CHAPTER 3

The UN Response to the Issue of Greenhouse Gas Emissions from International Shipping

3.1 Introduction

Greenhouse gas (GHG) emissions from international shipping contribute to global warming and climate change, while international regulation on shipping emissions is subject to the evolution of the international climate change regime.[1] Climate change did not become an issue of global concern until it was brought to the attention of the UN. In 1987 a report entitled *Our Common Future* was discussed in the UN General Assembly, attracting worldwide attention to the global issues of development and environment. In this report, 'climate change' was mentioned nine times as a fast-growing global threat.[2] It was also in this meeting that the scientific community formally brought the climate change issue to the political agenda under the auspices of the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP), specialised agencies of the UN.[3] One year

1 The international climate change regime, often called the *UNFCCC-Kyoto Protocol* regime, mainly refers to a series of multilateral environmental agreements (MEAs), their related protocols and soft law in relation to climate change. See Patricia W. Birnie, Alan E. Boyle and Catherine Redgwell, *International Law and the Environment* (Oxford University Press, 3rd ed, 2009) 84. The international regulation on the reduction of GHG emissions from international shipping is primarily the mandate of the IMO as indicated in Article 2(2) of the *Kyoto Protocol*. On this basis, the regulation by the IMO on this GHG emissions issue should be subject to the international climate change regime, or in other words, the UNFCCC-Kyoto Protocol regime. This issue is discussed at 3.3 of this chapter.

2 The term 'climate change' was mentioned nine times in the text and twice in the footnotes of the report. Item 32, Chapter 1 of the report reads that, 'it is true globally for such threats as climate change, ozone depletion, and species loss, [and the] risks increase faster than do our abilities to manage them.' Item 11, chapter 7 of the report reads that, "[t]he environmental risks and uncertainties of a high energy future are also disturbing and give rise to several reservations … the serious probability of climate change generated by the 'greenhouse effect' of gases emitted to the atmosphere, the most important of which is carbon dioxide (CO_2) produced from the combustion of fossil fuels." World Commission on Environment and Development (WCED), *Our Common Future* (Oxford University Press, 1987) 35, 146–147.

3 Bert Bolin, *A History of the Science and Politics of Climate Change: the Role of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2007) 40.

later, the WMO and the UNEP established the Intergovernmental Panel on Climate Change (IPCC). In 1992 the *United Nations Framework Convention on Climate Change* (*UNFCCC*)[4] was adopted at the Rio United Nations Conference on Environment and Development (UNCED), and its *Kyoto Protocol* and *Paris Agreement* was then adopted in 1997 and 2015 respectively.[5] The *UNFCCC*, its *Kyoto Protocol* and *Paris Agreement*, together with the agreements or declarations adopted in their Conferences of Parties (COPs), the COPs serving as the Meeting of the Parties to the Kyoto Protocol (CMPs), and the COPs serving as the Meeting of the Parties to the Paris Agreement (CMAs), constitute the core elements of the current climate change regime. They have significantly shaped the direction of international regulation on the reduction of GHG emissions from international shipping.

This chapter examines the responses from the UN to the issue of GHG emissions from ships, aiming to identify the areas that need to be improved to facilitate and improve the global regulation of GHG emissions from international shipping. This chapter consists of two main parts. The first part introduces the UN's institutional responses to the issue, in particular the responses from the IPCC, as well as the interaction among the IPCC, UNEP, and other UN agencies. The second part examines the international legal framework on climate change from two perspectives: analysis of two conventions on the prevention of atmospheric pollution prior to the *1992 UNFCCC* and a critical review of the *UNFCCC*, its *Kyoto Protocol* and agreements produced in their COPs and CMPs.

3.2 The UN Institutional Responses

Climate change is an urgent environmental problem of a global nature, which makes it difficult for individual States to develop an effective national regulatory response. To cope with this issue, the UN, including its various agencies, has responded actively. This part reviews the work conducted by the IPCC in combating climate change, and the contributions from the UNEP, WMO, and other UN institutions. Due to their key roles in regulating GHG emissions from

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

5 *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) ('*Kyoto Protocol*'); *Paris Agreement to the United Nations Framework Convention on Climate Change* (2015), opened for signature 22 April 2016, FCCC/CP/2015/L.9 (not yet in force) ('*Paris Agreement*').

international shipping, the responses by the IMO, a UN specialised agency, are examined in Chapter 4.

3.2.1 *The UN and the IPCC*

The late 1970s and the 1980s witnessed a growing debate among scientists and policy makers on the risks associated with human-induced climate change. The need for independent, scientific and technical advice became apparent to inform decision-making on this important and complex issue. The first efforts were made by the United States (US) although this initiation was triggered by the energy crisis in the 1970s.[6] The US government treated climate change as 'a threat to humankind', and its National Academy of Science (NAS) conducted an assessment on possible future human-induced changes of climate in 1977.[7] The inclusion of this issue in the political arena of the US government in 1978 encouraged more research in relation to climate change.[8] However, it was only in 1980 that the International Council of Science (ICSU), UNEP and WMO jointly developed a first international assessment on climate change, although this effort proved to be 'not very successful'.[9] To cope with this challenge, in 1988 the 43rd Session of the United Nations General Assembly (UNGA) adopted a resolution entitled 'Protection of the global climate for present and future generations of mankind'. The resolution endorsed the action by UNEP and WMO in jointly establishing the IPCC, and requested the IPCC to prepare a comprehensive review and recommendations on all aspects of climate change and its impacts, with a view to formulating realistic response strategies.[10] Therefore, the IPCC was set up by the WMO and UNEP as an effort by the UN to provide the governments of the world with a reliable scientific view on climate change. As discussed earlier, the report named *Our Common Future* triggered this process within the UN. The IPCC is intended to serve as a link between the scientific

6 In 1978, the Carter administration of the US intended to use domestic coal to solve the energy crisis, which brought the issue of climate change into the political agenda for the first time. Nicolas Nierenberg, Walter R. Tschinkel and Victoria J. Tschinkel, 'Early Climate Change Consensus at the National Academy: The Origins and Making of Changing Climate' (2010) 40(3) *Historical Studies in the Natural Sciences* 318, 319.

7 Bolin, above n. 3, 33.

8 Examples are the report by the JASON defense advisory panel chaired by Gordon MacDonald in 1979 and a report by an ad hoc National Academy of Sciences (NAS) with Jule G. Charney as the lead author in the same year. Nierenberg, Tschinkel and Tschinkel, above n. 6.

9 Bolin, above n. 3, 35.

10 *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. 5, 10.

community and political institutions, and thus promote the construction and improvement of the international climate change regime.

