties*, opened for signature 23 May 1969, 8 ILM 679 (entered into force 27 January 1980) art. 31(1) ('*1969 Vienna Treaty Convention*'). This article provides that,

> 'A treaty shall be interpreted in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose.'

79 Harrison, above n. 77, 23.

80 Ibid.

81 *LOSC* art. 217.

82 Ibid.

83 Birnie, Boyle and Redgwell, above n. 4, 413. Birnie, Boyle and Redgwell assert that Article 217 of the LOSC just 'fully accords with existing customary and conventional law' and is thus 'nothing novel'. But see Rothwell and Stephens, above n. 60. Rothwell and Stephens

Therefore, flag State jurisdiction over GHG emissions from international shipping under the *MARPOL 73/78* regime is almost the same as that under the *LOSC* framework. Flag States are primarily responsible for the regulation and control of GHG emissions from their ships. However, in practice some flag States may not exercise their entire jurisdiction in terms of GHG emissions from their own fleets, and empirical survey suggests that flag States impose lower fines than port States with regard to the average fines for violating *MARPOL* standards.[84] There are many reasons why flag States lack incentives to exercise such jurisdiction. For instance, GHG emissions from international shipping are often outside the territory of the flag State and may only imperil the environment of others, so the incentives for a flag State to enforce may be low.[85] Further, such enforcement is often costly. The principal, or indeed sole, interest of many flag States is often to obtain economic benefits by means of registration fees or taxes from ships registered there due to the existence of 'flags of convenience'(FOC),[86] where registration is the 'only substantial connection' with the flag State.[87]

2.2.3 *Coastal State Jurisdiction*

Churchill and Lowe provide an apposite definition of coastal State, based on which a coastal State is 'the State in one of whose maritime zones a particular vessel lies'.[88] Different from flag States, coastal States have incentives to impose severe restrictions upon ships navigating within their maritime zones. In general, the pollution caused by ships, including GHG emissions from international

assert that 'the LOSC does not alter the capacity of flag States to take action to enforce pollution control standards', but it 'transforms the customary law capacity into a positive obligation', which should be an advance.

84 Ho-Sam Bang, 'Recommendations for Policies on Port State Control and Port State Jurisdiction' (2013) 44(1) *Journal of Maritime Law and Commence* 115, 127.

85 Michael Faure and Ying Song (eds), *China and International Environmental Liability: Legal Remedies for Transboundary Pollution* (Edward Elgar Publishing, 2008) 87.

86 Ibid 85. To date there is no uniform definition of FOC. See, e.g., Egiyan defines the FOC as 'national flags of those States in which shipowners register their ships so as to avoid: (a) financial obligations; and (b) the nature and conditions of shipping were their vessels registered in their own countries'. G.S. Egiyan, 'Flag of Convenience' or 'Open Registration' of Ships' (1990) 14(2) *Marine Policy* 106, 107; Griffin defines the FOC as 'flags of certain countries whose laws make it easy and attractive for ships owned by foreign nationals or companies to fly these flags'. Andrew Griffin, 'MARPOL 73/78 and Vessel Pollution: A Glass Half Full or Half Empty?' (1994) 1(2) *Indiana Journal of Global Legal Studies* 489, 506.

87 Birnie, Boyle and Redgwell, above n. 4, 360.

88 Churchill and Lowe, above n. 55, 344.

shipping, often makes the coastal States the victim of such damage. The damage frequently occurs either in the exclusive economic zone or in the territorial sea of the coastal State, although such damage is cumulative and global in nature in the context of GHG emissions from ships. However, the claims for stricter jurisdiction by coastal States are restricted by the *LOSC* in order to maintain navigational rights and an equitable balance between coastal States and foreign flag States. Coastal States' jurisdiction to regulate and enforce their laws against vessels depends on their sovereignty or sovereign rights over maritime zones contiguous to their coasts, and the *LOSC* provides the framework for dealing with this issue. Hence this part examines coastal State jurisdiction based on these maritime zones under the *LOSC*, and reviews the regulations from *MARPOL 73/78* and other treaties.

In internal waters, such as ports, coastal States enjoy full legislative and enforcement jurisdiction. Generally they are free to apply national laws and determine conditions of entry for foreign vessels when such ports are open, but appropriate publicity and communication with the IMO is necessary.[89] On the one hand, internal waters form part of the territory of coastal States thus the coastal State has full territorial sovereignty over these waters.[90] On the other hand, this arrangement was also recognised by *MARPOL 73/78* and utilised by the United States and other countries in passing stringent national legislation applicable to foreign shipping.[91] As the first State to ban all single-hull oil tankers from entering its ports, the US did not wait for agreement in the IMO, and this approach was then adopted by the European Union in a similar ban following the sinking of the *Prestige* (oil spill incident) in 2002.[92] Accordingly, in the context of GHG emissions from international shipping, coastal States may in principle legislate and enforce their own national requirements on emissions, and apply them to their internal waters and ports as a condition for the entry of foreign vessels.

In contrast to internal waters, the legislative and enforcement jurisdiction of coastal States in the territorial sea is not unlimited. Concerning legislative jurisdiction, the coastal State enjoys sovereignty, and may apply its national laws on environmental protection to its territorial sea. Furthermore, international treaties on dumping or pollution from ships accord three rights to coastal States in the territorial sea, namely the designation of Emission Control

89 *LOSC* art. 211(3).

90 See *LOSC* art. 211(3). The only exception is for vessels in distress, which have a right to take refuge in the nearest port.

91 *MARPOL 73/78* art. 5(3).

92 Birnie, Boyle and Redgwell, above n. 4, 414.

Areas,[93] the designation and control of navigation routes for safety and environmental purposes,[94] and the prohibition of pollution discharges.[95] However, such rights should not hamper the exercise of innocent passage of foreign ships,[96] and such laws and regulations should not include matters related to the design, construction, manning or equipment of foreign ships (CDEM standards) 'unless they are giving effect to generally accepted international rules or standards'.[97] As for enforcement by coastal States in their territorial sea, the *LOSC* stipulates such measures as inspection, proceedings and detention of foreign vessels for coastal States under certain circumstances.[98] These measures, however, are regarded as 'rarely used' for anti-pollution purposes due to their possible hampering of innocent passage of foreign ships.[99]

Regarding the issue of GHG emissions from international shipping, the coastal State's jurisdiction in its territorial sea may be more in the nature of prescriptive rather than enforcement jurisdiction. Coastal States may adopt

93 *MARPOL 73/78* Annex VI regs 2.8, 13, 14. Regulation 2.8 reads that:

'Emission Control Area means an area where the adoption of special mandatory measures for emissions from ships is required to prevent, reduce and control air pollution from NO_x or SO_x and particulate matter or all three types of emissions and their attendant adverse impacts on human health and environment.'

Regulation 13 stipulates that an 'Emission Control Area shall be any sea area, including any port area, designated by the Organization'. This means that an Emission Control Area could also be located in the exclusive economic zone or other maritime zones of a coastal State.

94 *LOSC* art. 22.

95 *MARPOL 73/78* art. 4(2); *LOSC* art. 21(1)(f); *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter*, opened for signature 29 December 1972, 18 ILM 510 (entered into force 30 August 1975) art. 4(3) ('*London Dumping Convention*'). See also Birnie, Boyle and Redgwell, above n. 4, 414.

96 *LOSC* art. 24(1), 211(4).

97 *LOSC* art. 21(2).

98 *LOSC* art. 220(2). According to this article, where there are clear grounds for believing that a vessel navigating in the territorial sea of the coastal States has violated laws and regulations consistent with international standards, then the coastal State may undertake a physical inspection of the vessel relating to the violation and may institute proceedings, including the detention of the vessel.

99 See *LOSC* art. 19(2). According to this article, only pollution that is 'wilful and serious' and contrary to the LOSC will deprive a vessel in passage of its innocent character, which is rare. However, these anti-pollution measures pose serious danger to navigational freedom and will generally hamper the innocent passage of foreign ships. In view of this concern, often the preferable solution will be to rely on port States for anti-pollution enforcement purpose. See also Birnie, Boyle and Redgwell, above n. 4, 417; Faure and Song, above n. 85, 93.

their national standards on GHG emissions from ships, such as operational requirements in the territorial sea.[100] They may also propose the establishment of GHG Emission Control Areas in their territorial sea to the IMO, as provided in *MARPOL* Annex VI for the purpose of reducing NO_x and SO_x emissions from shipping.

The establishment of the Exclusive Economic Zone (EEZ) is regarded by many commentators as the 'most significant reform' of the *1982 LOSC*.[101] The EEZ confers on coastal States sovereign rights over living and non-living resources, and jurisdiction relating to the protection and preservation of the marine environment.[102] Under the *LOSC*, coastal States may regulate pollution from seabed installations and dumping within the EEZ, but this prescriptive jurisdiction is limited to the application of international rules and standards, namely IMO rules and standards.[103] In other words, this national legislation should neither be 'less demanding' nor 'more stringent' than IMO rules and standards.[104] A State can only adopt stricter rules when such rules are regulating the IMO designated Particularly Sensitive Sea Areas (PSSAs) or ice-covered areas which are within a coastal State's EEZ.[105] Regarding enforcement jurisdiction, only when there are 'clear grounds' for believing that a vessel has committed a violation in the EEZ and such violation threatens substantial damage to the coastal State, may the coastal State 'require the vessel to give information regarding its identity and port of registry'.[106] The coastal State may exercise its power over EEZ pollution control only when the vessel is still navigating in its

100 An operational requirement/measure is one of the three methods considered so far within the IMO for regulating GHG emissions from ships (the other two are technical measures and market-based measures) and this method has been adopted by the IMO in the form of the Ship Energy Efficiency Management Plan (SEEMP) in 2011 amendments of Annex VI to *MARPOL 73/78*. It includes the requirements during the course of getting on board, checking of certificate and documents and inspection of or on other pollution prevention measures or facilities. For example, the coastal State may regulate the speed limit of foreign vessels in its territorial sea so as to reduce the GHG emissions and ensure better safety.

101 Rothwell and Stephens, above n. 60, 356. As a new maritime zone introduced by the 1982 *LOSC*, the EEZ extends to 200 nautical miles from the territorial sea baseline which to a significant extent expands the sovereign rights of a coastal State.

102 *LOSC* art. 56.

103 *LOSC* arts. 208, 210, 211(5)(6).

104 Rothwell and Stephens, above n. 60, 356.

105 Ibid. 357.

106 *LOSC* art. 220(3)(5).

EEZ and this power is limited to a request for information.[107] Therefore, this enforcement is not favoured by the coastal State in that it cannot effectively prevent, stop or penalise possible violation of relevant international regulations by the foreign vessel.[108] Accordingly, in the context of GHG emissions from international shipping, what a coastal State may do is to incorporate IMO regulations, currently the energy efficiency requirements on ships under amendments to Annex VI of *MARPOL 73/78*, into its domestic environmental protection regime so that these regulations can be applied in its EEZ.

No State has territorial jurisdiction in the high seas.[109] In these waters, the flag State has exclusive jurisdiction over its ships when they produce pollution including GHG emissions. The coastal State is not permitted to take measures unless it is threatened by the damage resulting from 'pollution or threat of pollution following upon a maritime casualty or acts relating to such casualty'.[110] Nevertheless, there is no evidence of such enforcement for GHG emissions.

2.2.4 *Port State Jurisdiction*

A port State refers to 'the State in one of whose ports a particular vessel lies'.[111] In contrast to the limited jurisdiction of coastal States, port States have substantial jurisdiction over pollution within their jurisdiction. This has been deemed as a 'corrective measure to remedy the inadequacy of flag State jurisdiction'.[112] As a port is situated in a State's internal waters, a port State may legislate for the prevention, reduction and control of marine pollution, including GHG emissions from international shipping, as a condition for the entry of foreign vessels into its ports or internal waters.[113] However, it is the port State's enforcement jurisdiction that attracts more attention since it might prove to be an effective deterrent against ships polluting any part of the sea because they are likely to face investigation or the institution of proceedings in the port State. In a broad sense, the enforcement jurisdiction of the port State includes both enforcement or administrative jurisdiction and judicial jurisdiction. Administrative jurisdiction is often called port State control and primarily involves the

107 *LOSC* art. 220(3).

108 Faure and Song, above n. 85, 94. Under the circumstances, the only remedy for the coastal State is probably to inform the flag States or the next port State of the possible violation, so that these States may take actions to investigate or institute proceedings.

109 *LOSC* art. 89.

110 *LOSC* art. 221.

111 Churchill and Lowe, above n. 55, 344.

112 Faure and Song, above n. 85, 98.

113 *LOSC* art. 211(3).

inspection and certification by a port, whereas judicial jurisdiction of the port State involves the prosecution of offences committed in its ports or coastal State maritime zones, or outside the internal waters, territorial sea or EEZ of the port State.[114]

Under *MARPOL 73/78* the inspection and certification rules serve as the basis for the enforcement jurisdiction of port States. Different certificates are designed and required by the IMO as various standards to measure corresponding aspects of pollution from ships.[115] For example, the IEE Certificate is related to reducing GHG emissions from international shipping.[116] According to *MARPOL* Annex VI, such certificates will only be issued to ships which meet the Ship Energy Efficiency Management Plan (SEEMP), and for new ships, the Energy Efficiency Design Index (EEDI) is also mandatory.[117]

As for inspection, two points are notable. Firstly, inspection should be limited to verifying that there is a valid certificate on board. If there are clear grounds for believing that the condition of the ship, or its equipment, does not correspond substantially with the particulars of the certificate, or there is no valid certificate, the port State must ensure that the ship does not sail until it can proceed to sea without presenting an unreasonable threat of harm to the marine environment.[118] If inspection detects violation of *MARPOL 73/78* or its Annexes, the port State shall forward a report to the flag State so that the appropriate action may be taken.[119] Secondly, port States must apply *MARPOL 73/78* standards to all ships calling at their ports in that *MARPOL* adopts 'no more favourable treatment' with respect to the ships of non-Parties to the

114 *LOSC* art. 218; See also Bang, above n. 84, 119. The difference between port State control and port State jurisdiction, and regional Memoranda of Understanding (MOUs) on port State control are examined in Chapter 6.

115 But these certificates shall be issued or endorsed either by the Administration (the flag State) or any organization duly authorized by it. In every case, the Administration assumes full responsibility for the certificate. See, e.g., *MARPOL* Annex VI reg 6(5).

116 *MARPOL* 73/78 Annex VI (2011 amendments) reg 6(4)(5).

117 *MARPOL* 73/78 Annex VI (2011 amendments) regs 6,7. See also International Maritime Organization (IMO), *Mandatory Energy Efficiency Measures for International Shipping Adopted at IMO Environment Meeting* (15 July 2011) <http://www.imo.org/MediaCentre/PressBriefings/Pages/42-mepc-GHG.aspx> accessed 31 October 2011.

118 *MARPOL73/78* art. 5(2).

119 *MARPOL73/78* art. 6(5).

convention.[120] Furthermore, a type of Memorandum of Understanding (MOU) relating to port State inspection has been developed to coordinate regional port State control.[121] Port State MOUs were designed to ensure that ships do not evade *MARPOL 73/78* rules through calling at ports where the inspection regime is lax. To date there are nine MOUs on port State control which have covered most of the regions of the world.[122] If we relate the issue of GHG emissions from international shipping to port State jurisdiction, the port State will inspect the vessel to verify whether the IEE Certificate is on board and whether there is any violation of *MARPOL* Annex VI even though the flag State of the ship is not a party to the convention.

Article 218 of the *LOSC* gives port States a discretionary power to investigate and prosecute discharge violations wherever they have taken place.[123] Regarding violations within the coastal zones of another State,[124] the port State can only act by request from the State concerned.[125] As to violations on the high seas, the port State may prosecute directly and independently in the public interest.[126] In this sense, port State jurisdiction has been viewed as a kind of 'universal jurisdiction'.[127] Therefore, if there is any violation of IMO regulations, including those relating to GHG emissions from international shipping (amendments of Annex VI to *MARPOL 73/78* or any other regulations), the investigation or prosecution by the port State could provide a kind of correction. However, in practice port States seldom exercise their judicial jurisdiction

120 *MARPOL73/78* art. 5(4). This article reads that,

'With respect to the ship of non-Parties to the Convention, Parties shall apply the requirements of the present Convention as may be necessary to ensure that no more favourable treatment is given to such ships.'

121 Rothwell and Stephens, above n. 60, 354.

122 Ibid. These nine MOUs are Paris MOU, Latin American MOU, Tokyo MOU, Caribbean MOU, Mediterranean MOU, Indian Ocean MOU, West and Central African MOU, Black Sea MOU and Riyadh MOU.

123 *LOSC* art. 218(1).

124 *LOSC* art. 218(2). 'Coastal zones' refers to the internal waters, territorial sea or EEZ of another State.

125 Ibid. 'The States concerned' may be that State (violation occurs in its coastal zones), the flag State, a State damaged or threatened by the discharge violation, or the violation has caused or is likely to cause pollution in the coastal zones of the State instituting the proceedings.

126 Ibid. Although the port State's jurisdiction under this article is independent and no request from the flag State is necessary, the flag State does enjoy a right of pre-emption, which enables it to insist on taking control of any prosecution. See *LOSC* art. 228(1).

127 Birnie, Boyle and Redgwell, above n. 4, 422.

to prosecute on the ground that instituting legal proceedings can be costly.[128] Some States, Netherlands and South Korea as examples, have not prosecuted any foreign ship but only utilise administrative penalties such as detention or charging inspection fees.[129]

2.3 Environmental Liability for Transboundary Harm Caused by Greenhouse Gas Emissions from International Shipping

As observed by Sands, two opposite fundamental objectives guided the development of the rules of international environmental law, namely 'that states have sovereign rights over their natural resources' and 'that states must not cause damage to the environment'.[130] The latter objective involves environmental liability for transboundary harm since the 'environment' not only includes areas within national jurisdiction, but also transboundary contexts and areas beyond national jurisdiction.[131] As one of the central tenets of international environmental law, the rules of liability on transboundary harm have been widely applied and developed.[132] This part examines these rules and explores their application to the issue of GHG emissions from international shipping.

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128 Bang, above n. 84, 126. Bang asserts that a very small number of *MARPOL* violations have been prosecuted by a few port States, but there is no evidence of such prosecution on illegal discharges.

129 Ibid. 127.

130 Philippe Sands, *Principles of International Environmental Law* (Cambridge University Press, 2nd ed., 2003) 235. These objectives are set out in Principle 21 of the Stockholm Declaration, which provides that:

> 'States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and 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.'
>
> *Stockholm Declaration on the Human Environment*, 11 ILM 1416 (16 June 1972) principle 21 ('*Stockholm Declaration*').

131 Ibid.

132 Cases involving the rules of transboundary harm include but are not limited to: *Trail Smelter Case* (*United States of America v Canada*) (*Reports of International Arbitral Awards*) (1938 & 1941) 3 UN RIAA 1905; *Nuclear Tests Case* (*Australia v France*) (*Interim Protection*) (1974) ICJ Reports 253 ; *Lac Lanoux Arbitration* (*France v Spain*) (1957) 12 UN RIAA 285; *Corfu Channel Case* (*U.K. v Albania*) (1949) ICJ Rep. 4;*The MOX Plant Case* (*Ireland v United Kingdom*) (2001) 47 ILM 405; *ITLOS*, Order of 3 December 2001 on Provisional Measures; *Pulp Mills on the River Uruguay* (*Argentina v Uruguay*) (2006) ICJ Reports.