Under the auspices of the UN, the IPCC's structure and working mechanisms have been improving. Currently the IPCC has three Working Groups and a Task Force on National Greenhouse Gas Inventories. Working Group I deals with 'the Physical Science Basis of Climate Change', Working Group II with 'Climate Change Impacts, Adaptation and Vulnerability' and Working Group III with 'Mitigation of Climate Change'. The Task Force on National Greenhouse Gas Inventories aims to develop and refine a methodology for the calculation and reporting of national GHG emissions and removals. It meets in Plenary at the level of Representatives of Governments, and is assisted by Technical Support Units (TSU) hosted and financially supported by the Government of the developed country co-chair of that Working Group/Task Force. Other departments within the IPCC include the IPCC Bureau, IPCC Secretariat and IPCC Executive Committee.[11] This structure is illustrated in Figure 3.1.

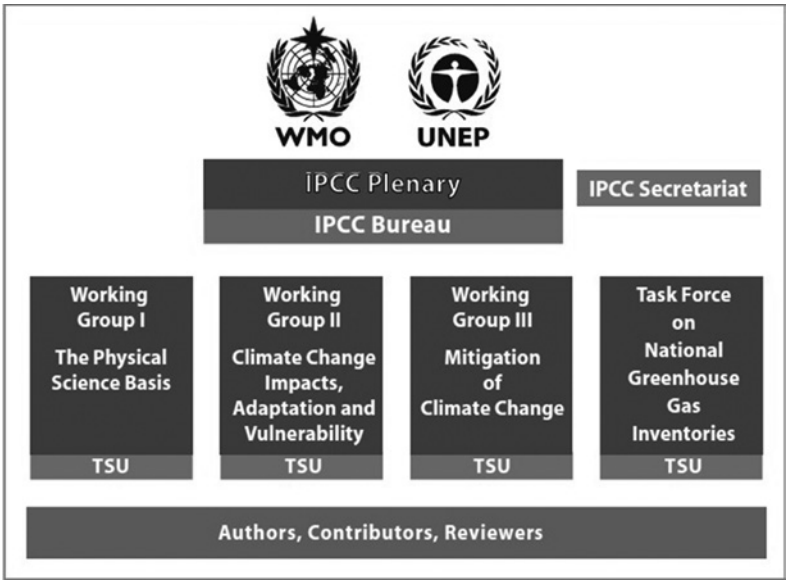

FIGURE 3.1 *Structure of the IPCC.*[12]

11 Intergovernmental Panel on Climate Change (IPCC), *Structure* <http://www.IPCC.ch/organization/organization_structure.shtml> accessed 22 August 2012.

12 Ibid.

Due to its scientific and intergovernmental nature, the IPCC's work is to be 'policy-relevant and yet policy-neutral, never policy-prescriptive'.[13] Apart from that, scientific integrity, objectivity, openness and transparency are other principles that the IPCC should apply.[14] Generally the IPCC provides reports for the information of policy-makers within governments. To ensure the incorporation of the principles mentioned above into its reports, the IPCC has to follow strict procedures. In 2010, as a response to the request by the IPCC Chair and the Secretary-General of the UN, the InterAcademy Council (IAC) reviewed the IPCC's processes and procedures and put forward some proposals for improvement which were partly adopted by the IPCC. Figure 3.2 describes how the IPCC reports are currently produced.

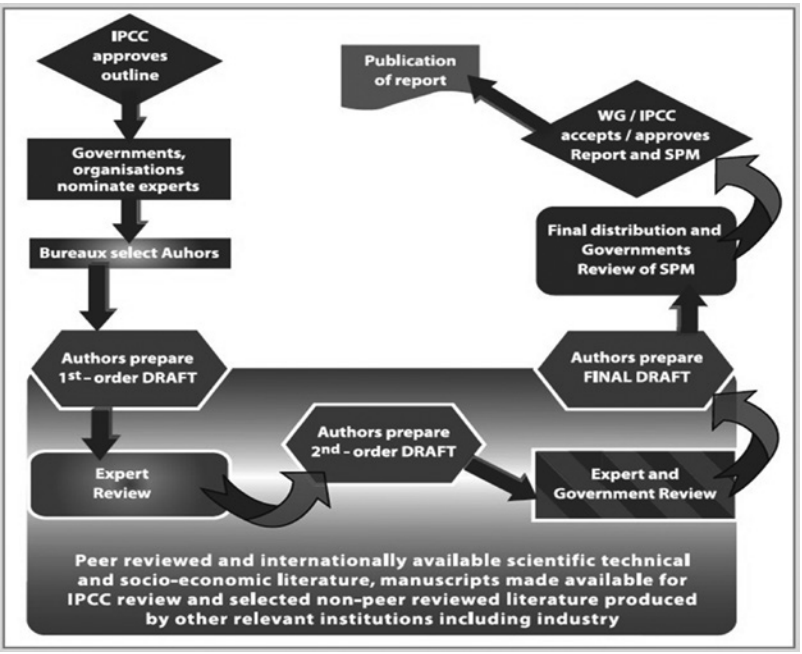

FIGURE 3.2 *The procedure of drafting and reviewing reports by the IPCC.*[15]

13 Intergovernmental Panel on Climate Change (IPCC), *Organization* <http://www.IPCC.ch/organization/organization.shtml> accessed 17 July 2012.

14 World Meteorological Organization (WMO), *Intergovernmental Panel on Climate Change (IPCC)*<http://www.WMO.int/pages/themes/climate/international_IPCC.php> accessed 22 August 2012.

15 Intergovernmental Panel on Climate Change (IPCC), *Principles and Procedures* <http://www.IPCC.ch/organization/organization_procedures.shtml> accessed 22 August 2012.

To date the IPCC has issued five Assessment Reports contributing to the combating of climate change around the world. The IPCC First Assessment Report of 1990 revealed the significance of climate change as a natural and political issue, and thus played a 'decisive' role in the adoption of the *UNFCCC*. The 'Legal measures' paper submitted by the Response Strategies Working Group of the IPCC laid the foundation for the drafting and adoption of the *UNFCCC*.[16] Apart from that, the IPCC has remained the most important source of scientific, technical and socio-economic information for the *UNFCCC*, after the entry into force of the Convention, through its Special Reports, Technical Papers and Methodology Reports. Since 1991 the IPCC has supported the *UNFCCC* by preparing Methodology Reports for National GHG Inventories.[17] Thus, the relationship between the *UNFCCC* and the IPCC is deemed as 'a model for interaction between science and decision-makers'.[18] The IPCC Second Assessment Report of 1995 provided key input to the further development of the *UNFCCC*, in particular the adoption of its *Kyoto Protocol*. The IPCC Third Assessment Report of 2001 and the IPCC Fourth Assessment Report of 2007 further confirmed the contribution of GHG emissions to climate change and global warming. In September 2013 and early 2014, the IPCC released the reports of its three working groups, and a synthesis report was released on 2 November 2014.[19] These reports further strengthen the scientific evidence of anthropogenic climate change, and leave 'fewer uncertainties about the serious consequences of inaction'.[20]

It is clear that the UN helped to establish the IPCC and monitor its sound development. The IPCC, conversely, underpins the efforts of the UN in persuading countries around the world to recognise and combat climate change jointly. One of these achievements is the *UNFCCC* and its *Kyoto Protocol*, which determines the direction of global regulating GHG emissions from international shipping through giving the IMO a GHG mandate, setting the reduction

16 Jill Barrett, 'The Negotiation and Drafting of the Climate Change Convention' in Robin Churchill and David Freestone (eds), *International Law and Global Climate Change* (1991) 183, 184–187.