2.3.1 *An Overview of Transboundary Harm*

As a broader concept than transboundary pollution,[133] 'transboundary harm' generally refers to 'harm caused in the territory of or in other places under the jurisdiction or control of a State other than the State of origin, whether or not the States concerned share a common border'.[134] The areas damaged by transboundary harm may be either within a jurisdiction or beyond national jurisdiction. The general duty to prevent and to minimise the risk of transboundary harm is derived from the fundamental principle *sic utere tuo ut alienum non laedas* or 'principle of good neighbourliness'. It has been underpinned by State practice, judicial decisions, multilateral environmental agreements, and the work of the International Law Commission (ILC).[135] In particular, Principles 2, 18 and 19 of the *1992 Rio Declaration on Environment and Development* (*Rio Declaration*) provide specific principles applicable to transboundary harm and environmental risks.[136] Two transboundary harm rules could be drawn from these principles. They are:

> (1) States have a duty to prevent, reduce, and control transboundary pollution and environmental harm resulting from activities within their jurisdiction or control; and
> (2) States also have a duty to cooperate in mitigating transboundary environmental risks and emergencies, through notification, consultation, negotiation, and in appropriate cases, environmental impact assessment.[137]

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133 Birnie, Boyle and Redgwell, above n. 4, 188. This difference can be seen clearly from Articles 1 and 2 of 1985 Vienna Convention for the Protection of the Ozone Layer (*Vienna Convention for the Protection of the Ozone Layer*, opened for signature 22 March 1985, 26 ILM 1529 (entered into force 22 September 1988)('*Vienna Ozone Convention*')) and 1992 *UNFCCC* on the definition of 'adverse effects', and Article 1 of the 1979 Convention on Long-Range Transboundary Air Pollution (*Convention on Long-Range Transboundary Air Pollution*, opened for signature 13 November 1979, 18 ILM 1442 (entered into force 16 March 1983)) ('*CLRTAP*') on the definition of 'pollution'.

134 *Draft Articles on Prevention of Transboundary Harm from Hazardous Activities*, ILC Report GAOR A/56/10 (2001) art. 2(c) ('*Draft Articles*'). Regarding this definition, 'State of origin' means the State in the territory or otherwise under the jurisdiction or control of which the activities referred to in article 1 are planned or are carried out; 'States concerned' means the State of origin and the State likely to be affected.

135 Birnie, Boyle and Redgwell, above n. 4, 137.

136 Ibid.

137 Ibid.

The two rules have been applied in many international judicial decisions.[138] The two rules have the status of customary international law, but in certain respects these rules can also be treated as general principles of law.[139] The rules on transboundary harm have been gradually formed and developed since the 1930s. This process, according to different elements reflected in the treaties or cases, can be summarised into three stages.

The first stage can be traced back to the *Trail Smelter* arbitration—the origins of a rule on transboundary harm and also the first international environmental law decision in the world.[140] The *Trail Smelter* dispute covered a period of 13 years from 1928 to 1941, and is usually the only case cited in which general principles of international law on State liability was applied to address issues involving transboundary damage.[141] One of the main contributions from the *Trail Smelter* arbitration could be summarised as the well-known '*Trail Smelter* principles',[142] which include: (1) each state has a duty to prevent transboundary harm;[143] and (2) the polluter-pays principle, which asserts that 'the polluting

138 For example, the first rule was applied in *Trail Smelter Case* and the *Corfu Channel Case*. *Trail Smelter Case,* below n. 140; *Corfu Channel Case* (*U.K. v Albania*) (1949) ICJ Rep. 4. The second rule was applied in *Lac Lanoux Arbitration case*. *Lac Lanoux Arbitration* (*France v Spain*) (1957) 12 UN RIAA 285.

139 Birnie, Boyle and Redgwell, above n. 4, 137. Customary international law and general principles of law are two sources of international law regulated by Article 38 of the *Statute of the International Court of Justice*. *Charter of the United Nations and Statute of the International Court of Justice*, signed 26 June 1945, 59 STAT 1031 (entered into force 24 October 1945). The two sources have different elements and implications. See Brownlie, above n. 48, 6–12, 16–18.

140 *Trail Smelter Case* (*United States of America v Canada*) (*Reports of International Arbitral Awards*) (1938 & 1941) 3 UN RIAA 1905 ('*Trail Smelter* (1941)'). The Trail Smelter arbitration of 1938 and 1941 was a landmark decision about a dispute over environmental degradation between the United States and Canada. A tribunal was set up by Canada and the United States to resolve a dispute over damages to US citizens and property in the State of Washington caused by a smelter on the Canadian side of the border. The tribunal decided that Canada had to pay the United States for damages, and further that it was obliged to abate the pollution. The second Trail Smelter dispute in 2003 on the contamination of the Upper Columbia River in Washington State of the United States by Trail Smelter in Canada, however, is not discussed in this chapter.

141 Hanqin Xue, *Transboundary Damage in International Law* (Cambridge University Press, 2003) 269.

142 Bratspies and Miller, above n. 32, 3.

143 *Trail Smelter* (1941), above n. 140. This rule was reflected in the famous conclusion made by the tribunal that,

> 'Under the principles of international law . . . no state has the right to use or permit the use of territory in such a manner as to cause injury by fumes in or to the territory of

State should pay compensation for the transboundary harm it has caused.'[144] These principles have been widely accepted as rules of customary international law and applied or cited by judges in some of the subsequent cases such as the *Lac Lanoux Arbitration* and the *Nuclear Tests Case*.[145]

Furthermore, the rules on transboundary harm are reflected in some treaties. For instance, the *1951 International Plant Protection Convention* recognised the need to prevent the introduction and spread of plant pests and diseases across national boundaries.[146] The *1963 Nuclear Test Ban Treaty* prohibits nuclear tests if the explosion would cause radioactive debris 'to be present outside the territory limits of the state under whose jurisdiction or control such explosion is conducted.'[147] The *1968 African Conservation Convention* provides that the States Parties shall cooperate 'whenever any national measure is likely

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another or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence.'

144 Bratspies and Miller, above n. 32. In this case the Tribunal's decision holds that a state should be strictly liable for damages arising from activities by a private corporation operating within the state's jurisdiction. See also ibid.

The *Trail Smelter case* can be deemed as the application of the polluter-pays principle, which from the author's point of view could be understood that the State (Canada) is actually also a 'polluter' in this case. According to a European Community Council recommendation of November 7, 1974, 'polluter' refers to 'someone who directly or indirectly damages the environment or who creates conditions leading to such damage'. The smelter was within the jurisdiction of the Canadian government and managed and taxed by the latter, so the Canadian government had the due diligence obligation to make it not produce transboundary air pollution. In this case, however, the Canadian government 'create[d] conditions leading to such damage'.

145 *Lac Lanoux Arbitration* (*France v Spain*) (1957) 12 UN RIAA 285. This case involves the proposed diversion of an international river by France (the upstream state), and the arbitral tribunal finally affirmed that a state (France) has an obligation not to exercise its rights to the extent of ignoring the rights of another (Spain, the downstream state).

Nuclear Tests Case (*Australia v France*) (*Interim Protection*) (1974) ICJ Reports 253. This case involves Australia's claims on the possible environmental damage from France's atmospheric nuclear tests in the Pacific. Judge de Castro stated: 'If it is admitted as a general rule that there is a right to demand prohibition of the emission by neighbouring properties of noxious fumes, the consequences must be drawn, by an obvious analogy, that the Applicant is entitled to ask the Court to uphold its claim that France should put an end to the deposit of radio-active fall-out on its territory.'

146 *International Plant Protection Convention*, opened for signature 6 December 1951, 150 UNTS 67 (entered into force 3 April 1952) preamble.

147 *Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and under Water*, opened for signature 5 August 1963, 480 UNTS 43 (entered into force 10 October 1963) art. I(1)(b).

to affect the natural resources of any other State.'[148] In summary, one common feature that both cases and treaties share is that they only deal with transboundary harm to other states.

The second stage commenced in 1972 when the *Stockholm Declaration* was adopted. The concept of transboundary harm during this period was expanded from mere relations between two States to relations which also include those between one State and global commons areas, namely the areas beyond the limits of national jurisdiction. Examples of global commons areas are the high seas and the airspace above them, the deep sea-bed, outer space, the Moon and other celestial bodies.[149] These changes were reflected in Principle 21 of *Stockholm Declaration*, Principle 2 of *Rio Declaration*, Article 3 of the *Convention on Biological Diversity* (*CBD*),[150] Preamble of the *UNFCCC*, and other conventions and UN documents.[151]

Among these international instruments, Principle 21 of the *Stockholm Declaration* has two relevant implications. Firstly, States have a due diligence obligation to regulate all public and private activities within their jurisdiction and control so as to prevent and control the transboundary harm to other States or areas outside the limits of their jurisdiction.[152] This affirmed and

148 *African Convention on the Conservation of Nature and Natural Resource*, opened for signature 15 September 1968, 1001 UNTS 4 (entered into force 9 October 1969) art. XVI(1)(b).

149 Birnie, Boyle and Redgwell, above n. 4, 145. Some relevant treaties include 1967 Outer Space Treaty (*Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*, opened for signature 27 January 1967, 610 UNTS 205 (entered into force 10 October 1967)), 1979 Moon Treaty (*Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, opened for signature 5 December 1979, 18 ILM 1434 (entered into force 11 July 1984)), 1972 London Dumping Convention (*Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter*, opened for signature 29 December 1972, 18 ILM 510 (entered into force 30 August 1975)), and 1982 LOSC art. 145, 209.

150 *Convention on Biological Diversity*, opened for signature 5 June 1992, 31 ILM 818 (entered into force 29 December 1993) ('*CBD*').

151 For example, the United Nations General Assembly emphasised that State parties 'must not produce significant harmful effects in zones situated outside their national jurisdiction' during the course of the exploration, exploitation and development of their natural resources. See, *Cooperation between States in the Field of the Environment*, UNGA Res 2995 XXVII (15 December 1972).

152 Kiss and Shelton, above n. 1, 189. See also Birnie, Boyle and Redgwell, above n. 4, 147–150. Birnie asserts that 'due diligence' addresses two issues: one is that it 'requires the introduction of policies, legislation, and administrative controls applicable to public and private conduct which are capable of preventing or minimizing the risk of transboundary

improved the '*Trail Smelter* principles'. Secondly, States should apply the same rules not only within their jurisdiction (for example, land territory, territorial sea, continental shelf, and exclusive economic zone) but also to activities and processes under their control, such as 'ships, airplanes and spacecraft having the nationality of the State, missions to Antarctica, troops stationed in foreign territories, and any occupied or dependent territories'.[153] The incorporation of 'global commons areas' into the protection regime against transboundary harm by Principle 21 was a significant advancement which suggests that the State obligation to prevent, reduce and control environmental harm was 'no longer solely bilateral in character';[154] instead it benefits all humankind.

The third stage began with the adoption of *LOSC*. However, some of the subsequent treaties or UN documents still fall into the category of the second stage.[155] The significance of *LOSC* concerning the prevention of transboundary harm mainly lies in the shift of emphasis from a negative obligation to prevent transboundary harm to a positive commitment to preserve and protect the environment.[156] To that end, two changes were made. Firstly, *LOSC* transforms the 'responsibility' into a 'duty' under Article 193[157] which probably indicates more moral commitment whereas the 'responsibility', which was used in

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harm to other States or the global environment'; the other is that it 'entails an evolving standard of technology and regulation' since internationally agreed 'ecostandards' can be easily detailed and precise, as in the annexes to *MARPOL 73/78*, and usually be easily updated, often using soft-law instruments or decisions of the parties.

153 Kiss and Shelton, above n. 1, 189–190.

154 Birnie, Boyle and Redgwell, above n. 4, 145.

155 For instance, essentially the 1992 *CBD* and the *Rio Declaration* adhere to the features on the prevention of transboundary harm reflected in the *Stockholm Declaration*.

156 Sands, above n. 130, 244; Birnie, Boyle and Redgwell, above n. 4, 151.

'Negative obligation' was reflected in previous treaties or regulatory documents where this state obligation was only mentioned and imposed by some limitations. For example, the second part of Rio Principle 2 only mentions the avoidance of the fact of harm, rather than the conduct of the state in bringing it about or failing to prevent it; and the first part of Rio Principle 2 probably indicates that economic activities outweigh the seriousness of the possible environmental harm.

157 *LOSC* art. 193. Article 193 reads that:

'States have the sovereign right to exploit their natural resources pursuant to their environmental policies and in accordance with their *duty* to protect and preserve the marine environment.'

But Sands asserts that 'it is unclear what was intended by the change'. Sands, above n. 130, 244.

previous treaties, is generally a condition of being responsible. Secondly, Article 194(2) utilises strong language to indicate such commitment. It provides that,

> States *shall* take *all measures necessary* to ensure that activities under their jurisdiction or control *are so conducted as not to cause damage* by pollution *to other States and their environment*, and that pollution arising from incidents or activities under their jurisdiction or control *does not spread beyond the areas* where they exercise sovereign rights in accordance with [the] Convention.[158] [emphasis added]

Following the LOSC, the rules on the prevention of transboundary harm continued to develop through subsequent treaties and the International Court of Justice (ICJ) rulings, such as the 1985 ASEAN Convention[159] and the ICJ's Advisory Opinion on the Legality of the Threat or Use of Nuclear Weapons.[160]

The liability regime on transboundary harm also developed with the evolution of rules on transboundary harm. The International Law Commission (ILC) has been working on transboundary environmental harm since 1978 with the 'improbable' title of 'Liability for Injurious Consequences of Acts Not Prohibited by International Law'.[161] In 1996 the ILC released draft articles and commentary,[162] which initially put forward the three-element damage

158 *LOSC* art. 194(2).

159 *Association of South Ease Asian Nations Agreement on the Conservation of Nature and Natural Resources*, opened for signature 9 July 1985, 15 EPL 64 (not yet in force) art. 20(1). Article 20(1) recognises the second element of Principle 21 of Stockholm Declaration and Principle 2 of Rio Declaration as a 'general accepted principle of international law'. It reads that,

'Contracting Parties have in accordance with generally accepted principles of international law the responsibility of ensuring that activities under their jurisdiction or control do not cause damage to the environment or the natural resources under the jurisdiction of other Contracting Parties or of areas beyond the limits of national jurisdiction.'

160 *Legality of the Threat or Use of Nuclear Weapons* (*Advisory Opinion*) (1996) ICJ Reports 241, para. 29. In this advisory opinion, the ICJ stated that:

'The existence of the general obligation of States to ensure that activities within their jurisdiction and control respect the environment of other States or of areas beyond national control is now part of the corpus of international law relating to the environment.' This statement could be interpreted as a confirmation of the role of the prevention of transboundary harm as a rule of customary international law.

161 Birnie, Boyle and Redgwell, above n. 4, 146; See also *II Yearbook International Law Commission* (1980) Pt1, 160, 138–139.

162 *Report of the Working Group on International Liability*, in International Law Commission Report (1996) GAOR A/51/10, Annex 1, 235.

structure made up of prevention, cooperation and strict liability.[163] However, more important contributions from the ILC are the *2001 Draft Articles on the Prevention of Transboundary Harm from Hazardous Activities* (*Draft Articles*) and the *2006 Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising Out of Hazardous Activities* (*Draft Principles*).[164]

The *2001 Draft Articles* apply to all activities within the jurisdiction or control of States which involve a risk of causing significant transboundary harm,[165] and the 'risk' covers both unlikely but disastrous accidents and highly probable but smaller scale harm.[166] Since the harm or the risk of harm has to be 'significant', a thorough determination of 'significance' is thus important.

The *2006 Draft Principles* are basically an international standard of liability involving both compensation for damage and the procedures and remedies. As the core principle, Principle 6(1) sets out the objective of prompt, adequate and effective compensation by means of competent judicial and administrative bodies of the State.[167] Concerning the allocation of loss arrangement

163 *Report of the Working Group on International Liability*, annex I, C, Ch I, art. 4 (Prevention), art. 5 (Liability), and art. 6 (Cooperation).

Article 4 reads that, 'States shall take all appropriate measures to prevent or minimize the risk of significant transboundary harm and, if such harm has occurred, to minimize its effects.' This article, together with article 6, provides the basic foundation for the articles on prevention. The obligation of States to take preventive or minimization measures is one of due diligence.

Article 5 stipulates that, 'In accordance with the present articles, liability arises from significant transboundary harm caused by an activity referred to in article 1 and shall give rise to compensation or other relief.' This principle of liability and reparation is a necessary corollary and complement to article 4. That article obliges States to prevent or minimize the risk from activities that are not prohibited by international law. Article 5, on the other hand, establishes an obligation to provide compensation or other relief whenever significant transboundary harm occurs.

Article 6 specifies that, 'States concerned shall cooperate in good faith and as necessary seek the assistance of any international organization in preventing or minimizing the risk of significant transboundary harm and, if such harm has occurred, in minimizing its effects both in affected States and in States of origin.' This kind of all-round cooperation is essential in designing and implementing effective policies to prevent or minimize the risk of causing significant transboundary harm.

164 *Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising Out of Hazardous Activities*, Annex, UN Doc A/RES/61/36 (18 December 2006) ('*Draft Principles*').

165 *Draft Articles* art. 1.

166 *Draft Articles* art. 2(a).

167 *Draft Principles* art. 6(1). Art 6(1) reads that:

'States shall provide their domestic judicial and administrative bodies with the necessary jurisdiction and competence and ensure that these bodies have prompt, adequate and effective remedies available in the event of transboundary damage caused by

in the *2006 Draft Principles*, three features are notable. Firstly, it adopts strict liability[168] in treaties and in national law instead of proof of fault.[169] The ILC commentary indicates that this choice has taken the inherent risks of hazardous activities into consideration and that it would be unjust and inappropriate to apply proof of fault once accidents occur.[170] Secondly, it imposes liability for damage on the operator and/or other person or entity,[171] which is drawn from the existing civil liability and compensation schemes and seems more flexible.[172] Thirdly, it offers more options for supplementary compensation from the industry and/or State in case the financial resources of the operator are insufficient to cover the damage suffered due to an incident.[173]

In addition to *MARPOL 73/78*, the *1999 Basel Liability Protocol*, the *2001 Bunker Convention*, and above treaties, some other treaties on specific areas, such as oil pollution from ships, have been adopted to cope with possible damage from transboundary harm. Typical examples are the 1969/1971 regime (*1969 CLC,*[174]

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hazardous activities located within their territory or otherwise under their jurisdiction or control.'

168 'Strict liability' means that a person is liable for any harm he causes even if he is not at fault or negligent. The rationale is that it is technically difficult to prove fault for the victims in the environmental context due to the complex process of tracing the formation of harm. This approach aims to better provide compensation for victims and reduce potential harm. David Weisbach, 'Negligence, Strict Liability, and Responsibility for Climate Change' (2012) 97(2) *Iowa Law Review* 521, 554–555.

169 *Draft Principles* art. 4(2). See also Birnie, Boyle and Redgwell, above n. 4, 320.

170 *International Law Commission Report* (2004) Commentary to Principle 4, 15–17.

171 *Draft Principles* art. 4(2)(3).