17 Intergovernmental Panel on Climate Change (IPCC), *Understanding Climate Change: 22 Years of IPCC Assessment* <http://www.IPCC.ch> accessed 17 July 2012.

18 Ibid.

19 Intergovernmental Panel on Climate Change (IPCC), 'Fifth Assessment Report (AR5)' (2014) <http://www.IPCC.ch/> accessed 18 June 2014.

20 Dahe Qin, *Opening Remark at Working Group I—Twelfth Session* (23 September 2013) <http://www.IPCC.ch/meetings/session36/speeches/op_wg1_p12_Dahe_Qin.pdf> accessed 18 June 2014, p. 2.

targets for *UNFCCC* Annex I States, and discussing regulatory principles for GHG emissions from ships.

3.2.2 *Other Institutions and Their Interaction*

In addition to the IPCC, some other UN subsidiary bodies or agencies also contribute to combating of climate change. As the 'voice for the environment within the United Nations system' established in 1972,[21] UNEP established a Climate Change sub-program. In this program, UNEP works with countries, particularly developing countries, to raise public awareness of the Earth's changing climate, strengthen countries' ability to adapt to climate change, and integrate climate change responses into their national development processes.[22] Essentially UNEP is assigned 'a catalytic and coordinating role' in the management of the climate change issue within the UN system.[23] The World Meteorological Organization (WMO) is regarded as the UN system's 'authoritative voice on the state and behaviour of the Earth's atmosphere'.[24] It exercises important functions such as weather and climate observation and monitoring, understanding of climate processes, the development of clear, precise and user-targeted information and other services for policy makers.[25] The UN Economic Commission for Europe (UNECE) also contributed significantly to the adoption of the *1979 Convention on Long-Range Transboundary Air Pollution* (CLRTAP).[26] The above work makes a substantial contribution to international efforts in fighting climate change. However, this work essentially implements the outcomes within the *UNFCCC-Kyoto Protocol* regime rather than regulating climate change. The scope of these institutions seldom includes the GHG emissions from international shipping.

Other institutions, the Committee on Trade and Environment (CTE) within the World Trade Organization (WTO) as an example,[27] contribute little to the issue of climate change. Although the CTE deals with the relationship between

21 United Nations Environment Programme (UNEP), *About UNEP* <http://www.UNEP.org> accessed 18 July 2012.

22 Ibid.

23 See Robin Churchill and David Freestone (eds), *International Law and Global Climate Change* (Graham & Trotman/M. Nijhoff, 1991) 167.

24 World Meteorological Organization (WMO), *WMO and Climate Change* <http://www.WMO.int/pages/themes/WMO_climatechange_en.html> accessed 18 July 2012.

25 Ibid.

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

27 The forerunner to the CTE was the Group on Environmental Measures and International Trade (GEMI) established in 1971 but it did not meet until 1992. In 1994 the CTE replaced

Multilateral Environmental Agreements (MEAs) and the international trading regime,[28] as of 30 July 2012, no conflict relating to an MEA, or a matter directly involving climate change, has been submitted to a dispute settlement panel within the WTO.[29] This is probably because of the limited authority of the CTE, which is confined to making recommendations rather than making decisions. Nevertheless, litigation seeking climate change mitigation or adaptation has been initiated in many countries such as Australia and the United States.[30] Examples are the *Anvil Hill Project Watch Association v Minister for the Environment and Water Resources* (*2007*) in Australia and the *Massachusetts v Environmental Protection Agency* (*2007*) in the USA.[31] Thus, it might be inferred that global issues need international responses, but national responses might

---

the GEMI under the *Marrakech Agreement* while the WTO took over the 1947 General Agreement on Tariffs and Trade (GATT).

28 The CTE has the mandate to 'identify the relationship between trade measures and environmental measures', and 'make recommendations on changes that might be necessary to the multilateral trading system both to enhance positive interaction between trade and environmental measures and avoid protectionist trade measures'. This mandate comes from the 'Decision on Trade and Environment on 14 April 1994'. See Farhana Yamin and Joanna Depledge, *The International Climate Change Regime: A Guide to Rules, Institutions and Procedures* (Cambridge University Press, 2004) 531–532.

29 World Trade Organization (WTO), *Chronological List of Disputes Cases* <http://www.WTO.org/english/tratop_e/dispu_e/dispu_status_e.htm> accessed 22 August 2012.

30 Jacqueline Peel, 'Issues in Climate Change Litigation' (2011) 5(1) *Carbon & Climate Law Review* 15, 15.

31 *Anvil Hill Project Watch Association Inc v Minister for the Environment and Water Resources* (2007) FCA 1481. In this case Centennial Coal proposed to build a large open-cut coal mine in NSW and received State approval under Part 3A of the *Environmental Planning and Assessment Act 1979* (*NSW*), while the Anvil Hill Project Watch Association, as a local community association, sued the Minister to review the government's decision in that the proposed mine is to produce up to 10.5 million tons of coal per annum and operate for 12 years and thus have a significant environmental impact. However, the Minister argued that the estimated annual emissions from burning coal harvested from the mine would constitute only 0.04 per cent of global GHG emissions. Justice Stone dismissed the application for review on the ground that the likelihood and extent of adverse impact on matters protected under the *Environment Protection and Biodiversity Conservation Act 1999* (*Cth*) (*EPBC Act*) was not significant enough to trigger the application of the *EPBC Act*.

Massachusetts v Environmental Protection Agency 549 U.S. 497 (2007), 127 S.Ct. 1438. This case was held in the US Supreme Court in which 12 states and several cities of the US brought suit against the Environmental Protection Agency (EPA), aiming to push the federal agency to regulate carbon dioxide and other GHGs as pollutants. The 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. The majority opinion of

also be effective under certain circumstances.[32] In the context of GHG emissions from international shipping, national or regional initiatives in tackling this issue might be of significance in advocating or pushing the international negotiation process. For instance, the European Union (EU) has taken unilateral measures to deal with GHG emissions from aviation and has planned to take similar measures to tackle GHG emissions from ships.[33] These measures might impose some pressure on the IMO in regulating this issue in a timely manner,[34] or provide the IMO with some approaches for reference. This issue is examined in more detail in Chapter 7.