172 Take the *2001 Bunker Convention* and the *1999 Basel Liability Protocol* as examples: under the *2001 Bunker Convention*, the shipowner, charterer, manager and operator are jointly and severally liable; while the *1999 Basel Liability Protocol* makes the generators, exporters, importers and disposers all potentially liable at different stages of the wastes' journey to its eventual destination. See *IMO International Convention on Civil Liability for Bunker Oil Pollution Damage*, opened for signature 27 March 2001, 40 ILM 1493 (entered into force 21 November 2008) ('*2001 Bunker Convention*') art. 3,7; *Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and Their Disposal*, opened for signature 10 December 1999, EMuT 989:22/B (not yet in force) art. 4,5,9('*1999 Basel Liability Protocol*'). See also Birnie, Boyle and Redgwell, above n. 4, 320.

173 *Draft Principles* art. 7.

174 *International Convention on Civil Liability for Oil Pollution Damage*, opened for signature 29 November 1969, 973 UNTS 3 (entered into force 19 June 1975) ('*1969 CLC*').

and the *1971 Fund Convention*[175]), the 1992 regime (the *1992 CLC*,[176] and the *1992 Fund Convention*[177]), and the *1996 HNS Convention*,[178] which will be further discussed in the polluter-pays principle section of this chapter.

2.3.2 *The Application of Transboundary Harm Rules to the Issue of Greenhouse Gas Emissions from International Shipping*

As already noted, GHG emissions from international shipping can be regarded as a type of 'conditional' pollution. Given that harm is a broader term than pollution, are GHG emissions from international shipping a kind of transboundary harm? And if so, how can the rules on the prevention of transboundary harm apply to this GHG emissions issue? This section provides an analysis of these issues.

First of all, can GHG emissions from international shipping produce transboundary harm? To address this question, we need to examine the terms 'harm' and 'transboundary' respectively.

'Harm' means adverse effects caused to persons, property or the environment.[179] As illustrated in Chapter 1, GHG emissions from international shipping may result in many deleterious effects on atmospheric composition, marine ecosystems, human health and climate. These effects, however, may not be considered 'serious' or 'substantial' due to the cumulative nature of GHG emissions. Some serious consequences, such as the inundation of some islands as a result of sea level rise,[180] or the extinction of some marine species due to ocean acidification, may be caused by many factors over quite a long term where GHG emissions from international shipping are only part of the

175 *International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage*, opened for signature 18 December 1971, 11 ILM 284 (entered into force 16 October 1978) ('*1971 Fund Convention*').

176 *International Convention on Civil Liability for Oil Pollution Damage*, opened for signature 27 November 1992, IMO LEG/CONF.9.15 (entered into force 30 March 1996) ('*1992 CLC*').

177 *International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage*, opened for signature 27 November 1992, 87 UKTSCm 3433 (entered into force 30 May 1996) ('*1992 Fund Convention*').

178 *International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea*, opened for signature 3 May 1996, 25 ILM 1406 (not yet in force) ('*1996 HNS Convention*').

179 *Draft Articles* art. 2(b).

180 For example, in late 2005 an entire coastal village in the north of Tegua Island in Vanuatu was relocated to higher ground; in 2009 the Carteret Islanders of Papua New Guinea became the world's first entire community to be displaced by climate change. See ch. 1, 1.1.2.

cause and only add to the quantum of harm. On the other hand, the harm could be 'more than detectable' in a comparatively short period. For instance, excessive GHG emissions from international shipping may contribute to shifting ranges and distribution of species which will have direct impacts on fish stocks and can be easily noticed. Researchers have found that in harbour cities ship emissions, including GHG emissions and other emissions, are often a dominant source of urban pollution.[181] Therefore, as discussed earlier, the harm resulting from GHG emissions from international shipping may be 'more than detectable', but whether it is 'serious' or 'substantial' needs to be examined on a case-by-case basis. This element, based on the requirements from the *2001 Draft Articles* and other international instruments, meets the threshold for 'significant' harm under certain circumstances.

The harm caused by GHG emissions from international shipping may also be 'transboundary'. The definition of 'transboundary harm' in the *2001 Draft Articles* indicates that the 'boundary' refers to territorial boundaries, jurisdictional boundaries or control boundaries of the State.[182] In the case of international shipping, the 'State of origin' is generally the flag State of the ship,[183] and the 'State likely to be affected' may be the coastal State, port State or a third State.[184] Since ships always sail between ports of different countries in the context of international shipping,[185] the harms caused by GHG emissions from international shipping to other areas may fall into four main scenarios.

The first scenario is that GHG emissions from international shipping cause significant harm to the high seas and the deep seabed, or the international airspace which is the airspace above the high seas and exclusive economic

181 Veronika Eyring et al., 'Transport Impacts on Atmosphere and Climate: Shipping' (2010) 44(37) *Atmospheric Environment* 4735, 4753.

182 *Draft Articles* art. 2(c). This article stipulates that,

> 'Transboundary harm' means harm caused in the *territory* of or in other places under the *jurisdiction* or *control* of a State other than the State of origin, whether or not the States concerned share a common border.

This sentence is a summary for the above article, stressing that there are actually three types of 'boundaries'.

183 *Draft Articles* art. 2(d). This article reads:

> 'State of origin' means the State in the territory or otherwise under the jurisdiction or control of which the activities referred to in article 1 are planned or are carried out.

184 *Draft Articles* art. 2(e). This article provides that:

> 'State likely to be affected' means the State or States in the territory of which there is the risk of significant transboundary harm or which have jurisdiction or control over any other place where there is such as risk.

185 See ø. Buhaug et al., 'Second IMO GHG Study 2009' (International Maritime Organization (IMO), 2009) 13.

zones (EEZ) of a coastal State. In this case, the harms occur between the flag State of the ship and the global commons areas, or in other words, between one national jurisdiction and the areas beyond the limits of national jurisdiction. The second scenario is that GHG emissions from international shipping impose adverse effects on the EEZ, territorial sea (or archipelagic waters), continental shelf, the land territory, the atmosphere above the land and territorial sea (or archipelagic waters) of a State. In these circumstances, the harms are inflicted to the coastal States or the port States (or the archipelagic States) by the flag State of the ship, and this scenario involves harms between two national jurisdictions. The third scenario is that GHG emissions from international shipping result in substantial harm to a third State, such as its land territory or territorial sea or airspace under its sovereignty, via the territorial sea or land of another coastal State or port State (a second State). In this scenario, the coastal State or port State (the second State) has jurisdiction over GHG emissions from ships of the flag State although they are not under an obligation to assume such jurisdiction.[186] In this case, the flag State will be responsible for the harm it causes to the third State directly. Clearly this scenario also involves harm between two national jurisdictions. In addition, there is another possibility, or the fourth scenario. GHG emissions from one ship produce harm to another ship or platform of another State (irrespective of whether they are on the high seas or anywhere on the sea) during their international voyages. This scenario involves harm between two national jurisdictions (two flag States). However, it rarely occurs in practice.

It is clear that all four scenarios fall into the category of harm between two national jurisdictions (Scenario two, three and four) or from one national jurisdiction to the areas beyond national jurisdiction (Scenario one). This observation underpins the transboundary nature of GHG emissions from international shipping, which was discussed earlier in this section.

The above discussion of the terms 'harm' and 'transboundary' in the context of GHG emissions from international shipping make possible the application of the rules on the prevention of transboundary harm to this specific issue. However, how can the rules on the prevention of transboundary harm apply

186 *LOSC* art. 211(4). This article stipulates that,

'Coastal States *may*, in the exercise of their sovereignty within their territory sea, adopt laws and regulations for the prevention, reduction and control of marine *pollution* from foreign vessels, including vessels exercising the right of innocent passage . . .'

Since GHG emissions from international shipping can be treated as a type of 'conditional' pollution as discussed at the beginning of this chapter, this article applies to this scenario.

to this GHG emissions issue? A brief examination of the four scenarios in relation to possible transboundary harm is now provided to justify the application of the two transboundary harm rules to GHG emissions from international shipping.

In the first scenario, harm occurs between one national jurisdiction and the areas beyond national jurisdiction. As discussed earlier, the flag State of the ship has primary jurisdiction when GHG emissions from international shipping cause significant harm to the high seas or international airspace.[187] Coastal States are not permitted to take action unless they are threatened by the damage (transboundary harm),[188] which generally does not apply in this scenario. In this case, in accordance with the two rules on transboundary harm, it is mainly the flag State that has a duty to prevent, reduce and control the possible transboundary harm from the GHG emissions of its ship. To achieve this goal, the flag State is required to adopt national laws on the reduction of shipping GHG emissions, which should at least have the same effect as that of generally accepted international rules and standards established through the IMO,[189] taking into account the amended Annex VI to *MARPOL 73/78* irrespective of whether they have ratified the amendments.[190] When a violation occurs, the flag State shall impose administrative penalties or institute proceedings in relation to such offences. Moreover, flag States shall conduct

187 However, the *1982 LOSC* also empowers the port State enforcement jurisdiction with respect to violations committed beyond its territorial sea (including the global commons areas) by a ship flying a foreign flag, where the flag State may be reluctant to do so, and/or where the coastal State is unable or incompetent to act. See *LOSC* art. 218.

188 *LOSC* art. 221.

189 *LOSC* art. 211(2). Currently there are no specific generally-accepted IMO rules relating GHG emissions from international shipping.

190 See *LOSC* art. 212(1). This provision provides that,

'States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from or through the atmosphere, applicable to the air space under their sovereignty and to vessels flying their flag or vessels or aircraft of their registry, taking into account internationally agreed rules, standards and recommended practices and procedures and the safety of air navigation.'

When applying this provision to the adoption of amended Annex VI to *MARPOL 73/78*, it can be argued that this amendment is 'internationally agreed' rather than 'generally accepted' as indicated in Article 211(2) of the LOSC. This is because the amendment was adopted by a majority vote within the IMO in July 2011 when some large shipping nations, such as China, India, Brazil, Chile, Kuwait and Saudi Arabia, voted against this adoption. This lack of consensus makes the amendment less likely to be a 'generally accepted' rule, but the broad participation of many countries still enable it to be an 'internationally agreed' amendment. See Harrison, above n. 77, 21–23.

regular surveys, issue or empower other parties to issue the IEE Certificate to ships flying their flags. Another aspect is the duty of cooperation by States concerned. When informed of suspected violations of *MARPOL 73/78* in areas beyond national jurisdiction, the flag State is obliged to cooperate with relevant parties, such as port States or sometimes coastal States, in detecting, inspecting or investigating such violations.

The second scenario deals with the harm between the flag State and a coastal State or port State. In accordance with the two rules on transboundary harm, two requirements apply to both parties. First of all, the flag State has the prescriptive and enforcement jurisdiction and responsibility to prevent, reduce and control transboundary harm resulting from GHG emissions from the ship entitled to fly its flag. This duty is exactly the same as that in the first scenario. Meanwhile, the coastal State may adopt national laws on the reduction of GHG emissions from international shipping applicable to either its territorial sea or its EEZ. However, such legislation should not hamper the right of innocent passage of foreign vessels in its territorial sea and should be consistent with Annex VI to *MARPOL 73/78* in its EEZ if the State is a party to Annex VI. In their internal waters and ports, both the coastal State and the port State are free to make and enforce national laws dealing with such emissions. More significantly, port States may investigate and prosecute discharge violations wherever they have taken place.[191] In the second place, once damage or risk of damage occurs, the States concerned, including the coastal State, port State, or other parties, shall notify the vessel or the flag State of the violation of Annex VI to *MARPOL 73/78* or the *LOSC* if applicable, so that measures can be taken to reduce the possible loss.

The third scenario involves harm between the flag State and a third State. The discussion for the second scenario applies if the third State is also a coastal State or a port State when the GHG emissions from international shipping are transferred to its territorial sea or other maritime zones via another coastal State or port State (the second State). However, if the third State is a landlocked State and the harm is caused to its land or the atmosphere above its land, the duties of the flag State are still the same as those in the first and second scenarios while the rights and obligations of the third State are very similar to those of the United States in the *Trail Smelter* case.

The fourth scenario involves harm between two flag States. When such harm occurs, it is mainly the two flag States that deal with the issue. The prescriptive and enforcement jurisdiction and obligations of the flag State illustrated in the first scenario will then apply.

191 *LOSC* art. 218(1).

Another relevant issue is the allocation of liabilities for the transboundary harm caused by GHG emissions from international shipping. Nowadays it is common that the vessel is registered in one State and managed by an operating company registered in another State, the crew is multinational and the beneficial owner is in another State. In these circumstances, when GHG emissions from international shipping cause transboundary harm, more jurisdictions will be involved besides the 'State of origin' and the 'State likely to be affected'. This issue will be further discussed in the section on the polluter-pays principle of this chapter.

2.4 The Precautionary Principle and Its Application to the Issue of Greenhouse Gas Emissions from International Shipping

The precautionary principle has emerged in environmental law and policy in response to the need for an effective method to deal with risks and uncertainties associated with activities with the potential to affect the environment. It has been generally accepted as a 'basic rule' that governs activities especially those affecting the ocean environment.[192] This principle prescribes a general rule which has been translated into specific responsibilities for the proponents of certain maritime activities to meet before they are undertaken, so as to mitigate the adverse effects of these activities on the marine environment.[193] This part first examines the concept of the precautionary principle from the perspectives of its evolution, legal status and implementation. Then, it explores the application of this principle to the issue of GHG emissions from international shipping.

2.4.1 *An Overview of the Precautionary Principle*

The precautionary principle, also called the precautionary approach or precautionary measures,[194] is closely related to other international environmental law principles including the obligation to prevent transboundary harm, the preventive principle and the polluter-pays principle. Firstly, the duty to

192 J.M. Van Dyke, 'Applying the Precautionary Principle to Ocean Shipments of Radioactive Materials' (1996) 27(4) *Ocean Development and International Law* 379, 379.

193 Ibid.

194 The term 'precautionary approach' is preferred by the US and many global agreements adopt it or 'precautionary measures', while the 'precautionary principle' is favoured by European treaties and European Community law. However, these differences are often regarded as less significant. See Birnie, Boyle and Redgwell, above n. 4, 155.

prevent transboundary harm requires that each State has a duty to prevent significant harm to other States or to common spaces. In other words, the State has the obligation of 'diligent prevention and control of foreseeable risks', which to some extent justifies the adoption of a precautionary approach.[195] Secondly, the polluter-pays principle, which is analysed in the following section, is closely associated with the precautionary principle.[196] The precautionary principle imposes an environmental duty of care to prevent potential harm through seeking 'collective environmental responsibility'.[197] Similarly, under the polluter-pays principle, not only present polluters but also potential polluters are responsible for their actions. It appears that both principles adopt a 'forward-looking approach'.[198] Finally, the precautionary principle has been developed on the basis of the preventive principle. However, prevention aims to avoid an 'identifiable threat' which has been scientifically proven, whereas precaution underscores avoiding 'uncertain outcomes which may, or may not, be harmful'.[199] In general, the polluter-pays and preventive principles deal with known situations and risks while the precautionary principle addresses the scientific uncertainty of issues.[200]

The precautionary principle emerged from the early concept of *vorsorge* (foresight, taking care) adopted by the former West Germany in its environmental management in the 1960s. It evolved into the *vorsorgeprinzip* (precautionary or foresight principle) to resolve the environmental issues faced by Germany and other European countries in the 1970s.[201] The principle was first employed internationally in the 1984 Conference on Protection of the North Sea.[202] It was later endorsed by the *1987 Montreal Protocol* and the 1990 *Bergen*

195 Ibid. 153.

196 Warwick Gullett, 'Environmental Protection and the Precautionary Principle: a Response to Scientific Uncertainty in Environmental Management' (1997) 14(1) *Environmental and Planning Law Journal* 52, 55.

197 Ibid. 54.

198 Minna Pyhålå, Anne Brusendorff and Hanna Paulomåki, 'The Precautionary Principle' in Malgosia Fitzmaurice, David M. Ong and Panos Merkouris (eds), *Research Handbook on International Environmental Law* (2010) 203, 204.

199 Warwick Gullett, 'The Precautionary Principle in Australia: Policy, Law and Potential Precautionary EIAs' (2000) 11(2) *Risk: Health, Safety & Environment* 93, 98.

200 Pyhålå, Brusendorff and Paulomåki, above n. 198, 205.

201 Elena McCarthy, 'Ocean Noise, Scientific Uncertainty, and the Paradox of the Precautionary Principle' (2007) 10(3) *Journal of International Wildlife Law & Policy* 233, 233; Pyhålå, Brusendorff and Paulomåki, above n. 198, 205.

202 McCarthy, above n. 201, 233; Birnie, Boyle and Redgwell, above n. 4, 154. The adoption of the 1984 Bremen Ministerial Declaration and the 1987 London Declaration of the First

Ministerial Declaration on Sustainable Development.[203] Since then, the precautionary principle has been incorporated into 'almost all' international agreements and declarations related to environmental protection.[204] These include the *1992 Rio Declaration*, *Agenda 21*, *1992 UNFCCC*, *1992 CBD*, and *1996 Protocol to London Dumping Convention*.[205] Furthermore, many States, including both developed and developing States, have incorporated the precautionary principle in their domestic environmental policy and law.[206]

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and Second International Conferences on the Protection of the North Sea indicates the early utilisation of the precautionary principle. Specifically, article D3 of the 1984 Bremen Ministerial Declaration says that, 'Precautionary measures for air quality control by reduction of emissions at source should also be determined for the protection of the North Sea, based on the best available technology'. Article 7 of the 1987 London Declaration purports that, 'in order to protect the North Sea from possibly damaging effects of the most dangerous substances, a precautionary approach is necessary which may require action to control inputs of such substances even before a causal link has been established by absolutely clear scientific evidence'.

203 *Montreal Protocol on Substances that Deplete the Ozone Layer*, opened for signature 16 September 1987, 26 ILM 1550 (entered into force 1 January 1989) preamble ('*Montreal Protocol*').

It states that, '[parties to the Montreal Protocol] determined to protect the ozone layer by taking precautionary measures to control equitably total global emissions of substances that deplete it, with the ultimate objective of their elimination on the basis of developments in scientific knowledge, taking into account technical and economic considerations'.

Bergen Ministerial Declaration on Sustainable Development, 20 EPL 200 (15 May 1990) principle 7.

It advocates that, 'in order to achieve sustainable development, policies must be based on the precautionary principle. Environmental measures must anticipate, prevent and attack the causes of environmental degradation. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation'.

Kiss and Shelton note that the 1990 Bergen Ministerial Declaration on Sustainable Development was 'the first international instrument to treat the principle as one of general application and linked to sustainable development'.

See Kiss and Shelton, above n. 1, 269–207.

204 Kiss and Shelton, above n. 1, 207.

205 *Rio Declaration* prin 15; *Agenda 21* ch. 17, para. 17.1; *UNFCCC* art. 3.3; *CBD* preamble; *1996 Protocol to London Dumping Convention* art. 3(1).

206 For example, in Australia the precautionary principle has been explicitly included in many fisheries laws and employed in a number of cases. Examples are the *Fisheries Management Act 1991* (Cth), *Dixon v Australian Fisheries Management Authority* (AFMA) [2000], *Arno Blank v AFMA* [2000], and *Latitude Fisheries Pty Ltd and Anor v AFMA* [2000].