Within the UN system, these agencies interact with each other in jointly combating climate change, and thus promote the efficiency of such work. This interaction can take different forms. The establishment of the IPCC is an example where the UNEP and WMO collaborated closely in the 1980s. Moreover, the UNEP has cooperated with other UN agencies actively in addressing climate

---

the justices commented that GHGs meet the definition of air pollutant regulated under the *Clean Air Act*.

32 One of the motivations for a country to regulate a global issue like climate change is that climate change is a 'multiscalar' environmental problem with both global impacts and local impacts. The climate change impact caused by an activity might be insignificant globally but could be 'measurable and significant' within the country. Peel, above n. 30, 17.

33 The EU has been working to include aviation and maritime carbon taxes in the EU Emission Trading System (EU ETS), and the aviation tax entered into force on 1 January 2012 (EU Directive 2008/10/101/EC) which applies to all airlines that fly in and out of the EU. In December 2012 the EU suspended this policy due to improved performance by the International Civil Aviation Organization (ICAO), or perhaps because of strong opposition from many countries, including the US, Russia, China and India. In the same year, the EU published a consultation document seeking the views on how best to reduce GHG emissions from ships so as to finally include GHG emissions from international shipping in an EU ETS. See, e.g., Elena Ares, *EU ETS and Aviation* (23 May 2012) <www.parliament.uk/briefing-papers/SN05533.pdf> accessed 24 August 2012; Aoife O'Leary, David Holyoake and Marta Ballesteros, 'Legal Implications of EU Action on GHG Emissions from the International Maritime Sector' (2011) 5–6; Will Nichols, *EU Launches Attempt to Deliver Shipping Emissions Trading Scheme* (24 January 2012) <http://www.businessgreen.com/bg/news/2140997/eu-launches-attempt-deliver-shipping-emissions-trading-scheme> accessed 1 January 2014.

34 Both the IMO and the ICAO received their GHG mandates from Article 2(2) of the *Kyoto Protocol* in the same year, so any significant regulatory progress occurred in one institution would possibly encourage the other institution to take further steps. Furthermore, the possible inclusion of shipping GHG emissions into an EU ETS would impair the regulatory authority of the IMO in this regard. See Sebastian Oberthür, 'Institutional Interaction to Address Greenhouse Gas Emissions from International Transport: ICAO, IMO and the Kyoto Protocol' (2003) 3(3) *Climate Policy* 191, 202.

change internationally, such as the *UNFCCC* Secretariat, the IPCC Secretariat and the World Bank.[35] Further, both the UNEP and WMO's work is shaped by the negotiations process of the *UNFCCC*, its *Kyoto Protocol* and *Paris Agreement*.[36] Other types of UN institutions include the COPs, CMPs and CMAs established under the *UNFCCC* process. They have been pushing the negotiations process of the international climate change regime through organising rounds of conferences for their State Parties. In particular, the Subsidiary Body on Scientific and Technological Advice (SBSTA) and the Ad Hoc Working Group on Long-term Cooperative Action (AWG-LCA) under the *UNFCCC* had been working on GHG emissions from international bunker fuels before 2012. The Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) established in 2011 had been working on negotiating the *Paris Agreement* that was adopted in 2015 and is expected to enter into force from 2020. Currently the Ad Hoc Working Group on the Paris Agreement (APA) has been established under the *Paris Agreement* to conduct the work mandated by the Agreement in conjunction with other bodies under the *UNFCCC*.

The *UNFCCC* cooperates with the IMO through reciprocal exchange of information and reciprocal participation in relevant meetings.[37] However, it is open to debate as to the regulatory roles of the *UNFCCC* and the IMO, in particular whether the IMO should be the exclusive international organisation responsible for the regulation of GHG emissions from international shipping.[38] Another form of institutional collaboration exists in the adoption of similar or common definitions through which the UN institutions might provide a common basis for regulation. One example of such collaboration lies in the adoption of a definition for 'air pollution'. The definition of 'air pollution' in Article 1(a) of the *CLRTAP* was generally adopted by the subsequent UN Conventions as the definition of marine pollution under the *United Nations*

35 Yamin and Depledge, above n. 28, 533–534, 539–540.

36 United Nations Environment Programme (UNEP), *Climate Change* <http://www.UNEP.org/gc/gc26/factsheet/pdfs/Climate_change.pdf> accessed 24 August 2012, p. 1; World Meteorological Organization (WMO), *WMO at UNFCCC/COP Sessions* <http://www.WMO.int/pages/prog/wcp/cop17/background_en.html> accessed 24 August 2012.

37 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, 95.

38 There is no hierarchy between the two institutions (UNFCCC and the IMO) in regulating GHG emissions from international shipping, and both institutions have been involved in the regulation of this GHG emissions issue. Therefore, currently different interpretations exist. The IMO's mandate has been discussed in Chapter 2 (2.5.3.1), and the IMO's role in regulating GHG emissions from ships is examined in Chapters 4 (4.2) and 7 (7.4.3.2, 7.5.5).

Convention on the Law of the Sea (*LOSC*)[39] and the definition of emission under Annex VI to the *International Convention for the Prevention of Pollution from Ships* (*MARPOL 73/78*).[40]

Aside from the UN institutional collaboration, a certain degree of institutional conflict or 'fragmentation' also exists in international environmental governance,[41] as well as the climate change regime. This fragmentation, however, is regarded as the main factor leading to slow development of the regulation by the IMO on GHG emissions from international shipping.[42] The impact of institutional fragmentation on the reduction of shipping emissions, as well as possible options for its improvement, is examined in Chapter 7 of this book.

The UN's institutional responses to the GHG emissions issue, or in other words, climate change, have implications for the reduction of GHG emissions from international shipping. The establishment of the IPCC links the scientific community and political institutions. As a growing source of GHG emissions contributing to climate change, emissions from international shipping have also been recognised by the IPCC in its Assessment Reports.[43] Other institutions, such as the UNEP and WMO, raise the awareness of the Earth's

39 *United Nations Convention on the Law of the Sea*, opened for signature 10 December 1982, 1833 UNTS 3 (entered into force 16 November 1994) art. 1(4) ('*LOSC*').

40 See *CLTRAP* art. 1(a); *LOSC* art. 1(4); *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, art. 2(7) ('*MARPOL 73/78*'). See also ch. 2, 2.1.1.

41 Karen N. Scott, 'International Environmental Governance: Managing Fragmentation through Institutional Connection' (2011) 12(1) *Melbourne Journal of International Law* 177, 179–182.