There have been a number of discussions on the concept of precautionary principle and how it should be interpreted and implemented.[207] Arguably Principle 15 of the *Rio Declaration* is the most accepted formulation of the precautionary principle.[208] Principle 15 stipulates that:

> Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.[209]

This formulation provides constraints or guidance on the decision-making process relating to a proposed action, and can be regarded as an advance when compared to the traditional preventive principle.[210] As such, Fisher

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See Warwick Gullett, Chris Paterson and Elizabeth Fisher, 'Substantive Precautionary Decision-Making: the Australian Fisheries Management Authority's "Lawful Pursuit" of the Precautionary Principle' (2001) 7(2) *The Australian Journal of Natural Resources Law and Policy* 95, 110–114. In India and Pakistan, the precautionary principle is treated as a principle of international law and invoked by their Supreme Courts. Birnie, Boyle and Redgwell, above n. 4, 159.

207 See, e.g., Timothy O'Riordan and James Cameron, *Interpreting the Precautionary Principle* (Earthscan Publications, 1994); Julian Morris, *Rethinking Risk and the Precautionary Principle* (Butterworth-Heinemann, 2000); Poul Harremoës, *The Precautionary Principle in the 20th Century: Late Lessons from Early Warnings* (Earthscan Publications, 2002); Simon Marr, *The Precautionary Principle in the Law of the Sea: Modern Decision Making in International Law* (Martinus Nijhoff, 2003); Barney Dickson, Rosie Cooney and Ebscohost, *Biodiversity and the Precautionary Principle: Risk Uncertainty and Practice in Conservation and Sustainable Use* (Earthscan, 2005); Jacqueline Peel, *The Precautionary Principle in Practice: Environmental Decision-making and Scientific Uncertainty* (Federation Press, 2005).

208 Gullett, above n. 196.

209 *Rio Declaration* pin 15.

210 But this approach has also been criticised for its weakness, and is treated as 'deliberation-guiding' rather than 'action-guiding'. It is argued that the 'deliberation-guiding' approach as adopted in Principle 15 of the Rio Declaration is 'less stringent' than the 'action-guiding' approach as adopted by the 1989 report of the Nordic Council's International Conference on the Pollution of the Seas. This report reads that,

'The need for an effective precautionary approach, with that important principle intended to safeguard the marine ecosystem by, amongst other things, eliminating and preventing pollution emissions where there is reason to believe that damage or harmful effects are likely to be caused, even where there is inadequate or inconclusive scientific evidence to prove a causal link between emissions and effects.'

Dickson classifies the formulations of the precautionary principle into two versions: one is 'action-guiding' version of the principle calling for action against the practice that

treats the precautionary principle as 'a legal principle that is concerned with decision-making under scientific uncertainty in the context of risk regulation'.[211] Fisher asserts that risk regulation consists of such three activities as standard setting, the application of those standards, and enforcement, while the precautionary principle mainly involves standard setting.[212] While Fisher underscores the standard setting stage of the decision-making process, Gullett pays more attention to the outcome of applying the precautionary principle. Gullett takes the view that this principle should 'at minimum' be interpreted as 'requiring the adoption of sound environmental practices and the reduction of emissions of pollutants at source'.[213] The application of this principle 'normally involves accepting a known risk of environmental harm to guard against an uncertain environmental outcome'.[214]

The precautionary principle has received widespread support theoretically and practically although it has been subject to significant and sustained criticism for its subjective criteria or vague wording.[215] It is arguable that the precautionary principle can be an important environmental law principle and a rule of customary international law.[216] In practice, this principle

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may cause damage; the other is 'deliberation-guiding' version which stipulates that lack of evidence shall not be used as a reason for postponing action against potentially harmful activities.

Barnabas Dickson, 'The Precautionary Principle in CITES: A Critical Assessment' (1999) 39(2) *Natural Resources Journal* 211, 213–214; *Nordic Council's International Conference on Pollution of the Seas*, Greenpeace 18, Annex 2 (1990) 27.

211 Elizabeth Fisher, "Precaution, Precaution Everywhere: Developing a Common Understanding of the Precautionary Principle in the European Community" (2002) 9(1) *Maastricht journal of European and comparative law* 21, 9.

212 Elizabeth Fisher, 'Is the Precautionary Principle Justiciable?' (2001) 13(3) *Journal of Environmental Law* 315, 317.

213 Gullett, above n. 196, 58.

214 Ibid.

215 See, e.g., Marr, above n. 207, 21. Marr asserts that the precautionary principle relies heavily on subjective criteria to trigger environmental action; Morris, above n. 207, 7–15. Morris claims that problems of this principle include the fallacy that the merest possibility of catastrophe should justify action, the precautionary principle is unnecessary, demands for a reversal of the burden of proof are disingenuous, the standard of proof is infinitely high, a duty to take action to prevent harm would be too broad, examining the full range of alternatives would be infinitely costly, and so on.

216 See, e.g., Sands, above n. 130, 279; Pyhälä, Brusendorff and Paulomäki, above n. 198, 210. Sands asserts that current State practice supports the view that the precautionary principle 'reflects a principle of customary law', and Pyhälä, Brusendorff and Paulomäki argue that this principle can be considered as a principle of customary international law 'at

has been invoked by many cases in the International Court of Justice (ICJ),[217] the International Tribunal for the Law of the Seas (ITLOS),[218] and the World Trade Organization (WTO).[219] However, these international bodies have not taken an explicit position as to whether the precautionary principle is a binding principle of customary international law although some judges have referred to it in individual judgments.[220] For example, in the 1999 *Southern Bluefin Tuna* (*Australia and New Zealand v. Japan*) case,[221] Judge Shearer commented that, 'the measures ordered by the Tribunal are rightly based upon considerations deriving from a precautionary approach'.[222] As noted earlier, this principle has also been incorporated in the statute law and case law of many countries.

Regarding the structure of the precautionary principle, the following four basic elements are generally found in most formulations.[223] They are: a threat of harm, a lack of scientific certainty or evidence, no proved causation between cause and effect, and the existence of the duty to act.[224] Then, in cases where there is reason to believe harm may occur but it cannot be proven scientifically, what precautionary responses or which precautionary measures should be taken by policy makers? Based on current research, the following three steps might be employed in applying the precautionary principle.

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least from a regional perspective'. But Birnie, Boyle and Redgwell purport that it is 'far from evident' that the precautionary principle has the normative character of a rule of law. Birnie, Boyle and Redgwell, above n. 4, 161.

217 Examples are the 1995 Nuclear Tests case and the 1997 Gabcikovo-Nagymaros Case. See *Request for an Examination of the Situation in Accodance with Paragraph 63 of the Court's Judgment of 20 December 1974 in the Nuclear Tests* (*New Zealand v France*) (1995) ICJ Reports 288; *Gabcikovo-Nagymaros Case* (*Hungary v Slovakia*) (1997) ICJ Reports 7.

218 Examples are the 1999 Southern Bluefin Tuna case, and the 2001 MOX Plant Case. See *Southern Bluefin Tuna Case* (*Australia & New Zealand v Japan*) (1999) Case Nos. 3 and 4 ITLOS; *The MOX Plant Case* (*Ireland v United Kingdom*) (2001) 47 ILM 405; ITLOS, Order of 3 December 2001 on Provisional Measures.

219 Example is the 1988 Hormones case involving beef hormones and genetically modified organisms which has been settled by the WTO.

220 Pyhälå, Brusendorff and Paulomåki, above n. 198, 208.

221 *Southern Bluefin Tuna Case* (*Australia & New Zealand v Japan*) (1999) Case Nos. 3 and 4 ITLOS.

222 See Pyhälå, Brusendorff and Paulomåki, above n. 198, 222.

223 Peter L. deFur and Michelle Kaszuba, 'Implementing the Precautionary Principle' (2002) 288(1–2) *The Science of The Total Environment* 155, 157. L.deFur and Kaszuba used 7 cases to illustrate the 4-element structure of the precautionary principle, especially the possible situations for 'uncertainty'.

224 Ibid.

The first step is to identify current options for precautionary measures, or tools for incorporating the precautionary principle. This principle calls for a response in the face of scientific uncertainty. However, the selection of appropriate precautionary measures should take into account the differing ecological, cultural, political and economic interests and conditions of different countries.[225] Furthermore, preventative measures should be taken so as to fulfil the purpose of the precautionary principle.[226] These preventive measures and tools may include research, an Environmental Impact Assessment (EIA), alternative assessment,[227] ecosystem management, and mitigating all reasonably foreseeable damage.[228] Of these measures, EIA has been given a key role in that the precautionary principle can be integrated in the EIA process.[229]

The second step is to locate appropriate precautionary responses or measures. One unifying feature of the precautionary principle is its reversal of the burden of proof. There can be a range of precautionary responses based on differing requirements for the burden of proof. Traditionally the opponents of an activity will be permitted to conduct the activity unless there is proof of likely and unacceptable harm, whereas the precautionary principle requires the opponents of an activity to prove that the proposed activity will not adversely affect the environment before they are permitted to proceed.[230] As such, Gullett put forward four operational approaches to implement precaution, which range from strongest precautionary strength to weakest precautionary strength as follows:

- Completely reverse the burden of proof to require the proponent to meet a high evidentiary standard pointing to harmlessness before the activity—or modified activity—may be permitted;

225 Pyhålå, Brusendorff and Paulomåki, above n. 198, 217.

226 Ibid.

227 A definition of alternative assessment is provided in the next section. See below n. 235.

228 See, e.g., Van Dyke, above n. 192, 381–383; Anne Steinemann, 'Improving Alternatives for Environmental Impact Assessment' (2001) 21(1) *Environmental Impact Assessment Review* 3, 4–10.

229 See, e.g., Warwick Gullett, 'Environmental Impact Assessment and the Precautionary Principle: Legislating Caution in Environmental Protection' (1998) 5(3) (Sept 1998) *Australian Journal of Environmental Management* 146, 148–154; Gullett, above n. 199, 116–123. Gullett asserts that the precautionary principle can be integrated in the EIA process through three steps, namely threshold for operation of EIA, content of EIA, and substantive influence on decision-making.

230 Gullett, above n. 196, 59; Sands, above n. 130, 273.

- Approve the activity, contingent on a low "acceptability" level of uncertainty (determined in a manner similar to cost-benefit analyses or risk assessments);
- Approve the activity but require the proponent to use best available technology (BAT) or best available technology not entailing excessive cost (BATNEEC) and conduct stringent post-decision monitoring;
- Apply precautionary measures pursuant to the doctrine of "no regrets".[231]

These four approaches may be utilised to provide appropriate precautionary measures for a proposed activity. It can be inferred that the requirements on how much is known about a possible outcome increase when the precautionary strength increases. In other words, the complete reversal of the burden of proof requires the least knowledge of the outcome of a proposed activity. A medium strength formulation of the principle can be found in the 2000 *Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean*. The parties agreed that,

> For new or exploratory fisheries, members of the Commission *shall adopt as soon as possible cautious conservation and management measures*, including, *inter alia*, catch limits and effort limits. *Such measures shall remain in force until there are sufficient data to allow assessment of the impact of the fisheries on the long-term sustainability of the stocks*, whereupon conservation and management measures based on that assessment shall be implemented. The latter measures shall, if appropriate, allow for the gradual development of the fisheries.[232] [emphasis added]

The burden of proof is reversed and it becomes necessary for the proponent (the Commission) to conduct impact assessment with sufficient data prior to the termination of precautionary conservation and management measures. In this case the proposed fishing activity is approved due to its low 'acceptability' level of uncertainty.

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231 Gullett, above n. 196, 60. The 'no regrets' doctrine permits regulatory action even when there are uncertain consequences of taking such action. This doctrine is applicable as long as there will be other benefits of taking such action. In contrast, the precautionary principle involves uncertain consequences of inaction. See also Ronnie Harding and Elizabeth Fisher, *Perspectives on the Precautionary Principle* (Federation Press, 1999) 41.

232 *Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean*, opened for signature 5 September 2000, 40 ILM 278 (entered into force 19 June 2004) art. 6(5).

The last step is to optimise the selected precautionary responses or measures taking relevant factors into consideration. Principle 15 of the *Rio Declaration* requires precautionary measures to be 'cost-effective'. The economic feasibility of proposed activities can be ensured through conducting cost-benefit analysis.[233] However, as noted earlier, environmental effectiveness should not be ignored while seeking cost-effectiveness of any proposed activity. It is thus important to seek a balance between cost-effectiveness and environmental effectiveness of proposed precautionary measures.

2.4.2 *The Applicability of the Precautionary Principle to the Issue of Greenhouse Gas Emissions from International Shipping*

This section will address two questions: is the precautionary principle applicable to the issue of GHG emissions from international shipping? If so, how should it be implemented in the context of GHG emissions from international shipping?

Two factors justify the application of the precautionary principle to GHG emissions from international shipping. First, the four elements constituting the formulation of the precautionary principle can also be found in this GHG emissions issue. As discussed in Chapter 1, five IPCC Assessment Reports have recognised the existence of harm or potential harm brought by GHG emissions from various sources, including those from international shipping. These harms include observed sea level rise, global warming and extreme weather. However, these harms cannot be proven scientifically, or in other words, there are uncertainties as to the outcome of proposed activities (i.e., international shipping). These IPCC Assessment Reports still utilise the terms 'likely' (IPCC Third Assessment Report), 'very likely' (IPCC Fourth Assessment Report), or 'extremely likely' (IPCC Fifth Assessment Report) to explore the causation between GHG emissions and their adverse effects. As climate change is a global issue, theoretically each State has a duty to act in reducing GHG emissions from ships. It is thus reasonable for the precautionary principle to apply to this issue.

Second, from an international law perspective, the precautionary principle should be applicable to GHG emissions from international shipping. Article 3 of the *UNFCCC* provides that '[t]he Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects'. In essence, this principle represents the fundamental consensus of the international community in tackling global climate

233 Kristin Kuntz-Duriseti, 'Evaluating the Economic Value of the Precautionary Principle: Using Cost Benefit Analysis to Place a Value on Precaution' (2004) 7(4) *Environmental Science & Policy* 291, 292.

change. Currently the *UNFCCC* and the International Maritime Organization (IMO) are working on the regulation of GHG emissions from ships. While the IMO received its mandate to regulate the GHG issue from Article 2(2) of the *Kyoto Protocol* to the *UNFCCC*, it is reasonable that the precautionary principle embodied in the *UNFCCC* should also be applied to the regulation of GHG emissions from ships either under the IMO regime or through the *UNFCCC* process.

The precautionary principle could be implemented in relation to GHG emissions from international shipping through three steps as examined in the previous section. The first step is to identify available precautionary responses or tools for incorporating the precautionary principle relating to GHG emissions from ships. Currently there are three routes the IMO has taken to regulate GHG emissions from ships, namely technical measures, operational measures, and market-based measures (MBMs).[234] These measures can be regarded as precautionary responses which could be utilised to curb the negative impacts resulting from the proposed activity (international shipping). Technical and operational measures have been introduced in the form of amendments to Annex VI of *MARPOL 73/78*, so the remaining precautionary measures are either to enhance the current technical and operational measures, or to employ MBMs.

Alternative assessment and EIA might be utilised as tools for incorporating the precautionary principle. Alternative assessment is also referred to as options analysis, facility planning, source reduction planning, and pollution prevention planning.[235] It is a frequently used method to examine alternatives for achieving a specific purpose and selecting the one with the least potential impact on human health and environment.[236] Alternative assessment has been applied widely as a central aspect of the EIA process.[237]It indicates a shift from 'problem-based' environmental policy to 'solution-based' policy.[238] In the context of shipping GHG emissions, the EIA and alternative assessment may be used to identify the environmental impacts of international shipping, or possible alternatives to current practices in international shipping. Additionally, there could be other precautionary responses or duties for shipping States. For instance, they may have a duty to notify the possible risks to coastal States or port States before their ships arrive, they may have a duty to consult, to develop

234 These measures are examined in details in Chapter 4.

235 Joel A. Tickner and Ken Geiser, 'The Precautionary Principle Stimulus for Solutions and Alternatives-based Environmental Policy' (2004) 24(7–8) *Environmental Impact Assessment Review* 801, 803.

236 Pyhälå, Brusendorff and Paulomåki, above n. 198, 218.

237 Tickner and Geiser, above n. 235, 803.

238 Ibid. 801.

alternative techniques or other methods to mitigate all reasonably foreseeable damage.[239] The carbon tax package adopted by the Australian government in 2012 is an example of this type of measure.[240]

The second step is to select appropriate precautionary measures to address shipping GHG emissions. As the main impacts of GHG emissions from international shipping have been generally recognised by IPCC Assessment Reports and IMO GHG Studies, it is reasonable to infer that there is substantial knowledge about the possible outcomes of the proposed activity—international shipping. GHG emissions from international shipping lead to negative environmental impacts, but this is a cumulative process and international shipping serves as the most important means of transportation for international trade.[241] Therefore, based on the four-approach theory proposed by Gullett, less precaution will be needed to prevent negative impacts brought about by shipping GHG emissions. While the first approach, which reverses the burden of proof, would require shipowners or ship operators to prove the harmlessness of international shipping, the fourth approach does not provide any obligations on shipowners or ship operators. Therefore, the middle two approaches will be more suitable than the other two options. Regarding the acceptability level of uncertainty relating to impacts of shipping GHG emissions, this uncertainty is generally acceptable for most people. International shipping, as an important means of transportation, cannot be prohibited or replaced by other means of transportation due to the possible higher negative impacts from other alternatives. On this basis, the second approach that approves the activity based on a low acceptability level of uncertainty may not apply in the context of international shipping. It is thus arguable that the third approach should be adopted. That is, approve the activity (international shipping) but require the proponent (shipowners or ship operators) to use BAT or BATNEEC and conduct stringent post-decision monitoring. Currently this technical measure has been adopted by the IMO.

239 See Van Dyke, above n. 192, 382–383.

240 The carbon tax package adopted by the Australian government establishes a carbon pricing mechanism which commenced on 1 July 2012 with a price that will be fixed for the first three years, and on 1 July 2015 the mechanism will transition to an emissions trading scheme with the price determined by the market. See *Australian Clean Energy Bill 2011* (*Explanatory Memorandum*), Policy Context 12.

241 United Nations Conference on Trade and Development (UNCTAD), 'Review of Maritime Transport 2012' (2012) <http://unctad.org/en/PublicationsLibrary/rmt2012_en.pdf> accessed 30 July 2014, p. xiii. International shipping carries around 80 per cent of global trade by volume and over 70 per cent by value.

The last step is to achieve a balance between cost-effectiveness and environmental effectiveness of proposed precautionary measures. This issue has been raised by some countries during the discussions and negotiations of technical measures within the IMO. While it is difficult to achieve cost-effectiveness through upgrading the technical threshold for shipbuilding, it is feasible to achieve a balance between cost-effectiveness and environmental effectiveness.[242]

2.5 'Common but Differentiated Responsibility' and 'No More Favourable Treatment'

Whether the principles of 'Common but Differentiated Responsibility' (CBDR) or 'No More Favourable Treatment' (NMFT) should be applied to the GHG emissions issue has become a focal point in the debate since the IMO received its mandate to regulate GHG emissions from international shipping from Article 2(2) of the *Kyoto Protocol* in 1997. While developed States insist that the NMFT principle should apply as it typically does for all shipping conventions adopted under the auspices of the IMO, developing States argue that the CBDR principle should override it as IMO's mandate for this regulatory issue comes from the *Kyoto Protocol*, which endorses the CBDR principle. This dispute has impeded the process of international regulation by the IMO and has imposed challenges on future implementation of the adopted energy efficiency measures within the IMO.[243] This part first examines the principles of CBDR and NMFT, and then discusses whether both principles should be applied to the regulation of GHG emissions from international shipping, and explores the approaches for achieving this application.

242 See ch. 7, 7.5.2.2. In Chapter 7, cost-effectiveness and environmental effectiveness is treated as one of the criteria for selecting MBMs for reducing GHG emissions from international shipping.

243 This can be illustrated by two aspects of the debate. First, from the year of 1998 when the IMO got the mandate from the Kyoto Protocol to regulate GHG emissions from international shipping, such emissions were not regulated until July 2011. Second, regarding the IMO mandatory energy efficiency measures adopted in July 2011, consensus was not reached within the IMO which imposes challenges for the future enforcement of these measures. The CBDR principle is not fully incorporated in the adopted energy efficiency measures. See Md. Saiful Karim, 'IMO Mandatory Energy Efficiency Measures for International Shipping: The First Mandatory Global Greenhouse Gas Reduction Instrument for an International Industry' (2011) 7(1) *Macquarie Journal of International and Comparative Environmental Law* 111, 113.

2.5.1 *Common but Differentiated Responsibility*

As a nascent principle of international environmental law, the CBDR principle has received considerable attention from the international community. As far as its origins are concerned, there are generally four different opinions. Harris asserts that the CBDR principle originated from the principle of the 'common heritage of mankind',[244] which has evolved into another relevant principle of 'common concern of mankind'. This latter principle was first raised in the UN General Assembly Resolution 43/53 in 1988, where climate change is recognised as 'a common concern of mankind since climate is an essential condition which sustains life on earth'.[245] In order to resolve such 'common concern' properly, States should be allocated responsibilities. As a response to the question of which States bear the greatest responsibility for climate change, the principle of CBDR came into being.[246] Sands purports that the principle of CBDR evolved from the application of equity in general international law based on which the special needs of developing countries should be taken into account.[247] Cullet takes the view that the differentiated treatment, as the key part of the CBDR principle, could be traced back to the older principle of economic differentiation adopted in agreements on international trade and economic development.[248] This view, however, reflects more the development of North-South relations, or the relations between developed States and developing States, which shaped the content of the principle of CBDR.[249] Some other scholars treat the 1972 Stockholm Conference on the Human Environment as the origin of the principle of CBDR.[250] This view is based on the fact that

244 Paul Harris, 'Common but Differentiated Responsibility: the Kyoto Protocol and United States Policy' (1999) 27(7) *N.Y.U. Environmental Law Journal* 27, 28.This principle was adopted by many international and regional treaties, such as the 1982 LOSC, 1959 Antarctic Treaty and 1946 International Convention for the Regulation of Whaling.

245 *Protection of Global Climate for Present and Future Generations of Mankind*, GA/Res 43/53, 43rd sess, 70th plen mtg, UN Doc A/RES/43/53 (6 December 1988) art. 1.

246 See Harris, above n. 244, 28–29.

247 Sands, above n. 130, 285.

248 Philippe Cullet, 'Differential Treatment in International Law: Towards a New Paradigm of Inter-state Relations' (1999) 10(3) *European Journal of International Law* 549, 577–578.

249 Ibid. 565–578. During this process, especially with the establishment of the new international economic order in the 1970s, developing countries shifted from 'full cooperation with the North' to 'trying to impose on developed countries a new set of principles and rules of international law'. Their claims in the context of climate change set the foundation for the CBDR principle.

250 See, e.g., Nina E. Bafundo, 'Compliance with the Ozone Treaty: Weak States and the Principle of Common but Differentiated Responsibility' (2006) 21(3) *American University*

during this conference the concept of sustainable development was first raised and the different development priorities of developed countries and developing countries were identified.[251] Thus, the Stockholm conference represented 'the first time that an international consensus had been reached, at least in theory, on applying CBDR and differentiated standards to international environmental problems'.[252] However, the current content and interpretation of the CBDR principle derives something from all these sources, and has been evolving as international relations and politics change.

The CBDR principle was implicit in the *1987 Montreal Protocol*.[253] It was first explicitly formulated in Principle 7 of the *Rio Declaration*, which provides:

> States shall co-operate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. *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.[254] [emphasis added]

This elaboration, although criticised by both developed States and developing States,[255] has been widely accepted and endorsed in many conventions and

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International Law Review 461, 468; Michael Weisslitz, 'Rethinking the Equitable Principle of Common but Differentiated Responsibility: Differential versus Absolute Norms of Compliance and Contribution in the Global Climate Change Context' (2002) 13(2) *Colorado Journal of International Environmental Law and Policy* 473, 479.

251 Weisslitz, above n. 250.

252 Ibid. 480.

253 *Montreal Protocol* art. 5. This protocol requires both developed countries and developing countries to work together to reduce controlled substances, but provides developing countries with a 10-year grace period. This practice is consistent with the principle of CBDR.

254 *Rio Declaration* pin 7.

255 Developed States did not want to be legally responsible for their past and current contributions to environmental degradation, while many developing States were not satisfied with its euphemistic expression on the liability of developed States. This dissatisfaction can be seen from the proposed text of the G77 Group of developing States, which provides that,

> '..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

treaties, including the *1992 CBD*,[256] *1992 UNFCCC* and its *Kyoto Protocol* and *Paris Agreement*.[257] Based on this formulation, the CBDR principle consists of two elements. One is the establishment of the common responsibility of States to protect the global environment. The other is the acknowledgement by all States that differentiated responsibilities should be allocated to different States due to their different contributions to a particular environmental problem and their differing capacities to take remedial measures.[258] In other words, the CBDR principle requires both developed and developing States to contribute to addressing environmental problems, but developed States bear greater responsibility.

2.5.1.1 Common Responsibility

As mentioned above, the notion of 'common responsibility' evolved from the principle of 'common heritage of mankind', or 'common concern of humankind'. UN General Assembly Resolutions and many conventions, including the *1992 CBD* and *UNFCCC*, have recognised biological diversity and climate change as 'matters of common concern to humankind'.[259] Addressing these environmental problems is 'not solely a matter of domestic jurisdiction of each individual State'. Rather, all States, including developing States, are required to 'participate actively in the formation and implementation of international law

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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'.

It is clear that the proposal by the developing States was 'much more direct on the point of responsibility' of developed States. Meanwhile the US issued an interpretative statement, stressing that Principle 7 does not 'imply a recognition . . . of any international obligations . . . or any diminution in the responsibility of developing countries'.

See *Proposal Submitted on behalf of the Group 77*, UN Doc.A/CONF.151/PC/WG.III/L.20/REV.1 (1992); *Report of the United Nations Conference on Environment and Development*, UN Doc.A/CONF.151/26 (1992) 20; Duncan French, 'Developing States and International Environmental Law: the Importance of Differentiated Responsibilities' (2000) (49) *International & Comparative Law Quarterly* 35, 36–37.

256 *CBD* art. 20(4).

257 *UNFCCC* art. 3–4; *Kyoto Protocol* art. 10; *Paris Agreement* preamble, arts. 2(2), 4(3)(4)(19).

258 Sands, above n. 130, 286.

259 Lavanya Rajamani, 'The Principle of Common but Differentiated Responsibility and the Balance of Commitments under the Climate Regime' (2000) 9(2) *Review of European Community & International Environmental Law* 120, 121.

for sustainable development'.[260] This notion, however, is rooted in the nature of the Earth and the spirit of solidarity.[261] This is underpinned clearly by the preamble of the *Rio Declaration*, which provides

> With the goal of establishing a new and equitable global partnership through the creation of new levels of co-operation among States, key sectors of societies and people.
> Recognizing the integral and interdependent nature of the Earth, our home.[262]

To gain the above 'equitable global partnership' so as to protect 'our home', *Agenda 21* also put forward similar objectives, and urged States to

> promote and support the *effective participation of all countries concerned, in particular developing countries*, in the negotiation, implementation, review and governance of international agreements or instruments, including appropriate provision of technical and financial assistance and other available mechanisms for this purpose, as well as the use of differential obligations where appropriate.[263] [emphasis added]

Certain means have been adopted by international institutions to facilitate the participation of developing States in jointly addressing international environmental problems, such as the establishment of global environmental protection funds (examples are the Global Environment Facility (GEF) and the Green Climate Fund (GCF)), technical and financial assistance, although the support is still 'insufficient for the task' and their effectiveness is to be improved.[264] However, these measures also suggest that 'common responsibilities can never be separated from differentiated responsibilities'.[265]

260 Yoshiro Matsui, "Some Aspects of the Principle of 'Common but Differentiated Responsibilities'" (2002) 2(2) *International Environmental Agreements: Politics, Law and Economics* 151, 153.

261 Ibid. 154; Rajamani, above n. 259.

262 *Rio Declaration* preamble.

263 *Agenda 21*, A/CONF.151/26 (Vols. I, II, III) (13 June 1992) para. 39.3 (c) ('*Agenda 21*').

264 Matsui, above n. 260, 154.

265 Ibid.

2.5.1.2 Differentiated Responsibility

As the other element of the principle of CBDR, differentiated responsibility means the allocation of differentiated environmental standards to developed States and developing States based on a range of factors. These factors, according to Sands, may include 'special needs and circumstances, future economic development of developing countries, and historic contributions to causing an environmental problem'.[266] This approach was widely endorsed by many UN documents and treaties. Examples include the *1972 Stockholm Declaration*,[267] *1974 Charter of Economic Rights and Duties of States*,[268] *1992 Rio Declaration*,[269] *1982 LOSC*,[270] *1987 Montreal Protocol*,[271] *1992 CBD*,[272] *1992 UNFCCC* and its *Kyoto Protocol* and *Paris Agreement*.[273]

In practice, differentiated responsibility leads to 'different legal obligations' so as to more effectively realise 'substantive equality'.[274] To achieve this goal, differentiated obligations are adopted by various international treaties and documents, and different techniques are employed to implement them.[275] The first approach is to establish differentiated standards. This approach applies not only between developed States and developing States but also between developed States.[276] Taking the *1992 UNFCCC* and its *Kyoto Protocol* as an example, Articles 4(1) and 4(2) of the *UNFCCC* stipulated that only Annex I States (mainly developed States) bear the responsibility of returning their GHG emission levels to 1990 levels by 2000. Article 11(2) of *Kyoto Protocol* puts forward the 'appropriate burden sharing' mechanism to guide the future negotiation of financial

266 Sands, above n. 130, 287.

267 *Stockholm Declaration* prin 23.

268 *Charter of Economic Rights and Duties of States*, UNGA Res.3281(XXIX), 29th Sess, Agenda Item 48, A/RES/29/3281 (12 December 1974) art. 30.

269 *Rio Declaration* prins 6, 11.

270 *LOSC* art. 194(2).

271 *Montreal Protocol* art. 5.

272 *CBD* art. 20(4).

273 *UNFCCC* art. 3, 4; *Kyoto Protocol* art. 10; *Paris Agreement* preamble, arts. 2(2), 4(3)(4)(19).

274 Sands, above n. 130, 289; Philippe Cullet, 'Common but Differentiated Responsibilities' in Malgosia Fitzmaurice, David M. Ong and Panos Merkouris (eds), *Research Handbook on International Environmental Law* (2010) 161.

275 Sands classifies these different techniques into 'grace' periods delaying implementation and less stringent commitments. See Sands, above n. 130, 289. But Matsui sorts these measures by using the concept of 'double standards' with one differentiating substantive rights and obligations, and the other differentiating the timing of the application of substantive provisions. See Matsui, above n. 260, 156–158.

276 French, above n. 255, 40.

commitments between developed States while its Annex B lists the individual reduction commitment of different developed States.[277] The second approach is to regulate 'grace' period to delay implementation by certain developing States. In this regard the *1987 Montreal Protocol* gave developing States 10 years' grace period for implementing regulated control measures.[278] The third approach is to have flexible and equitable requirements on different States as to the implementation of adopted measures, taking specific needs and special situations of developing States into consideration. Article 3 of the *UNFCCC* provides:

> In their actions to achieve the objective of the convention and to implement its provisions, the Parties shall be guided, inter alia, by the following: [1] . . . the benefit of present and future generations of humankind, *on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities* . . .[2] The *specific needs and special circumstances of developing country Parties*, especially those that are *particularly vulnerable* to the adverse effects of climate change . . .[279] [emphasis added]

Apart from these approaches, the transfer of financial and technological resources to developing States is also frequently utilised as a method of differentiating responsibilities between developed States and developing States. This kind of transfer, however, may take various forms including official assistance channels, the setting of different funds,[280] private means, and the Clean Development Mechanism (CDM) created by the *Kyoto Protocol*. These techniques are generally incorporated into multilateral environmental agreements (MEAs) by means of 'substantive provisions'. In other words, MEAs generally implement the differentiated responsibility, or the CBDR principle, by way of 'substantive provisions' instead of referring explicitly to such terms.[281]

277 Ibid.

278 *Montreal Protocol* art. 5(1).

279 *UNFCCC* art. 3.

280 Examples include the UNEP Environmental Fund, the World Heritage Fund, and the Multilateral Fund under the Montreal Protocol.

281 See Steinar Andresen and Ellen Hey, 'The Effectiveness and Legitimacy of International Environmental Institutions' (2005) 5(3) *International Environmental Agreements: Politics, Law and Economics* 211, 216. On 20 October 2011, at the 2011 Biennial Ingram Lecture organised by University of New South Wales, Professor Ellen Hey delivered a presentation entitled 'The Principle of CBDR and International Environmental Law'. She asserted that except for the *UNFCCC*, MEAs generally do not refer explicitly to the principle of CBDR instead they implement it by way of substantive provisions.

These different techniques employed to incorporate differentiated responsibility indicate that there are differing interpretations of the meaning of 'differentiation'. Many developing countries tend to interpret the 'differentiated responsibility' as different central obligations where developing countries are excluded from binding obligations such as GHG emissions reductions.[282] However, there has been less room for such interpretation during the negotiations of the international climate change regime. In particular, the 2010 *Cancun Agreements*[283] adopted at the 16th Conference of Parties (COP) to the *UNFCCC* reveals 'a shift towards greater parallelism between developed and developing countries' as to requirements relating to mitigation actions or targets and international Measurement, Reporting and Verification (MRV).[284] The 2015 *Paris Agreement* adopts a 'self-differentiation' model through creating the concept of 'Nationally Determined Contributions (NDCs)'.[285] Given the growing divergence in the interpretation of differentiation, Rajamani put forward a broad interpretation of differentiated responsibility. Based on current international environmental agreements, she asserts that differentiated responsibility consists of three categories, namely: differentiated central obligations, differentiated implementation arrangements, and the granting of assistance, including financial and technological assistance.[286]

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282 See, e.g., *Report of the Working Group on Energy Efficiency Measures for Ships*, MEPC 61st Session, IMO Doc MEPC 61/WP.10 (30 September 2010) para. 4.31. In this meeting, while China insisted on the incorporation of the CBDR principle in regulating GHG emissions from international shipping, China proposed that '[t]he application of EEDI should be mandatory to developed countries and voluntary to developing countries'. See also Lavanya Rajamani, 'The Climate Regime in Evolution: The Disagreements that Survive the Cancun Agreements' (2011) 5(2) *Carbon & Climate Law Review* 136, 145. India underscored in one of its submissions to the UNFCCC that 'mitigation actions of developing countries will be voluntary' and they 'should under no circumstances be seen as taking on internationally legally binding commitments by these countries'.

283 *The Cancun Agreements*, Decisions 1–2/CMP.6, Report of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol on its Sixth Session, FCCC/KP/CMP/2010/12/Add.1 (15 March 2011); Decision 1/CP.16, Report of the Conference of the Parties on its Sixteenth Session, FCCC/CP/2010/7/Add.1 (15 March 2011).

284 Rajamani, above n. 282, 144. See also ch. 3, 3.2.2.

285 NDCs refer to the reduction targets that each country intends to achieve under the *Paris Agreement*, and this contribution should reflect its common but differentiated responsibilities and respective capabilities, in the light of different national circumstances. See ch. 3, 3.2.2.3.

286 Lavanya Rajamani, *Differential Treatment in International Environmental Law* (Oxford University Press, 2006) 191.

The basis for differentiated responsibility has been analysed and supported by many commentators.[287] Two key justifications that have been invoked by international treaties and scholarly commentary are the historical responsibility of the North for current environmental degradation and their present capability to remedy such problems. The first justification is related to the differing contributions of States to environmental problems. From this perspective, the principle of CBDR can be deemed as the application of the polluter-pays principle.[288] As the main GHG emitter contributing to current environmental problems, developed States are the main polluters and thus should be responsible for this issue. The second justification involves different capabilities of States. This can theoretically be underpinned by the principle of equity or the concept of environmental justice. It has been generally accepted that justice is 'a compulsory part of international environmental law'.[289] Due to imbalanced historical and present distribution of resources and power, it can be argued that a form of distributive justice should be realised.[290] Therefore, differentiated responsibility can be viewed as a kind of 'entitlement' by developing States or obligation by developed States instead of on the basis of 'need' or 'compassionate measures'.[291]

Other justifications are based on the different priorities of developed and developing States,[292] 'international cooperation' or 'solidarity' being a feature of current international environmental law where developed States are obliged to bear more responsibilities,[293] and the utilisation of differentiated

287 See, e.g., Cullet, above n. 248; French, above n. 255; Rajamani, above n. 286; Matsui, above n. 260.

288 See, e.g., Matsui, above n. 260, 155; Rajamani, above n. 259, 122.

289 Cullet, above n. 274, 162.

290 Ibid.

291 S.R. Choudhary, 'Common but Differentiated Responsibility in International Environmental Law from Stockholm to Rio' in Konrad Ginther, Erik Denters and Paul J.I.M. de Waart (eds), *Sustainable Development and Good Governance* (1995) 322, 334. But Matsui treats this differentiated responsibility of developed States as the one with a moral or political nature. See Matsui, above n. 260, 155.

292 Generally protecting global environment or adapting to the consequences thereof has become one of the priorities of developed States whereas developing States pay more attention to their economies instead of environmental protection. See *Stockholm Declaration* 1.4; French, above n. 255, 52.

293 Ibid. 55. French attributes the basis of this 'international cooperation' to the Rio Declaration. The preamble of the Rio Declaration reads, '[w]ith the goal of establishing a new and equitable global partnership through the creation of new levels of cooperation among States, key sectors of societies and people'.

treatment as an incentive for developing States to participate in multilateral environmental agreements.[294]

2.5.1.3 Legal Status and Application

The inclusion of the CBDR principle in various treaties and UN documents has successfully increased the participation of developing States in international environmental regulation and management and achieved consensus in some areas especially within the climate regime. Its legal status, however, is still open to debate. Generally, it is regarded as a principle of international environmental law.[295] Nevertheless, due to different understandings of the term 'principle', it has been accorded different degrees of status by scholars—some have classified it as 'merely aspirational' while others regard it as 'legally binding',[296] Currently its status in customary international law terms is not defined.[297]

The preamble of the *Kyoto Protocol* emphasises that 'in pursuit of the ultimate objective of the [*UNFCCC*] Convention as stated in its Article 2', States' actions should be 'guided by Article 3 of the [*UNFCCC*] Convention'.[298] Article 2 of the *UNFCCC* requires that the goal of GHG emission reduction should be conducted in a way to 'enable economic development to proceed in a sustainable manner', which implies the necessity of differentiated treatment if the requirement of 'sustainable development' and the context of this article is

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Birnie, Boyle and Redgwell, above n. 4, 135. Birnie et al assert that solidarity is 'a key element' of the CBDR principle, which is reflected by chapter 17.2 of Agenda 21. It provides that, '. . . shall be commensurate with their technological and financial capacities and priorities in allocating resources for development needs and ultimately depends on technology transfer and financial resources required and made available to them'. Thus, through making obligations 'conditional' developing States can thereby impose pressure on developed States.