42 Hackmann, above n. 37, 1. But, some scholars have asserted that this kind of fragmentation could be considered 'a strength rather than a weakness'. See, e.g., O.R. Young, *The Institutional Dimensions of Environmental Change: Fit, Interplay, and Scale* (MA: MIT Press, 2002); Steinar Andresen, 'The Effectiveness of UN Environmental Institutions' (2007) 7(4) *International Environmental Agreements: Politics, Law and Economics* 317;. T. Gehring and S. Oberthür, 'Interplay: Exploring Institutional Interaction' in Oran R. Young, Leslie A. King and Heike Schroeder (eds), *Institutions and Environmental Change: Principal Findings, Applications, and Research Frontiers* (MA: MIT Press, 2008).

43 See, e.g., Intergovernmental Panel on Climate Change (IPCC), 'Fourth Assessment Report' (2007) <http://www.IPCC.ch/publications_and_data/ar4/syr/en/contents.html> accessed 27 August 2012, p. 36; Intergovernmental Panel on Climate Change (IPCC), 'Fifth Assessment Report: Working Group III Report' (2014) <http://report.mitigation2014.org/spm/IPCC_wg3_ar5_summary-for-policymakers_approved.pdf> accessed 18 June 2014, p. 8.

climate change, provide technical knowledge on combating climate change and implement the outcomes within the international climate change regime. Their work, although not specialised in the reduction of shipping emissions, is indispensable in uniting people from both developed countries and developing countries. As one of the main institutions coping with GHG emissions from ships, the *UNFCCC* and its *Kyoto Protocol* and *Paris Agreement*, as well as its COPs, CMPs, CMAs, SBSTA, AWG-LCA, ADP and APA, provide crucial platforms for different countries to discuss and negotiate the reduction of such emissions. Furthermore, given that international regulation of shipping GHG emissions within the UN institutions is a lengthy and complex process, any regulatory or enforcement initiative or unilateral action by individual States or the EU might facilitate or improve the global regulation of the GHG emissions issue under the auspices of these UN institutions.[44] Therefore, any initiatives made by individual States or regional organisations to reduce shipping GHG emissions should be studied and promoted if applicable.

3.3 International Legal Framework on Climate Change

In a broad sense, the international legal framework on climate change covers various global and regional treaties and non-binding political agreements to combat climate change by States or through intergovernmental organisations. As a relatively narrow concept, the international climate change regime usually refers to the *1992 UNFCCC* and its *Kyoto Protocol* and *Paris Agreement*, as well as its COPs, CMPs and CMAs.[45] As such, the climate change regime was formally established in 1992 when the *UNFCCC* was adopted; whereas the broader international legal framework on climate change also comprises the previous regional and international efforts in regulating atmospheric pollution. This part first reviews the UN's efforts in tackling air pollution from the perspectives of the *1979 Convention on Long-Range Transboundary Air*

44 See Oberthür, above n. 34.

45 This definition of the international climate change regime has been supported by many scholars. See, e.g., Birnie, Boyle and Redgwell, above n. 1, 356; Yamin and Depledge, above n. 28, 24–29; Ronald D. Brunner, 'Science and the Climate Change Regime' (2001) 34(1) *Policy Sciences* 1, 1; Sebastian Oberthür, 'The Climate Change Regime: Interactions with ICAO, IMO, and the EU Burden-Sharing Agreement' in Sebastian Oberthür and Thomas Gehring (eds), *Institutional Interaction in Global Environmental Governance* (The MIT Press, 2006) 53, 54.

Pollution (*CLRTAP*),[46] and *the 1985 Convention for the Protection of the Ozone Layer* (*Vienna Convention*).[47] Based on the analysis of the *UNFCCC* and its *Kyoto Protocol*, this part then examines the key outcomes of the *UNFCCC-Kyoto Protocol* regime during its series of negotiations with a particular emphasis on the newly-adopted *Paris Agreement*. The analysis of these outcomes indicates that international regulation on the reduction of GHG emissions from international shipping is subject to the evolution and direction of the UN climate change regime.

3.2.1 *The Prevention of Atmospheric Pollution*

The issue of atmospheric pollution is generally discussed in the academic literature separately from climate change.[48] Thus atmospheric pollution was excluded from the climate change regime. However, it could be a part of the international legal framework on climate change and also one aspect of the international legal framework on the reduction of GHG emissions from international shipping. At least three factors lead to this conclusion. First, the international legal framework on climate change is a concept broader than the climate change regime. It encompasses not only current conventions regulating climate change, but also the formation of the key regulatory tool, the 'framework treaty', which was initially adopted by two conventions on the prevention of atmospheric pollution: the *1979 Convention on Long-Range Transboundary Air Pollution* (*CLRTAP*), and the *1985 Convention for the Protection of the Ozone Layer* (*Vienna Convention*). The two conventions were regarded as the first 'framework treaties' to address atmospheric pollution, and this approach was later followed by the *UNFCCC* and its *Kyoto Protocol*. Second, climate change and atmospheric pollution are 'interlinked'.[49] Certain types of atmospheric pollution, transboundary air pollution as an example, and the depletion of the ozone layer, have been proven to contribute to global warming and climate change.[50] Effective international regulation on climate change could reduce atmospheric pollution. Third, as discussed in Chapter 1, GHGs can be a type of 'conditional' pollution, and the

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

47 *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 Convention*').

48 See, e.g., Philippe Sands, *Principles of International Environmental Law* (Cambridge University Press, 2nd ed, 2003) 322–356; Alexandre Charles Kiss and Dinah Shelton, *International Environmental Law* (Transnational Publishers, 3rd ed, 2004) 562–579.

49 Birnie, Boyle and Redgwell, above n. 1, 336.

50 See ibid. 336.

broad definition of GHGs includes those resulting in atmospheric pollution.[51] For example, the release of GHGs including chlorofluorocarbons (CFCs), halons, and other chlorine-based substances may lead to the destruction of the ozone layer.[52] Thus, the issue of atmospheric pollution becomes an indispensable part of the international legal framework on climate change, as well as GHG emissions from international shipping.

3.2.1.1 The *1979 Convention on Long-Range Transboundary Air Pollution*

As early as the *Trail Smelter* case in 1941, transboundary air pollution has been a matter of international concern. The *1982 LOSC* is considered to be 'the first binding rules of a global nature' on atmospheric pollution.[53] Its Articles 212 and 222 grant States legislative and enforcement responsibilities regarding air pollution. However, the role of the *LOSC* in combating climate change is generally less mentioned than the *1979 Convention on Long-Range Transboundary Air Pollution* (*CLRTAP*). This is probably because the *CLRTAP* is a 'framework treaty' that relates it to climate change. As 'the first international legally binding instrument' dealing with regional air pollution,[54] the *1979 CLRTAP* was adopted by the UNECE, signed by all European States, the US and Canada. It established a regional framework to combat transboundary air pollution. The main characteristics of the convention consist of two aspects. It provides for a 'soft commitment' by all parties that they should 'endeavour to limit and, as far as possible, gradually reduce and prevent air pollution including long-range transboundary air pollution'.[55] Thus it establishes a general obligation on parties to limit their emissions of air pollutants, although there was no specific target or timetable for such a limit.[56] For example, it does not limit such pollution to a given level in certain years. The other important feature lies in its broad definition of 'air pollution', which leaves room for further regulation by means of protocols. Article 1(a) of the convention provides:

> 'air pollution' means the introduction by man, directly or indirectly, of substances or energy into the air resulting in deleterious effects of such a

51 See ch. 1, 1.1.

52 Birnie, Boyle and Redgwell, above n. 1, 336.

53 Kiss and Shelton, above n. 48, 564.

54 United Nations Economic Commission for Europe (UNECE), *The 1979 Geneva Convention on Long-rang Transboundary Air Pollution* <http://www.UNECE.org/env/lrtap/lrtap_h1.html> accessed 2 August 2012.