294 French, above n. 255, 56.

295 *UNFCCC* art. 3. The CBDR was regulated under the title of 'Principles' in article 3. See also Cullet, above n. 274, 161; Harrison, above n. 77, 7.

296 Lavanya Rajamani, 'The Nature, Promise, and Limits of Differentiated Treatment' (2005) 16(1) *Yearbook of International Environmental Law* 81, 102.

297 For example, Kiss regards it as one of the seven principles under sustainable development; Birnie et al., discuss it under the principles of global environmental responsibility. But Sands treats it as an independent general principle. Cullet is of the opinion that it is 'one of the important principles of international environmental law', however, its 'binding nature remains disputed'. See Kiss and Shelton, above n. 1, 218; Birnie, Boyle and Redgwell, above n. 4, 128–137; Sands, above n. 130, 285–289; Cullet, above n. 274, 161.

298 *Kyoto Protocol* preamble.

taken into account.[299] Article 3 of the *UNFCCC* treats the CBDR as one of the principles of the convention, and the preamble of the *UNFCCC* also acknowledges this principle. Therefore, through the incorporation of the CBDR principle into various conventions, especially the *UNFCCC* and its *Kyoto Protocol* and *Paris Agreement*, the cornerstone role of this principle within the global climate change regime has been generally accepted. However, the implication of the differentiation element of this principle has been evolving.

2.5.2 *No More Favourable Treatment*

2.5.2.1 An Overview

No more favourable treatment (NMFT), also called the equal treatment for all ships principle, or universal treatment principle, refers to 'port States enforcing applicable standards in a uniform manner to all ships in their ports, regardless of flag'.[300] Under the *IMO Convention*,[301] Article 1(b) describes the 'removal of discriminatory action' as one of the purposes of the IMO, and Article 3 treats the 'normal processes of international shipping business' as a recommended way to deal with shipping-related matters. Indeed, these two Articles provide a legal basis for the NMFT principle. The term NMFT was included in *MARPOL 73/78* and applies to all annexes to that Convention.

Article 5(4) of *MARPOL 73/78* stipulates that,

> With respect to the ship of non-Parties to the Convention, Parties shall apply the requirements of the present Convention as may be necessary to ensure that *no more favourable treatment* is given to such ships.[302] [emphasis added]

Article II of the 1978 Protocol to 1974 *International Convention for the Safety of Life at Sea* (*SOLAS*) also has a similar provision, which reads:

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299 One element of sustainable development is to integrate environmental protection into economic and other development. This integration approach may also underpin the adoption of differentiated legal commitments based on the differentiated historical responsibility of States and their different capacity to respond to environmental requirements. Sands, above n. 130, 263.

300 Buhaug et al., above n. 185, 20.

301 *Convention on the Inter-Governmental Maritime Consultative Organization*, opened for signature 6 March 1948, 289 UNTS 3 (entered into force 17 March 1958), amended and renamed as *Convention on the International Maritime Organization*, opened for signature 14 November 1975, 9 UTS 61 (entered into force 22 May 1982) ('*IMO Convention*').

302 *MARPOL 73/78* art. 5(4).

> 3. With respect to *the ships of non-Parties to the Convention and the present Protocol*, the Parties to the present Protocol shall apply the requirements of the Convention and the present Protocol as may be necessary *to ensure that no more favourable treatment is given to such ships*.[303] [emphasis added]

Article X of the 1978 *International Convention on Standards of Training, Certification and Watchkeeping for Seafarers* (*STCW*) provides:

> This Article shall be applied as may be necessary to ensure that *no more favourable treatment is given to ships entitled to fly the flag of a non-Party* than is given to ships entitled to fly the flag of a Party.[304] [emphasis added]

It appears that the NMFT principle only applies to Article X of this convention. However, the fact that this Article addresses the issue of 'control' indicates the application of this principle to the whole convention since the main purpose of this convention is to deal with the control of foreign ships while in the ports of a State.[305]

To date this principle has been consistently applied without exception to all 53 IMO treaty instruments currently in existence.[306]

2.5.2.2 Legal Status and Application

The NMFT principle has been widely applied to treaties adopted by the IMO. Nevertheless, it is only a customary rule applicable within the IMO regime. The application of this principle is one of the key features of IMO's efforts in exercising uniform standards around the world, and it has assisted the IMO to fulfil the regulatory purposes of these treaties. First, the introduction of the NMFT principle has been proven to be an effective means and incentive for non-participating States to become contracting parties to an IMO treaty.[307]

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303 *International Convention for the Safety of Life at Sea*, opened for signature 1 November 1974, 1184 UNTS 2 (entered into force 25 May 1980) art II ('*SOLAS*').

304 *International Convention on Standards of Training, Certification and Watchkeeping for Seafarers*, opened for signature 7 July 1978, 1361 UNTS 2 (entered into force 28 April 1984), as amended by the 1995 Protocol, 1969 UNTS (entered into force 1 February 1997) art. X, para. 5 ('*STCW*').

305 G.P. Pamborides, *International Shipping Law: Legislation and Enforcement* (Kluwer Law International, 1999) 107–108.

306 International Maritime Organisation (IMO), *Status of Conventions: List of IMO Conventions and Their Amendments* (16 May 2013) <http://www.imo.org/About/Conventions/StatusOfConventions/Pages/Default.aspx> accessed 1 January 2014.

307 Pamborides, above n. 305, 108.

Under this principle, port State control will impose the standards as indicated in an IMO treaty on all ships calling at a port of a contracting party. In this way, it becomes more difficult for a state to avoid compliance with a convention adopted under the auspices of the IMO. Second, the application of the NMFT principle may relieve concern over the existence of the 'flag of convenience' (FOC) phenomenon.[308] Under the FOC, a ship may change its flag easily to have a non-Annex I State nationality if differentiated responsibility applies and ships flying the flags of non-Annex I States would then enjoy less stringent treatment.[309] If this were to be the case, the regulatory efforts by the IMO to address many maritime issues would be ineffective. Furthermore, 75 per cent of the world shipping tonnage, by deadweight, of all merchant ships on international voyages is registered in developing States.[310] Therefore, it would be 'ineffective' for the IMO to act by means of regulating only 25 per cent of the world's shipping tonnage if the NMFT principle were not in place.[311]

It is worth noting that the IMO has limited the application of the NMFT principle to IMO regulated treaties. For instance, the preamble of amended Annex VI to *MARPOL 73/78* in 2011 provides:

> Recognizing also that adoption of the amendments to Annex VI *in no way prejudges the negotiations held in other international fora*, such as *the United Nations Framework Convention on Climate Change* (*UNFCCC*), *nor affect the positions of the countries that participate in such negotiation*,[312] [emphasis added]

This statement reveals the IMO's view on the application scope of its NMFT principle. That is, the IMO's regulations on GHG emissions from ships, including the revised *MARPOL* Annex VI, are independent from those reached within the *UNFCCC-Kyoto Protocol* regime. The application of the NMFT principle to shipping GHG emissions issue should not be regarded as a precedent which may be applicable to the international climate change regime. Nevertheless, as an obligation under the *Kyoto Protocol*, the IMO still needs to report its progress on the GHG emissions issue to the *UNFCCC*'s SBSTA on a regular basis.

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308 Definitions of FOC is provided at footnote 86.

309 Haifeng Wang, 'GHG Emissions from the International Goods Movement by Ships and the Adaptation Funding Distribution' in Zongwei Luo (ed), *Green Finance and Sustainability: Environmentally-Aware Business Models and Technologies* (Business Science Reference, 2011) 274, 283.

310 Buhaug et al., above n. 185, 21.

311 Ibid.

312 *MARPOL Annex VI* (*2011 amendments*) preamble.

2.5.3 *Application of Both 'Common but Differentiated Responsibility' and 'No More Favourable Treatment' Principles to the Issue of Greenhouse Gas Emissions from International Shipping*

The CBDR principle and the NMFT principle are distinct in terms of their content and their scope of application. Generally the CBDR principle applies to the global climate change regime, whereas the NMFT principle applies to all IMO treaties. Regulating GHG emissions from international shipping involves both global climate change and the IMO. In this case, how the two principles should be applied to this GHG emissions issue is controversial.

2.5.3.1 Applicability of Two Regulatory Principles

Three divergent views exist as to the applicability of the CBDR and NMFT principles to the regulation of GHG emissions from international shipping. One view is that only the CBDR principle should be applied to this GHG emissions issue on the ground that the IMO received its mandate to regulate GHG emissions from international shipping from Article 2(2) of the *Kyoto Protocol* to the *UNFCCC*. This view has been supported by many developing countries[313] and some scholars.[314] This interpretation of the IMO's mandate justifies the application of the CBDR principle, which runs through the *UNFCCC* and its *Kyoto Protocol*, to this issue. Article 2(2) of the *Kyoto Protocol* provides,

> *The parties included in Annex I* shall pursue limitation or reduction of emissions of greenhouse gases not controlled by the Montreal Protocol from aviation and *marine bunker fuels*, *working through* the International

313 See, e.g., China, India, Brazil, Saudi Arabia and some other developing countries all hold that the IMO's mandate comes from the Kyoto Protocol. *Report of the Marine Environment Protection Committee on its 59th Session*, Statement by the Delegation of China on GHG Issues, IMO Doc MEPC 59/24/Add.1 Annex 13 (2009) para. 1; *Report of the Marine Environment Protection Committee on Its Sixty-First Session*, MEPC 61st Session, Agenda Item 24, IMO Doc MEPC 61/24 (6 October 2010) annex 3.

314 See, e.g., Wang, above n. 309, 275; A. Miola, M. Marra and B. Ciuffo, 'Designing A Climate Change Policy for the International Maritime Transport Sector: Market-Based Measures and Technological Options for Global and Regional Policy Actions' (2011) 39(9) *Energy Policy* 5490, 5492; Derya Aydin Okur, *The Challenge of Regulating Greenhouse Gas Emissions from International Shipping and the Complicated Principle of 'Common but Differentiated Responsibilities'* (2012) <http://web.deu.edu.tr/hukuk/dergiler/dergimiz13-1/2-deryaaydinokur.pdf> accessed 1 January 2014, p. 28; Jodie Moffat, 'Arranging Deckchairs on the Titanic: Climate Change, Greenhouse Gas Emissions and International Shipping' (2010) 24(2) *Australian and New Zealand Maritime Law Journal* 104, 105.

> Civil Aviation Organization and *the International Maritime Organization*, respectively.[315] [emphasis added]

Marine bunker fuel, also called degraded residue heavy fuel oil, is the main fuel used by ships on international voyages.[316] Therefore, it is arguable that the above article can be interpreted as meaning that the IMO has a mandate from the *Kyoto Protocol* to regulate GHG emissions from international shipping. Furthermore, this provision may also be interpreted as meaning that only Annex I States (developed States) are under the commitment to conduct the emissions reductions.[317] However, this view has been opposed by the Sub-Division for Legal Affairs of the IMO. It asserted that the IMO did not receive its GHG mandate from the *Kyoto Protocol*, and this provision should not be interpreted as meaning that non-Annex I States are exempt from any obligations. Rather, it should be interpreted that the reduction of such emissions is 'a task which is properly within the purview of IMO', and 'only Annex I countries should be involved in the negotiations within IMO'.[318] Article 31 of the *1969 Vienna Convention on Treaties* stipulates that,

> 1. A treaty shall be interpreted *in good faith in accordance with the ordinary meaning* to be given to the *terms of the treaty in their context* and in the light of its object and purpose.
> 2. The context for purpose of the interpretation of a treaty shall comprise, in addition to the text, including its preamble and annexes . . .[319] [emphasis added]

In accordance with these rules, in particular based on the ordinary meaning of the terms and the context of negotiating the *Kyoto Protocol*, Article 2(2) of the *Kyoto Protocol* may be understood as meaning that only Annex I States are obliged to make reductions in international shipping, which is consistent with the rest of the *Kyoto Protocol* where the CBDR principle has been fully incorporated. However, this interpretation will only be logical if the IMO receives its

315 *Kyoto Protocol* art. 2.2.

316 Md. Saiful Karim and Shawkat Alam, 'Climate Change and Reduction of Emissions of Greenhouse Gases from Ships: An Appraisal' (2011) 1(1) *Asian Journal of International Law* 131, 131.

317 See, e.g., W.B. Fitzgerald, O.J.A. Howitt and I.J. Smith, 'Greenhouse Gas Emissions from the International Maritime Transport of New Zealand's Imports and Exports' (2011) 39(3) *Energy Policy* 1521, 1523; Moffat, above n. 314, 104.

318 *Legal Aspects of the Organization's Work on Greenhouse Gas Emissions in the Context of the Kyoto Protocol*, note by the Secretariat, IMO Doc MEPC 58/4/20 (1 August 2008).

319 *1969 Vienna Treaty Convention* art. 31 (1)(2).

GHG mandate from this provision. The IMO has denied this possibility and its documents indicate that no consensus was achieved as to the interpretation of this provision after the adoption of the *Kyoto Protocol*.[320] Therefore, it seems that the first view would be more acceptable only when it is recognised that the IMO receives its GHG mandate from the *Kyoto Protocol*.

The second view supports the sole application of the NMFT principle to this GHG emissions issue. This view is held by the Sub-Division for Legal Affairs of the IMO and some scholars.[321] The IMO has been the main international institution working on the regulation of GHG emissions from international shipping since 1997. Therefore, there is little doubt that the NMFT principle is applicable to this issue. As noted earlier, this is because the NMFT principle has been consistently applied to all IMO treaties and has become a customary practice within the IMO regime. Furthermore, the reduction of GHG emissions from ships has been partially regulated in the form of amendments of Annex VI to *MARPOL 73/78* in 2011 and 2014 respectively. Since the NMFT principle is explicitly stipulated in Article 5(4) of *MARPOL 73/78*, it follows that the regime of GHG emission reductions from ships in Annex VI is subject to this article. In other words, the principle of NMFT applies to GHG emissions from international shipping in this context. In order to exclude the application of the CBDR principle, the proponents of this view assert that the IMO derives its global mandate from the *IMO Convention*, the *LOSC* and IMO Regulation 8, but not from Article 2(2) of the *Kyoto Protocol*.

The third view recognises the application of both the CBDR and the NMFT principles to this GHG emissions issue, but insists that this might only be achieved through market-based mechanisms.[322] However, the proponents of

320 See, e.g., *Report of the Marine Environment Protection Committee on Its Forty-Ninth Session*, MEPC 49th Session, Agenda Item 22, IMO Doc MEPC 49/22 (8 August 2003) para. 4.9. At the 49th MEPC meeting in 2003, the Committee agreed that the regulation of GHG emissions from international shipping should be based on the NMFT principle rather than the CBDR principle. However, no consensus was achieved as to this agreement.

321 See, e.g., International Maritime Organisation (IMO), 'Main Events in IMO's Work on Limitation and Reduction of Greenhouse Gas Emissions from International Shipping' (2011) <http://www.imo.org/MediaCentre/resources/Pages/Greenhouse%20gas%20emissions.aspx> accessed 14 June 2014, p. 28; Sebastian Oberthür, 'Institutional Interaction to Address Greenhouse Gas Emissions from International Transport: ICAO, IMO and the Kyoto Protocol' (2003) 3(3) *Climate Policy* 191, 195.

322 See, e.g., Karim and Alam, above n. 316, 144–147; European Federation for Transport and Environment, *Bunker Fuels and the Kyoto Protocol: How ICAO and the IMO Failed the Climate Change Test* <http://www.transportenvironment.org/sites/te/files/media/2009_06_aviation_shipping_icao_imo_history.pdf> accessed 1 January 2014.

this view have only explored the approaches of applying both principles to this issue, and some of them also assert that the IMO's mandate to regulate shipping GHG emissions does not derive from Article 2(2) of the *Kyoto Protocol*.[323]

To date none of these three views have been generally accepted by most countries and the shipping industry. Theoretically speaking, it appears that identifying the origin of the IMO's mandate to regulate GHG emissions from international shipping is a key to addressing this debate. Identifying the generally accepted origin of the IMO's mandate could determine which principles may apply to the regulation of this issue. Generally if an international agreement gives the IMO a specific mandate, it would appear reasonable that the principles reflected in that agreement should also apply to the regulation of the GHG issue by the IMO.

As discussed earlier, the proponents of the first view attribute the IMO's mandate in regulating GHG emissions from ships solely to the *Kyoto Protocol*. Article 2(2) of the *Kyoto Protocol* requests the Annex I States of the *UNFCCC* to 'work through the IMO' to limit or reduce their GHG emissions from ships. Whether this provision gives the IMO the exclusive mandate to regulate this GHG issue is open to debate and dependent on various interpretations of the term 'work through'. However, it 'establishes a formal link to the IMO' by authorising the IMO to regulate this GHG issue,[324] and implies that the IMO should 'take the lead' on this issue.[325] Furthermore, the acceptance of this mandate by the IMO is consistent with the *IMO Convention*.[326] Since then the IMO has reported its progress in regulating the GHG issue to the *UNFCCC*'s Subsidiary Body on Scientific and Technological Advice (SBSTA) on a regular basis, which could be regarded as one of its obligations in fulfilling this mandate.[327] Therefore, it is argued that it is not reasonable to assert that the IMO's mandate has nothing to do with the *Kyoto Protocol*.[328]

323 Karim and Alam, above n. 316, 147.

324 Bernd Hackmann, 'Analysis of the Governance Architecture to Regulate GHG Emissions from International Shipping' (2012) 12(1) *International Environmental Agreements: Politics, Law and Economics* 85, 90.

325 Harrison, above n. 77, 1.

326 *IMO Convention* art. 68. This provision stipulates that the IMO may take over functions or obligations within its scope from any other international organizations by means of international agreements.

327 But Hackmann asserts that this cooperation between the UNFCCC and the IMO is 'reciprocal exchange of information and a reciprocal participation in relevant meetings', and both institutions are independent in their decisions. Hackmann, above n. 324, 95.

328 See, e.g., Karim and Alam assert that the IMO's mandate 'is not subject to the UNFCCC or to its Kyoto Protocol'. Karim and Alam, above n. 316, 147–148.

The proponents of the second view assert that the IMO derives its global mandate from the *IMO Convention,* the *LOSC* and IMO Resolution 8, but not from Article 2(2) of the *Kyoto Protocol*. According to this view, Articles 1(a) and 64 of the *IMO Convention* provide the IMO with a global mandate and global competence 'in the field of shipping and the effect of shipping on the marine environment',[329] in particular in relation to 'technical matters of all kinds affecting shipping engaged in international trade'.[330] Articles 211(1) and 212(3) of the *LOSC* request States Parties to 'establish global rules, standards, and recommended practices and procedures' to prevent, reduce and control atmospheric and vessel-source marine pollution. In particular, these actions shall be conducted through diplomatic conferences or a competent international organization (the IMO). Therefore, the *LOSC* defines flag, coastal and port State jurisdiction, while the IMO specifies how member State jurisdiction should be exercised to meet IMO safety and shipping anti-pollution regulations.[331] Furthermore, Resolution 8 on 'CO_2 emissions from ships' was adopted by the *MARPOL* Conference of the Parties in 1997. This resolution requested the IMO to start its work on the reduction of GHG emissions from ships and has therefore been regarded as a key legal document underpinning subsequent regulatory efforts by the IMO. In addition, those who take the view that attributes the IMO's mandate to these three sources exclude Article 2(2) of the *Kyoto Protocol* as a source of the IMO's mandate relating to the GHG issue. It is asserted that there has been no precedent for any IMO treaty instruments adopting a common but differentiated responsibility approach similar to that incorporated in the *Kyoto Protocol*.[332] This argument, however, runs counter to the legal basis for the first view on the IMO's mandate to regulate the GHG emissions issue. Generally an organisation which receives and accepts a mandate under an international agreement cannot question principles incorporated in that agreement simply based on its own previous practice which is incompatible with such principles.[333]

329 *IMO Convention* art. 64.

330 *IMO Convention* art. 1(a).

331 *Implications of the United Nations Convention on the Law of the Sea for the International Maritime Organization*, IMO Doc LEG/MISC.6 (10 September 2008) 13.

332 IMO, above n. 321, 28.

333 *1969 Vienna Treaty Convention* art. 31; *IMO Convention* art. 41. In accordance with Article 31 of the *Vienna Convention on the Law of Treaties*, a provision of a treaty shall be interpreted based on the context, the object and purpose of the treaty and the context includes the text, the preamble and annexes. On this basis, the provision that provides a mandate for an organisation should be subject to the principle incorporated in that treaty, which also enables the application of the principle to the organisation. For example, Article 41 of the

From an international law perspective, the above two views on the origin of the IMO's GHG mandate both have their legal bases. There is no clear hierarchy between the *Kyoto Protocol* and *IMO Convention* and the *LOSC* on the issue and it is open to debate which rules should prevail if there is a conflict between these treaties.[334] For this reason, it might be appropriate to strike a compromise between the two views. It is clear that the *IMO Convention* and the *LOSC* provide the IMO with general competence to regulate GHG emissions from ships, while the *Kyoto Protocol* gives the IMO a specific mandate to regulate this matter. The two interpretations of the IMO's mandate are thus consistent and the IMO can utilise both these competences to regulate GHG emissions from international shipping. An important implication of this compromise interpretation is that principles incorporated in the *Kyoto Protocol* and the *IMO Convention* will also apply to the regulation of the GHG issue, namely, the CBDR and the NMFT principles. It therefore appears that the third view is more logical. However, the approaches that have so far been proposed for applying these two principles to this issue as expressed in the third view can be improved. This is examined in the next section.

2.5.3.2 Approaches to Applying the Two Principles

It is a challenge to determine how to incorporate both the CBDR and NMFT principles into the IMO's regulation of shipping GHG emissions. To address this issue, two assumptions can be made. One is that the CBDR principle is State-based whereas the NMFT principle is ship-based, so there is no irreconcilable conflict between them. The other is that common responsibility and differentiated responsibility are two core elements of the CBDR principle and common responsibility has been incorporated into this issue via the NMFT principle,[335] so the key to applying the CBDR principle is effective incorporation of differentiated responsibility. There are different interpretations of the implications of the CBDR principle, in particular the meaning of 'differentiated responsibility'. Due to the complexity of the issue of GHG emissions from shipping, the adoption of a broad interpretation of differentiated treatment would be practical. As discussed earlier, Rajamani put forward a broad interpretation of

IMO Convention provides that the MEPC, 'when exercising the functions conferred upon it by or under any international convention or other instrument, shall conform to the relevant provisions of the convention or instrument in question.'

334 Since the *Kyoto Protocol*, *IMO Convention* and the *LOSC* vary extensively in their context and scope, Article 30 of the *Vienna Convention on the Law of Treaties* cannot apply to addressing conflicts between these treaties.

335 *MARPOL 73/78* art. 5(4).

differentiated responsibility which consists of three categories, namely differentiated central obligations, differentiated implementation arrangements, and the granting of assistance, including financial and technological assistance.[336] If this broad interpretation of differentiation is employed, the CBDR principle could be applied to the GHG issue in different ways depending on the nature of various measures for addressing this issue.

There are three routes for regulating shipping GHG emissions that have been considered within the IMO: technical measures, operational measures, and MBMs. In terms of technical and operational measures adopted by the IMO in 2011, strengthening effective transfer of technologies and financial assistance from developed countries to developing countries in relation to these technical and operational measures would constitute an application of the CBDR principle to this issue as indicated in the third category of differentiated responsibility.[337] As a requirement of the NMFT principle, port States exercise uniform control over all ships calling at their ports through participation in various MOUs on Port State Control.[338] For this reason, it would be difficult to implement differentiated central obligations as indicated in the first category of differentiated responsibility with regard to the issue of GHG emissions from shipping.[339] Indeed this category of differentiated responsibility is often claimed by developing countries as the main form of the CBDR principle.[340] Meanwhile, the difficulty in applying the first category

336 Rajamani, above n. 286, 191.

337 Regulation 23 of the amended *MARPOL* Annex VI in 2011 stipulates the transfer of technology and financial assistance; however, this regulation is still very weak and thus needs to be strengthened.

338 Port State Control refers to 'the inspection of foreign ships in national ports to verify that the condition of the ship and its equipment comply with the requirements of international regulations and that the ship is manned and operated in compliance with these rules'. With the support of the IMO, to date various regional port State control organizations and agreements on Port State Control, namely the MOUs, have been signed to cover all of the world's oceans. International Maritime Organization (IMO), *Port State Control* <http://www.imo.org/blast/mainframe.asp?topic_id=159> accessed 1 January 2014.

339 Some States proposed that combining both principles could be achieved by differentiating commitments for developed and developing countries based on certain routes of shipping without relying on the nationality of ships. However, due to various regional MOUs on port State control, in practice this proposal is not feasible. Miola, Marra and Ciuffo, above n. 314, 5492.

340 For instance, when China and India have mentioned the application of the CBDR principle to this issue, they have generally explained that only developed countries should commit themselves to compulsory GHG emission reductions from international shipping, while energy-efficiency measures should be voluntary for developing countries. *Report of*

of differentiated responsibility to technical and operational GHG-reduction measures is also underpinned by the existence of Flag-of-Convenience (FOC) States. It may be hypothesised that developing flag States are exempt from complying with IMO GHG-reduction regulations, as implied by the first category of the CBDR principle. In this circumstance, shipowners from developed countries would probably opt for flagging their ships under these FOC States to avoid the stringent regulations and increased cost in their own States flowing from compliance with these regulations. As of 1 January 2013, ships registered in developing countries (excluding transition economies) accounted for 75.49 per cent of the world fleet by deadweight tonnage (dwt), which if combined with the FOC would render these GHG-reduction measures barely effective.[341] Theoretically, it would be feasible to phase-in application of the CBDR principle to this GHG issue as indicated in the second category of differentiated responsibility.[342] Indeed during the discussions within the IMO, some developing countries proposed this approach to postpone the application of regulations to developing countries.[343] However, due to the concern for the FOC and the urgency of addressing this issue against the backdrop of global climate change, this option was not adopted by the IMO.

More options are available to incorporate the two principles with respect to MBMs. One possibility is to apply the CBDR principle to the issue by allocating differentiated central obligations to developed countries and developing

the Marine Environment Protection Committee on Its Sixty-First Session, MEPC 61st Session, Agenda Item 24, IMO Doc MEPC 61/24 (6 October 2010) 1–3.

341 United Nations Conference on Trade and Development (UNCTAD), 'Review of Maritime Transport 2013' (2013) <http://unctad.org/en/PublicationsLibrary/rmt2013_en.pdf> accessed 1 January 2014, p. 57.

342 See Miola, Marra and Ciuffo, above n. 314, 5492. For example, it was proposed that a three-phased approach could be employed to address this GHG issue, namely the set-up of a scheme for voluntary participation by the countries and ports as the first step, a scheme that covers all traffic in the ports of *UNFCCC* Annex I countries as the second step, and finally this scheme would be extended to cover all countries on a global level.

343 *Comments on the Proposed Mandatory Energy Efficiency Regulations*, submitted by China, Saudi Arabia and South Africa, MEPC 62nd Session, Agenda Item 5, IMO Doc MEPC 62/5/10 (5 May 2011) para. 14. In this document, the co-sponsors proposed a draft text which provided that, 'the regulations of EEDI and SEEMP shall apply to ships of developing countries five years after the date of their entry into force'; or 'shall be phased in over a period of eight years for ships built for developing countries and during the period of phasing in, developing countries shall only apply 50% of the required EEDI reduction rate'.

countries so as to ensure 'no net incidence on developing countries',[344] as indicated in the first category of differentiated responsibility. Currently some proposed MBMs incorporating both principles have been submitted to the IMO for further discussion.[345] This approach has also been supported by the *UNFCCC* Secretariat,[346] as well as by other countries and international organisations.[347] Since these MBM proposals also apply the NMFT principle, the effectiveness of these measures is unlikely to be influenced by FOC States. A detailed assessment of current MBM proposals and the selection of MBMs for addressing GHG emissions from international shipping is provided in Chapters 4 and 7 of this book.

2.6 The Polluter-Pays Principle and Its Application to the Issue of Greenhouse Gas Emissions from International Shipping

Preventing and controlling pollution is a costly process where a significant financial investment in human and material resources and infrastructure or a large amount of compensation for victims may be required.[348] But who is going to pay these bills? The polluter-pays principle provides some rules for addressing this problem. Despite the view from many States that it is only

344 *Ensuring No Net Incidence on Developing Countries from A Global Maritime Market-Based Mechanism*, submitted by World Wide Fund for Nature (WWF), MEPC 63rd Session, Agenda Item 5, IMO Doc MEPC 63/5/6 (22 December 2011).

345 See, e.g., the Rebate Mechanism proposed by the International Union for Conservation of Nature (IUCN) has incorporated the CBDR and NMFT principles.

346 *Report of the Marine Environment Protection Committee on Its Sixty-First Session*, MEPC 61st Session, Agenda Item 24, IMO Doc MEPC 61/24 (6 October 2010) annex 6, p. 2. At the 61st MEPC meeting, the *UNFCCC* Secretariat made a statement, which asserts that '[w]e have to commit ourselves to work on a solution which respects both principles, and allows each treaty regime to retain the integrity of its principles and practices'.

347 See, e.g., Malaysia, Ethiopia and WWF support the adoption of both principles in addressing the GHG issue. *Report of the Marine Environment Protection Committee on Its Sixtieth Session*, MEPC 60th Session, Agenda Item 22, IMO Doc MEPC 60/22 (12 April 2010) annex 4, p. 10; *Report of the Marine Environment Protection Committee on Its Sixty-First Session*, MEPC 61st Session, Agenda Item 24, IMO Doc MEPC 61/24 (6 October 2010) annex 3, p. 11; *Ensuring No Net Incidence on Developing Countries from A Global Maritime Market-Based Mechanism*, submitted by World Wide Fund for Nature (WWF), MEPC 63rd Session, Agenda Item 5, IMO Doc MEPC 63/5/6 (22 December 2011).

348 See Kenneth A. MacInnis, 'The Polluter Pays Principle: Preventing Ship-Source Pollution in the Arctic' in Aldo E. Chircop et al. (eds), *The Regulation of International Shipping: International and Comparative Perspectives* (2012) 143, 143.

applicable at the domestic level rather than at the international level,[349] the polluter-pays principle has been evolving and is widely applied in various international instruments. This part first examines the polluter-pays principle as to its evolution, content and implementation, and then discusses how it can be applied to the issue of GHG emissions from international shipping.

2.6.1 *An Overview of the Polluter-Pays Principle*

The polluter-pays principle refers to the requirement that 'the costs of pollution should be borne by the person responsible for causing the pollution'.[350] Although its meaning and application are still open to debate,[351] the polluter-pays principle has been recognised worldwide and is referred to in both national legislation and international declarations and agreements.[352] The origin of this principle can be traced back to 1972 when the Organisation for Economic Co-operation and Development (OECD) formally propounded it as a means of coping with environmental problems.[353] The formulation of this principle was first contained in the *1972 OECD Guiding Principles*,[354] which provide:

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349 Sands, above n. 130, 281.

350 Ibid. 279.

351 Ibid. 280.

352 James A. Tobey and Henri Smets, 'The Polluter-Pays Principle in the Context of Agriculture and the Environment' (1996) 19(1) *WORLD ECONOMY* 63, 63.

353 Concerning the origin of the polluter-pays principle, there are some different views.

Some scholars trace it back to the *1972 OECD Guiding Principles* which recommend the adoption of the polluter-pays principle to allocate costs of pollution prevention and control measures. *Recommendation of the Council on Guiding Principles concerning International Economic Aspects of Environmental Policies* (26 May 1972) OECD Recommendation C (72) 128 art. 1 A. See, e.g., Kiss and Shelton, above n. 1, 213; Priscilla Schwartz, 'The Polluter-Pays Principle' in Malgosia Fitzmaurice, David M. Ong and Panos Merkouris (eds), *Research Handbook on International Environmental Law* (2010) 243, 244.

Other scholars, Sands for example, asserts that the polluter-pays principle in treaty law can be traced back to some of the first instruments setting minimum rules on civil liability for damage by hazardous activities, and the earliest one is the *1960 Paris Convention* which provides that the operator of the nuclear installation, whether a private entity or the state, is strictly liable for injury to or loss of life of any person and damage to or loss of property. Sands, above n. 130, 281; See also *OECD Convention on Third Party Liability in the Field of Nuclear Energy*, opened for signature 29 July 1960, 956 UNTS 251 (entered into force 1 April 1968) art. 3 (1).

354 *Environment and Economics: Guiding Principles Concerning International Economic Aspects of Environmental Policies*, OECD Doc. No.C(72)128, 1972 WL 24710 (26 May 1972).

> The principle to be used for allocating costs of pollution prevention and control measures to encourage rational use of scarce environmental resources and to avoid distortions in international trade and investment is the so-called "Polluter-Pays-Principle". This Principle means that the polluter should *bear the expenses of carrying out the above mentioned measures decided by public authorities* to ensure that the environment is in an acceptable state. In other words, the cost of these measures should be reflected in the cost of goods and services which cause pollution in production and/or consumption. Such measures *should not be accompanied by subsidies* that would create significant distortions in international trade and investment.[355] [emphasis added]

This formulation of the polluter-pays principle specifies the costs and suggests the basic rules for the implementation of this principle. However, environmental damage is excluded from such costs.[356] To make the principle better suit changing situations, the OECD adopted further recommendations in 1974, 1989 and 1991 respectively, supplementing the content of the Guidelines on the implementation of the principle and its exceptions as well.[357] Similarly, the European Community (EC) also adopted the polluter-pays principle in its various recommendations and acts of EC secondary legislation.[358]

The polluter-pays principle has not only been applied 'in a geographic region subject to uniform environmental law' such as the OECD and EC,[359] it has also been widely endorsed in a number of international instruments. Sands asserts that the polluter-pays principle in international treaty law originated from early treaties on civil liability for damages from hazardous activities,[360] such as the

355 Ibid annex para. 4.

356 Sands, above n. 130, 281.

357 For instance, in 1974 a new OECD recommendation called on its member States to observe the polluter-pays principle uniformly, and defined 'polluter' as 'someone who directly or indirectly damages the environment or who creates conditions leading to such damage'; in 1989 the OECD Recommendation on the Application of the Polluter-Pays Principle to Accidental Pollution implied that the operator of a hazardous installation should bear relevant cost, provided guidance on 'reasonable measures', and listed certain exceptions to the principle; in 1991 a final recommendation urged OECD member States to treat 'economic instruments' as a means of implementing this principle. See ibid.; Schwartz, above n. 353, 244; Kiss and Shelton, above n. 1, 215.

358 Sands, above n. 130, 283–284.

359 Kiss and Shelton, above n. 1, 215.

360 Sands, above n. 130.

1963 IAEA Liability Convention,[361] *1969 CLC*,[362] and *1971 Oil Fund Convention*.[363] In these treaties, the ideas on the polluter-pays principle were reflected by providing that the damage resulting from hazardous activities should be borne by the shipping industry and oil cargo interests,[364] although the polluter-pays principle was not explicitly invoked. In 1992, Principle 16 of the *Rio Declaration* explicitly raised the polluter-pays principle to the global level, providing that:

> National authorities should endeavour to promote the *internalization of environmental costs* and the use of economic instruments, taking into account the approach that *the polluter should, in principle, bear the cost of pollution*, with due regard to the public interest and without distorting international trade and investment.[365] [emphasis added]

The formulations of the polluter-pays principle by the OECD and Principle 16 of the *Rio Declaration* indicate that the purpose of this principle is to internalise the economic costs of pollution control and prevent governments from subsidising these environmental costs. Due to the global participation and profound significance of the 1992 Rio Conference on Environment and Development (UNCED), the polluter-pays principle was for the first time recognised globally as an environmental policy in 1992.[366] But essentially this principle was still not legally binding due to its not having achieved the status of 'the normative character of a rule of law'.[367] After UNCED it was endorsed by more international instruments.[368] Examples include *1992 Convention for the Protection of the Marine Environment of the North-East Atlantic* (*OSPAR*

361 *IAEA Vienna Convention on Civil Liability for Nuclear Damage*, opened for signature 29 May 1963, 1063 UNTS 265 (entered into force 12 November 1977).

362 *International Convention on Civil Liability for Oil Pollution Damage*, opened for signature 29 November 1969, 973 UNTS 3 (entered into force 19 June 1975).

363 *International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage*, opened for signature 18 December 1971, 11 ILM 284 (entered into force 16 October 1978).

364 Sands, above n. 130, 281.

365 *Rio Declaration* prin 16.

366 Birnie, Boyle and Redgwell, above n. 4, 322.

367 Ibid.

368 Before the Rio Conference, the polluter-pays principle was endorsed by the 1990 OPRC in its preamble that the polluter-pays principle is 'a general principle of international environmental law'. See *International Convention on Oil Pollution Preparedness, Response and Cooperation*, opened for signature 30 November 1990 (entered into force 13 May 1995) preamble ('*OPRC*').

Convention),[369] *1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes* (*Watercourses Convention*),[370] *1992 Convention on the Transboundary Effects of Industrial Accidents* (*Industrial Accidents Convention*),[371] and *1996 Protocol to the Contracting Parties to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter* (*1996 Protocol to London Dumping Convention*).[372]

The polluter-pays principle is treated as 'a rule of economic, juridical and political good sense'.[373] It seeks to address the issues of 'cost allocation' and 'cost internalisation'.[374] 'Cost allocation' of this principle resolves the question of 'who pays' for the pollution prevention and control, whereas its 'cost internalisation' answers the question of 'how much should be paid'.[375] As noted earlier, cost internalisation is a concept from economics. With this concept, the polluter-pays principle aims to improve economic efficiency by 'internalising external environmental costs of production and consumption into

369 *Convention for the Protection of the Marine Environment of the North-East Atlantic*, opened for signature 22 September 1992, 32 ILM 1068 (entered into force 25 March 1998) art. 2 ('*OSPAR Convention*'). This article reads that 'The Contracting Parties shall apply: . . . the polluter pays principle, by virtue of which the costs of pollution prevention, control and reduction measures are to be borne by the polluter.'