55 *CLRTAP* art. 2; Sands, above n. 48, 325.

56 Sands, above n. 48, 325.

> nature as to endanger human health, harm living resources and ecosystems and material property and impair or interfere with amenities and other legitimate uses of the environment, and 'air pollutants' shall be construed accordingly.[57]

In this definition, 'substances or energy' directly or indirectly introduced by man is a broad expression and covers both GHG emissions and ozone depleting substances.[58] It enables various types of air pollutants to be regulated by the protocols of the *1979 CLRTAP*. To date the *CLRTAP* has eight protocols which have set specific targets for reduction of air pollutants, ranging from sulphur emissions,[59] Nitrogen Oxides,[60] Volatile Organic Compounds (VOCs),[61] heavy metals,[62] and Persistent Organic Pollutants (POPs).[63] For instance, its 1985 Protocol required its parties to reduce the sulphur emissions or their transboundary fluxes by 30 per cent by 1993, using 1980 levels as the basis for calculation of reductions.[64] Additionally, the convention established a 'Cooperative Programme for the Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe' (EMEP), an Executive Body and Secretariat to monitor the air pollutants and develop relevant procedures. The *1979 CLRTAP* has its strengths and weaknesses. It is weak due to its nature of being a 'framework treaty'. It is strong in providing such framework for future cooperation and regime development of more effective measures against pollution.[65] The approach of combining a framework treaty followed by protocols was

57 *CLRTAP* art. 1(a). This definition of air pollution was later generally adopted by the *LOSC* and *MARPOL* Annex VI, which may be regarded as a kind of collaboration within UN institutions. See ch. 3, 3.2.2.

58 Sands, above n. 48, 325.

59 The 1985 Protocol on the Reduction of Sulphur Emissions or their Transboundary Fluxes by at least 30 per cent (entered into force 2 September 1987); the 1994 Protocol on Further Reduction of Sulphur Emissions (entered into force 5 August 1998).

60 The 1988 Protocol concerning the Control of Nitrogen Oxides or their Transboundary Fluxes (entered into force 14 February 1991).

61 The 1991 Protocol concerning the Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes (entered into force 29 September 1997).

62 The 1998 Protocol on Heavy Metals (entered into force 29 December 2003).

63 The 1998 Protocol on Persistent Organic Pollutants (POPs) (entered into force 23 October 2003).

64 The 1985 Protocol on the Reduction of Sulphur Emissions or their Transboundary Fluxes by at least 30 per cent art. 2.

65 See Birnie, Boyle and Redgwell, above n. 1, 345; Kiss and Shelton, above n. 48, 565–568.

adopted by subsequent environmental treaties to combat climate change and ozone depletion.[66]

In the context of GHG emissions from international shipping, the framework treaty model reflected in the *1979 CLRTAP* was adopted by both the *1992 UNFCCC* and its *Kyoto Protocol*, and *MARPOL 73/78*. The *CLRTAP* broad definition of 'air pollution' also covers GHG emissions from international shipping. However, its definition of 'long-range transboundary air pollution' specifies that the distance between the polluter and the victim should generally make it impossible 'to distinguish the contribution of individual emission sources or groups of sources'.[67] In reality, this article excludes the application of this treaty to the issue of GHG emissions from shipping. The distance between the ship which emits GHGs and the victims from such emissions should be long enough that the ship cannot be identified, so that the treaty may be applicable to GHG emissions from ships.[68] Yet, it would be meaningless whether the treaty could be applied in this context as such, since the ship might avoid liability against its emissions, which is also inconsistent with the polluter pays principle.[69] Additionally, the definition of 'air pollution' by the treaty indicates that the pollution should be actual and has 'result[ed] in deleterious effects'.[70] This expression did not include the risk of pollution or damage, which was based on the knowledge at that time. As time went on, the precautionary principle was incorporated into the Protocols of the *CLRTAP*.[71]

3.2.1.2 The *1985 Convention for the Protection of the Ozone Layer*

As a layer in the Earth's atmosphere containing high concentrations of ozone (O_3), the ozone layer is thought to prevent people from harmful exposure to

66 Examples are the *1992 UNFCCC* and its protocols and the *1985 Convention for the Protection of the Ozone Layer* and its protocols. They are examined in the following sections.

67 *CLRTAP* art. 1(b). This article reads that,

> "Long-range transboundary air pollution' means air pollution whose physical origin is situated wholly or in part within the area under the national jurisdiction of one State and which has adverse effects in the area under the jurisdiction of another State at such a distance that it is not generally possible to distinguish the contribution of individual emission sources or groups of sources."

68 See Kiss and Shelton, above n. 48, 564.

69 See ch. 2, 2.6.

70 *CLRTAP* art. 1(a).

71 Henrik Selin and Noelle Eckley, 'Science, Politics, and Persistent Organic Pollutants: The Role of Scientific Assessments in International Environmental Co-operation' (2003) 3(1) *International Environmental Agreements* 17, 27. See also ch. 2, 2.4.

ultraviolet radiation from the sun and adjust the temperature structure of the earth. Since the 1960s, losses in the ozone layer over the Antarctic, the Arctic, Australia and some other areas have been observed.[72] As a response to this issue, an international ozone regime was established under the auspices of the UNEP. Currently the regime consists of the *1985 Convention for the Protection of the Ozone Layer* (*Vienna Convention*), the *1987 Montreal Protocol on Substances that Deplete the Ozone Layer* (*Montreal Protocol*),[73] and four amendments to the Protocol, adopted in London (1990),[74] Copenhagen (1992),[75] Montreal (1997)[76] and Beijing (1999).[77]

Similar to the *1979 CLRTAP*, the 1985 *Vienna Convention* is essentially a framework treaty. It does not set any targets or timetable for action, but requires its parties to 'take appropriate measures' to cooperate in four respects. Article 2(2) of the convention lists these obligations:

> To this end the Parties shall . . . :
> (a) Co-operate by means of systematic observations, research and information exchange in order to better understand and assess the effects of human activities on the ozone layer and the effects on human health and the environment from modification of the ozone layer;
> (b) Adopt appropriate legislative or administrative measures and cooperate in harmonizing appropriate policies to control, limit, reduce or prevent human activities under their jurisdiction or control should it be found that these activities have or are likely to have adverse effects resulting from modification or likely modification of the ozone layer;

72 Sands, above n. 48, 343.

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

74 *The 1990 Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer* (*London*), opened for signature 29 June 1990, 30 ILM 537 (entered into force 10 August 1992) ('*The 1990 Amendment*').