370 *Convention on the Protection and Use of Transboundary Watercourses and International Lakes*, opened for signature 17 March 1992, 31 ILM 1312 (entered into force 6 October 1996) art. 2 ('*Watercourses Convention*'). This article stipulates that 'the Parties shall be guided by the following principles: . . . The polluter-pays principle, by virtue of which costs of pollution prevention, control and reduction measures shall be borne by the polluter.'

371 *Convention on the Transboundary Effects of Industrial Accidents*, opened for signature 17 March 1992, 31 ILM 1330 (entered into force 19 April 2000) preamble ('*Industrial Accidents Convention*'). The preamble states that '[t]aking account of the polluter-pays principle as a general principle of international environmental law.'

372 *Protocol to the Contracting Parties to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter*, opened for signature 7 November 1996, 36 ILM 1 (entered into force 24 March 2006) art. 3 ('*1996 Protocol to London Dumping Convention*'). This article reads that 'Taking into account the approach that the polluter should, in principle, bear the cost of pollution, each Contracting Party shall endeavour to promote practices whereby those it has authorized to engage in dumping or incineration at sea bear the cost of meeting the pollution prevention and control requirements for the authorized activities, having due regard to the public interest.'

373 Organisation for Economic Co-operation and Development (OECD), *The Polluter Pays Principle* (OECD Publishing, 1975) 25.

374 Tobey and Smets, above n. 352, 64.

375 Ibid.

market prices'.[376] Another relevant question is 'how to pay', which is sometimes interpreted as the implementation of the polluter-pays principle.

Since the meaning of the polluter-pays principle varies in different contexts,[377] currently there are no indisputable answers to the above three questions. However, some of the interpretations or options under discussion are provided below in Table 2.1. Firstly, who pays for the pollution? Or, who is the polluter? In contrast to the rigid definition provided by the OECD, in practice the concept of the polluter varies depending on different categories in different contexts. According to Schwartz, at least three categories may apply based on different criteria.[378] A list of these categories and types of persons is summarised in Table 2.1.

TABLE 2.1 *Different categories of polluters*[379]

Category Criteria of Polluters	**Types of Persons as Polluters**
Personality	States, corporations, industries, individuals
Nature and effects of conduct or activity	Any activity that contributes to the deterioration of the environment, including natural resource use for economic or social purposes and attaching liability to direct or indirect environmental consequences. Examples: the handling or disposal of waste; the use and management of water resources; enjoyment of environmental quality as in use of recreational facilities . . .

376 Ibid.

377 Jonathan Remy Nash, "Too Much Market? Conflict between Tradable Pollution Allowances and the 'Polluter Pays' Principle" (2000) 24(2) *Harward Environmental Law Review* 465, 472–473.

378 Schwartz, above n. 353, 247–248.

379 Ibid.

TABLE 2.1 *Different categories of polluters* (cont.)

Category Criteria of Polluters	Types of Persons as Polluters
Scope of responsibility	Subject: individual or collective, partial or total, actual or potential Measures: aid, technology transfer, or emission reduction programmes provided by developed States to developing States (application of the CBDR)

These categories of polluters, however, may not always be responsible for the pollution they cause. As indicated in Table 2.1, sometimes the polluter may be only partially responsible. So in practice a case-by-case examination for determining the particular polluter's responsibility for the pollution should always be undertaken.

Secondly, what should the polluter pay for? Or in other words, what is the cost? Similarly to the first question, different regional or international instruments list various types of cost to be borne or paid as a result of incorporating the polluter-pays principle. Some of these views are listed in Table 2.2.

TABLE 2.2 *Different cost bearing arrangements by regional or international instruments*[380]

Regional or International Instruments	Types of Cost Bearing
OECD 1972, 1974	(1) Cost related to measures needed to prevent, control and reduce pollution; (2) Cost of administrative measures by the authorities in response to pollution, including those implementing anti-pollution policies, developing anti-pollution technologies and grants for modernising out-of-date plants.

380 This table is developed based on the following sources: MacInnis, above n. 348, 148; Schwartz, above n. 353, 248–249.

Regional or International Instruments	Types of Cost Bearing
Principle 16 of the Rio Declaration Agenda 21	Cost of pollution and 'environmental cost', including: cost related to pollution regulation, environmental protection and management.
OECD 1974, 1989, 1991	Cost of achieving prescribed environmental quality, preventing or remedying environmental damage, preventing accidental pollution, and the clean-up or reinstatement of the environment after an accident, the 'cost of exceptional measures' needed to protect human health and the environment.
Environmental Liability Directive 2004	
Landfill Directive 1999	Social cost, remaining external cost of investment on technology, the cost incurred when a ban is placed on polluting activity, indemnity cost, operational cost, including the cost of present and future expenditure and loss of profit, even if not accessible in monetary terms.
Antarctic Treaty Secretariat 2005	(1) Cost of abatement, compensation and reparation; (2) Cost of promoting best environmental practice, best available technology, and the cost of a prompt and effective response to environmental emergencies.
A General Summary	(*1*) *Costs of pollution control by governments;* (*2*) *Emergency response and clean-up costs; and* (*3*) *Compensation to victims of pollution.*

Through examining different cost-bearing arrangements in regional and international instruments, it may be inferred that based on the polluter-pays principle, a polluter often needs to pay three types of cost. They are costs of pollution control by governments, emergency response and clean-up costs, and compensation to victims of pollution.[381] While in a particular case, there could be so many types of cost for the polluter to bear, generally the polluter is

381 MacInnis, above n. 348, 148.

the first one to pay such cost. However, it will not invalidate the polluter-pays principle if the polluter passes on such costs to the consumer.[382] As argued by Kiss, 'if the polluter holds a right to pollute, the victims must pay for cessation or reduction of the activity'.[383] The mechanism of the polluter-pays principle is underpinned by both economic and social theories.

Thirdly, how to pay? Or, how to implement the polluter-pays principle? To answer this question, the OECD provides seven options, namely direct controls, taxes, payments, subsidies, various incentives (tax benefits, accelerated amortisation, credit facilities), the auction of pollution rights and charges.[384] However, Schwartz puts forward four categories of implementation methods under the polluter-pays principle. The main content is listed in Table 2.3.

TABLE 2.3 *Different implementation methods of the polluter-pays principle*[385]

Category	**Sub-category**	**Examples**
Regulatory Regime	Command and control	Fuel sulphur emission limits in *MARPOL* Annex VI
	Self-regulation	Market-based instruments, e.g., environmental fees, tradable permit, liability rules
	Voluntary initiatives	Energy Efficiency Operational Indicator (EEOI) developed by the IMO
Economic Strategies	Internalisation	Cost incorporated with the external effects
	Incentives	ET, CDM, JI within the Kyoto Protocol; Carbon tax
	Initiatives	Employ best available techniques

382 OECD, above n. 373, 27.

383 Kiss and Shelton, above n. 1, 214.

384 OECD, above n. 373, 28.

385 This table is developed partially based on the following source: Schwartz, above n. 353, 249–255.

Category	Sub-category	Examples
	Innovations	Advocate investment by adopting new measures, technology designs or environmentally friendly products
Liability Regime	Fault-based liability	Deterrence, redress, reparation, and restitution of States
	Strict liability	Operator non-fault liability
Cooperative Regime	Bilateral, regional and global cooperation	managing transboundary risks/harm

Generally the above methods may be utilised in a particular case independently or jointly so as to improve performance in combating pollution. However, for the purpose of this book, the assessment of the regulatory regime is the focus.

As the term 'in principle' used in Principle 16 of the *Rio Declaration* may imply, the polluter-pays principle allows certain exceptions from its strict application. Generally speaking, States should follow the polluter-pays principle 'except when it would be socially, economically, or environmentally unreasonable to do so'.[386] This policy arrangement is consistent with the concept of 'equitable internalisation' in that they both take into account the different responsibilities or capacities among different States when such policies apply.[387] This feature, however, also indicates its 'soft' law nature.

386 Sanford E. Gaines, 'The Polluter-Pays Principle: from Economic Equity to Environmental Ethos' (1991) 26(3) *Texas International Law Journal* 463, 477.

387 Nash, above n. 377, 476–477. 'Equitable internalisation' refers to the allocation of 'abatement costs and the costs of residual pollution among polluters and between polluters and victims'.

2.6.2 *The Application of the Polluter-Pays Principle to the Issue of Greenhouse Gas Emissions from International Shipping*

Although endorsed by various regional and international instruments, the polluter-pays principle has not gained 'the same degree of support or attention' in recent years as the preventive and precautionary principles,[388] or the CBDR. As asserted by Gaines, the polluter-pays principle cannot address all environmental problems.[389] Similarly the application of the polluter-pays principle to the issue of GHG emissions from international shipping is not straightforward.

As discussed in 2.3 of this chapter, transboundary harm caused by GHG emissions of ships to other areas may include four scenarios. In each scenario, the harm may lead to adverse effects to persons, property or the environment. According to the polluter-pays principle, generally the polluter should bear all the costs that such emissions may generate. The polluter may include the flag State,[390] ship owners and operators,[391] or in some cases, individuals who should be responsible for such damage. However, in practice ship owners and ship operators are generally regarded as the polluters of GHG emissions from ships due to their direct contribution to these emissions. The recently-adopted technical and operational measures by the IMO clearly reflect this rule. Through implementing the EEDI and SEEMP, shipowners primarily pay for the higher shipbuilding cost whereas ship operators pay the cost relating to implementing stringent operational requirements. Flag States may also be responsible for transboundary harm resulting from such emissions under certain circumstances, which may include regulation and negotiation related costs as can be seen from the *Trail Smelter* case.

Compared with the identification of the polluter of GHG emissions from international shipping, the cost bearing and implementation methods of the polluter-pays principle are more complicated. International shipping refers to 'shipping between ports of different countries, as opposed to *domestic shipping*'.[392] Such voyages may consist of domestic voyages (shipping within

388 Sands, above n. 130, 280.

389 Gaines, above n. 386, 487.

390 In international shipping, the flag State may be responsible for the transboundary damage caused by the emissions from the ships flying its flag due to its role of exercising its jurisdiction.

391 Ship operators generally include ship managers and charterers. They should be held liable for their choice to employ the services of a substandard vessel. See Pamborides, above n. 305, 145.

392 Buhaug et al., above n. 185, 13. According to the *Second IMO GHG Study 2009*, 'domestic shipping' refers to 'shipping between ports of the same country, as opposed to *international shipping*', and excludes military and fishing vessels.

the maritime zones of a State, including the internal water, territory sea, and EEZ) and international voyages (shipping outside the maritime zones of a State) of the flag State. Regarding international voyages, in practice two approaches of dealing with transboundary harm from ships are in place based on the different injuries. When such injuries are 'slight and infrequent', the polluter may be more willing to 'absorb them without increasing its level of control'.[393] This offer is generally accepted by the victims in that such harm may not be easily recognised due to its cumulative nature and the litigation or arbitration cost may be higher than the value of such a claim.[394] However, when the possible compensation arising from the injuries is significant, the polluter may prefer to avoid or reduce such costs through legal means.[395] In this respect, the polluter-pays principle generally applies. These approaches are argued to be 'appropriate' if examined from the economic, environmental and social ethics perspective.[396] When harm occurs during the domestic voyage of the flag State's vessel, the polluter-pays principle may not be applicable. Instead, the traditional legal principle that 'injuries incidental to lawful activities will not be compensated' may apply.[397] This is because of the fact that the affected party, as a member from the same State, probably benefits indirectly from the shipping activities. In this context, depending on different situations, the flag State may apply relevant domestic legislation to this issue, into which the polluter-pays principle may not be incorporated. It appears that a uniform cost-bearing mechanism in relation to GHG emissions from ships is necessary to be established globally so as to address this divergence in current shipping practice.

The previous section concludes that the costs may include costs of pollution control by governments, emergency response and clean-up costs, and compensation to victims of pollution. Due to the cumulative nature of GHG emissions from ships, the cost relating to shipping GHG emissions may only include the first and third of these costs. While pollution costs can be calculated through identifying measures that have been taken by governments, the identification of victims is complicated. This is mainly due to the nature of this issue being a part of the global climate change regime. Often while the

393 Gaines, above n. 386, 492. Gaines refers to general environmental harm when analysing these two possibilities, which in the view of the present author could also be applied to the environmental harm brought about by international shipping.

394 Ibid.

395 Ibid.

396 Ibid.

397 Ibid.

polluter is discharging GHG emissions from ships, they also suffer from its adverse effects either directly or indirectly.[398] In this sense, polluters are often victims of such pollution. Therefore, the application of the polluter-pays principle, or specifically the implementation of allocation of costs, to the issue has to be put in a global context through adopting globally uniform measures. If this assertion is related to the MBMs that are currently under discussion within the IMO, MBMs which involve the global emissions reduction of different sectors may better reflect the polluter-pays principle.[399]

Among the four categories of the implementation methods mentioned above, the liability regime is less useful in this context due to the difficulty of identifying specific polluters and victims. The cooperative regime is necessary but could be integrated into other categories whenever it applies. Economic strategies are useful, which can be clearly seen from the three mechanisms established under the *Kyoto Protocol*.[400] As good examples of economic strategies, emissions trading (ET), the clean development mechanism (CDM) and joint development (JI) have been achieving success. For the purpose of this book, the development of a regulatory regime for the issue under discussion is the focus and there is still ample room for further steps.

Concerning the method of 'command and control', the 2011 amendments of Annex VI to *MARPOL 73/78* regulate the mandatory EEDI for new ships and SEEMP for all ships. These measures will have profound influences on the reduction of GHG emissions from ships.[401] As for voluntary initiatives, a wide range of discussions were held within the IMO and as a result, many measures, such as Energy Efficiency Operational Indicator (EEOI), have been suggested by the IMO as voluntary measures for all States. The third type of regulatory regime, self-regulation, often called a market-based instrument (MBI) or MBMs, has aroused intense debate within the IMO. The adoption of

398 See Vesselin Popovski and Kieran G. Mundy, 'Defining Climate-Change Victims' (2012) 7(1) *Sustainability Science* 5, 5. Some small island States have announced that they would take those States contributing to the most emissions to international legal proceedings. For example, in 2002 Tuvalu (later joined by Kiribati and Maldives) announced that it was taking Australia to the International Court of Justice for the damages Australia has caused via its climate policy. However, Koivurova asserts that this approach would not work. Timo Koivurova, 'International Legal Avenues to Address the Plight of Victims of Climate Change: Problems and Prospects' (2007) 22(2) *Journal of Environmental Law and Litigation* 267, 277, 298.

399 See ch. 4, 4.3.4; ch. 7, 7.5.2.2.

400 The three mechanisms under the *Kyoto Protocol* are clean development mechanism (CDM), emissions trading (ET) and joint implementation (JI).

401 See ch. 4, 4.3.3.3.

MBMs complies with the polluter-pays principle. The environmental fees (contributions), being one type of MBMs,[402] can be taken as an example. An environmental fee is generally imposed on a unit of pollution thus providing the polluter with an incentive to reduce the amount of pollution in order to avoid heavy fees.[403] The setting of suitable fee rates, or in other words, the calculation of internalised cost, is crucial. If a fee is set too low compared with the cost needed for the reduction of one unit of pollution, the polluter may prefer to pay and continue polluting.[404] One example of the environmental fee is a fund for GHG emissions from international shipping (GHG Fund). Basically the contributions to the GHG Fund are paid per tonne of bunker fuel by the polluter as the cost for preventive measures in this context, and are allocated to possible affected parties or victims whenever it applies. This approach complies with the polluter-pays principle in this regard. Lastly it is arguable that equitable consideration for the implementation of the polluter-pays principle cannot be ignored in the context of GHG emissions from international shipping. This is because equitable consideration not only imposes flexibility on the implementation of the polluter-pays principle, but also resonates with the CBDR principle. This approach may better encourage the participation of developing States in global emissions reduction from international shipping.

2.7 Conclusion

This chapter serves as the theoretical foundation for the book especially the gap analysis and gap-filling options relating to the current regulatory framework for the reduction of GHG emissions from international shipping to be raised in the following chapters. It was first argued that GHG emissions from international shipping, in particular CO_2, are a type of 'conditional' pollution. Therefore, many marine pollution-related treaties apply to this GHG emissions issue. This argument and the principles relating to flag State, coastal State and port State jurisdiction also underpin the application of international environmental law principles to GHG emissions from international shipping.

402 Three main types of MBIs include environmental fees, tradable permit (allowance) schemes, and liability rules. *Scientific Study on International Shipping and Market-Based Instruments*, IMO Doc. MEPC 60/INF.21 (15 January 2010) annex, para. 2.3; see also ch. 4, 4.3.4.2.1.

403 Ibid. para. 2.4.

404 Ibid.

It was further argued that GHG emissions from international shipping might lead to transboundary harm under four scenarios. On this basis, the duties associated with transboundary harm would apply in the context of GHG emissions from international shipping. These include a flag State's primary prescriptive and enforcement jurisdiction and responsibility to prevent, reduce and control transboundary harm resulting from GHG emissions from the ships entitled to fly its flag. To achieve this goal, flag States need to adopt national legislation on the reduction of such emissions, taking into account the amended Annex VI to *MARPOL 73/78* irrespective of whether they have ratified this amendment. Flag States need to conduct regular surveys, issue or empower other parties to issue the IEE Certificate to ships flying their flags, as well as impose administrative penalties or institute proceedings in relation to offences. Furthermore, coastal States and port States also have a duty to cooperate in mitigating transboundary environmental risks arising from excessive GHG emissions from international shipping.

GHG emissions from ships have been recognised as harmful, but there is not yet scientific proof that they have caused specific impacts. The application of the precautionary principle in this context would justify the action of States in taking proactive steps to tackle shipping GHG emissions. In contrast to the precautionary principle, the polluter-pays principle aims to address three relevant questions, namely: Who is the polluter? What should the polluter pay for? And, how to pay? It has been argued in this chapter that in the context of the GHG emissions issue, the polluter should include ship owners, ship operators and flag States under certain circumstances. The cost should be put in a global context through adopting uniform measures, whereas the means of payment could include various technical and operational measures and MBMs. In particular, MBMs which involve the global emissions reduction of different sectors may better reflect the polluter-pays principle.

Whether the CBDR and NMFT principle should be applied to GHG emissions from international shipping is a controversial issue. This chapter argues that both the CBDR and the NMFT principles have solid ground for their application to this GHG emissions issue, and it is nearly impossible to exclude either of them in this regard. In this context it was argued that the *IMO Convention* and the *LOSC* provide the IMO with general competence to regulate GHG emissions from ships, while the *Kyoto Protocol* gives the IMO a specific mandate to regulate this matter. It is thus reasonable for both principles to apply to this GHG emissions issue. It was further argued that depending on the nature of regulatory measures, the CBDR and NMFT principles could be incorporated into the regulation of GHG emissions from ships in different ways.

The application of these selected international law principles to the regulation of GHG emissions from international shipping has several implications. It reveals that the GHG emissions issue is reflective of, or subject to, the underlying principles of international environmental law. These principles should thus be taken into account in the developing regulatory regime of GHG emissions from ships. In addition, the development of this regime also has resulted in new implications for these principles, and impacts on their evolution. This interaction can be seen from the interpretation of the CBDR and NMFT principles in the context of shipping GHG emissions.