75 *The 1992 Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer* (*Copenhagen*), opened for signature 25 November 1992, 32 ILM 874 (entered into force 14 June 1994) ('*The 1992 Amendment*').

76 *The 1997 Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer* (*Montreal*), opened for signature 25 September 1997, UNEP/OzL.Pro.9/12 (entered into force 10 November 1999) ('*The 1997 Amendment*').

77 *The 1999 Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer* (*Beijing*), opened for signature 17 December 1999, UNEP/OzL.Pro.11/10 (entered into force 25 February 2002) ('*The 1999 Amendment*').

> (c) Co-operate in the formulation of agreed measures, procedures and standards for the implementation of this Convention, with a view to the adoption of protocols and annexes;
> (d) Co-operate with competent international bodies to implement effectively this Convention and protocols to which they are party.[78]

These obligations are general, and are implemented by parties at their discretion based on relevant scientific and technical considerations, taking their capabilities into consideration.[79] The above Article 2(a)(b), however, incorporates the precautionary principle in that it requests its State Parties to take actions once 'these activities have or are likely to have adverse effects'. Compared with the *1979* CLRTAP, the *1985 Vienna Convention* was a major advance in this regard, and was thus regarded as 'one of the first' to recognise and adopt the precautionary approach.[80] This approach was also applied in its *1987 Montreal Protocol* and its amendments[81] and the IMO negotiation process on the reduction of GHG emissions from international shipping.[82] The spirit of cooperation indicated in the above article is another important feature of the convention, which was strengthened in its *1987 Montreal Protocol*.[83] The cooperation among States, in particular between developed States and developing States, is regarded as one of the important reasons for the success of the *1985 Vienna Convention* and its *Montreal Protocol*,[84] and arguably it was the absence of this cooperation that resulted in the slow progress of global climate change

78 *Vienna Convention* art. 2(2).

79 *Vienna Convention* art. 2(2)(4).

80 Birnie, Boyle and Redgwell, above n. 1, 351.
The precautionary approach was also explicitly invoked in the Preamble of the *Vienna Convention*. The Preamble of the *Vienna Convention* notes that, '[m]indful also of the precautionary measures for the protection of the ozone layer which have already been taken by the national and international levels.' See also ch. 2, 2.4.

81 The preamble of the *Montreal Protocol* notes that, '[d]etermined to protect the ozone layer by taking precautionary measures to control equitably total global emissions of substances that deplete it.' This expression goes beyond the limitation of the *1985 Vienna Convention* to precautionary measures that already existed. The Montreal Protocol and its amendments stipulate specific legal obligations and timetables for such requirements with the absence of scientific evidence, which could be deemed as the application of the precautionary principle in this context.

82 See ch. 2, 2.4.

83 See, e.g., *Montreal Protocol* arts. 9, 10.

84 Bryan A. Green, 'Lessons from the Montreal Protocol: Guidance for the Next International Climate Change Agreement' (2009) 39(1) *Environmental Law* 253, 259.

negotiations. The acquisition of alternative technology as stipulated in Article 4 was regarded as 'most unsatisfactory' on the ground that the parties only need to cooperate in accordance with their domestic laws and regulations.[85] However, the definition it provides on 'adverse effects' clearly indicates that ozone depletion might lead to climate change,[86] which relates the convention to the international climate change regime.

The *1987 Montreal Protocol* was regarded as a 'landmark international environmental agreement' due to the new regulatory techniques, institutional arrangements, and innovative financial mechanisms that it adopted.[87] As a Protocol to the *1985 Vienna Convention*, it sets specific targets for reducing and eliminating consumption and production of ozone depleting substances. These substances were listed and regulated by the Protocol and its four amendments.[88] As these substances, including O_3, are types of GHGs in a broad sense, the adoption of the Protocol paved the way for the negotiation and adoption of the *UNFCCC* and its *Kyoto Protocol*. The adoption of the Common but Differentiated Responsibility (CBDR) principle[89] is another important feature of the Protocol. Article 5(1) of the Protocol offers developing country parties a grace period of ten years beyond the dates set for phase-out of the controlled substances regulated under Article 2 of the Protocol.[90]

---

85 Birnie, Boyle and Redgwell, above n. 1, 350. Article 4(2) of the *Vienna Convention* provides that, '[t]he parties shall cooperate, consistent with their national laws, regulations and practices and taking into account in particular the needs of the developing countries, in promoting, directly or through competent international bodies, the development and transfer of technology and knowledge.'

86 Article 1(2) of the *Vienna Convention* reads that,

> "'Adverse effects' means changes in the physical environment or biota, including changes in climate, which have significant deleterious effects on human health or on the composition, resilience and productivity of natural and managed ecosystems, or on materials useful to mankind."

87 Sands, above n. 48, 345–346. UNEP, *Key Achievements of the Montreal Protocol To Date* <http://ozone.UNEP.org/Publications/MP_Key_Achievements-E.pdf>accessed29August 2012. According to the statistics by the UNEP, as of the end of 2009, the Parties to the *Montreal Protocol* had phased out the consumption of 98 per cent of all the chemicals controlled by the Protocol. In this sense, the *Montreal Protocol* was successful in achieving its goals of phasing out the ODSs. See Green, above n. 84, 259.

88 Totally there are 5 Annexes ranging from Annex A, Annex B, Annex C, Annex D, and Annex E listing different groups of controlled substances under this regime.

89 See ch. 2, 2.5.

90 Article 5(1) of the Protocol provides,

> 'Any Party that is a developing country and whose annual calculated level of consumption of the controlled substances is less than 0.3 kilograms per capita on the date of the entry

Article 5(2) and 5(3) aims to facilitate access to 'environmentally safe alternative substances and technology' by developing countries, and promises to offer them 'subsidies, aid, credits, guarantees or insurance programmes'.[91] These regulations attract participation from developing countries including India and China. Meanwhile, the Protocol's institutional arrangements for the regular meetings of parties (MOPS), and the 'Financial Mechanism' including the establishment of a Multilateral Fund, have also gained wide support.[92] These methods have been relied on extensively in the subsequent treaties on climate change.

Three approaches adopted by the *Montreal Protocol* might be valuable to the issue of GHG emissions from international shipping. One is its flexible arrangement, which has helped both cooperation between various States and participation from developing States.[93] For instance, parties are required to review and modify the provisions of the Protocol in the future as a new economic or environmental situation or technology appears.[94] Three categories of exemptions of certain Ozone Depleting Substances (ODSs) for certain uses were provided,[95] which might alleviate concerns from relevant States due to their special situations.[96] Additionally, rules on trade of ODSs are not rigid. The trade on production allowances among party States is allowed, which makes it possible for low-producing States to meet their domestic needs.[97] In contrast to the above flexible agreement, the IMO explicitly sets the principle of No More Favourable Treatment (NMFT) in its *MARPOL 73/78*,[98] which makes it less attractive for developing States to participate in the reduction of GHG emissions from ships. When comparing the successful practice under the *1987 Montreal Protocol* with the slow progress within the IMO in regulating

into force of the Protocol for it, or any time thereafter within ten years of the date of entry into force of the Protocol shall, in order to meet its basic domestic needs, be entitled to delay its compliance with the control measures set out in paragraphs 1 to 4 of Article 2 by ten years after that specified in those paragraphs.'

91 *Montreal Protocol* art. 5(2)(3).

92 See, e.g., Sands, above n. 48, 354–357; Kiss and Shelton, above n. 48, 575–579.

93 Green, above n. 84, 262–265.

94 *Montreal Protocol* art. 6.

95 The three categories of exemptions include 'the critical uses of methyl bromide, essential uses for all other [ODSs], and laboratory and analytical uses'. UNEP Ozone Secretariat, *Exemption Information* <http://ozone.UNEP.org/Exemption_Information/> accessed 28 August 2012.

96 Green, above n. 84, 263.

97 *Montreal Protocol* art. 2(5).

98 *MARPOL 73/78* art. 5(4); see also ch. 2, 2.5.

the shipping GHG emissions issue, it might be inferred that certain kinds of flexibility are necessary to facilitate reaching consensus in the IMO on future action to regulate shipping GHG emissions. Indeed, the IMO had demonstrated flexibility in its newly-adopted Energy Efficiency measures for reducing shipping emissions in that it gave new ships a six and a half year delay in applying new shipbuilding standards, although this benefit applies to ships registered in both developing and developed States.[99] It is arguable that more flexibility is needed for adopting market-based measures (MBMs) to further reduce GHG emissions from international shipping.[100]

Another innovative approach adopted by the *Montreal Protocol* lies in its well-designed application of the CBDR principle. First, it links the obligations by developing State parties with the effective implementation of financial cooperation and the transfer of technology from developed State parties.[101] Article 5(5) of the amended Protocol in 1990 provides:

> Developing the capacity to fulfil the obligations of the Parties operating under paragraph 1 of this Article to comply with the control measures set out in Articles 2A to 2E and Article 2I, and any control measures in Articles 2F to 2H that are decided pursuant to paragraph 1 *bis* of this Article, and *their implementation by those same Parties will depend upon the effective implementation of the financial co-operation as provided by Article 10 and the transfer of technology* as provided by Article 10A.[102]

As discussed in Chapter 2, the financial cooperation and transfer of technology included in the above article is a kind of 'differentiated treatment', and constitutes a form of the CBDR principle. The Protocol is innovative in setting the implementation of financial cooperation and technology transfer as the conditions for the developing States to fulfil their obligations under the Protocol. This approach was later adopted by the *UNFCCC*.[103] Second, the provisions of

99 John Vidal, *Maritime Countries Agree First Ever Shipping Emissions Regulation* <http://www.guardian.co.uk/environment/2011/jul/18/maritime-countries-shipping-emissions-regulation> accessed 29 August 2012; see also ch. 4, 4.3.2.

100 See ch. 4, 4.3.4, ch. 7, 7.5. There are three routes within the IMO in regulating GHG emissions from international shipping, namely technical measures, operational measures, and MBMs. Currently technical and operational measures have been adopted by the IMO, while the MBMs are still under discussion.

101 Sands, above n. 48, 354.

102 *The 1990 Amendment* art. 5(5).

103 *UNFCCC* art. 4(7).

the Multilateral Fund required that the financial assistance would only cover the incremental costs undertaken by developing States in fulfilling their obligations under the Protocol.[104] As such, both developing and developed States found this an appropriate measure to relieve their concerns: developing States received the assistance that they were lacking while developed States were guaranteed that their assistance would be utilised for the purpose of reducing ODSs.

Currently the mechanisms on financial cooperation and technology transfer are in place under the *UNFCCC*,[105] as well as various funds. It is important to maintain and improve these mechanisms to incorporate the successful practice of the *Montreal Protocol* into the reduction of GHG emissions from shipping. In particular, it might be necessary to apply both the CBDR and the NMFT principles in a creative manner. Due to the growing status of developing States in the international economy and politics, it is important to take into account the interests from this group of nations in the development of global regulation of shipping GHG emissions. To that end, the adoption of the CBDR principle might take different forms, such as certain kinds of MBMs, so as to be more flexible and attractive for most States. It is arguable that the obligation or commitment to reduce GHG emissions by developing countries should *only be activated* once the financial assistance and technology transfer as agreed by both parties are effectively implemented by developed countries. This approach, however, is stronger than those indicated within the *Montreal Protocol* and the *1992 UNFCCC*.[106] Similar restrictions on the utilisation of the funds by the Protocol might also be applied through a GHG Fund. The key to attracting the participation from developing States lies in a sound arrangement on the utilisation and allocation of these benefits as can be seen from the *Montreal Protocol*. These issues are further discussed in Chapters 4 and 7.

The third successful approach adopted by the *Montreal Protocol* lies in its dealing with non-parties by means of trade sanctions which effectively attracted the involvement and cooperation from the industry. Article 4 of the Protocol as revised in 1990 and 1997 requires each party to ban the import and export of controlled substances or products containing such substances from and to non-parties. Due to their consistency with Article 20(b) of the *General*

104 Green, above n. 84, 266.

105 *UNFCCC* art. 4(7).

106 *UNFCCC* art. 4(7).

Agreement on Tariffs and Trade (GATT) and the WTO,[107] these trade measures could be used as 'sticks' while financial assistance serves as a 'carrot'.[108] More importantly, the Protocol encouraged the utilisation of 'environmentally safe alternative substances'.[109] In this way it successfully ensured the industry that a worldwide reduction of ODSs would eventually eliminate the market for ODSs, and it would be secure and profitable from a long term perspective to invest in the research and development of alternatives to ODSs.[110] Thus the industry actively participated in the exploration of new alternatives, as well as the transfer of ozone safe technology, as these technologies were mostly owned by the private sector rather than the governments of developed States.

While ozone depletion and climate change are both issues of a global nature, these trade measures, or methods of dealing with non-parties, particularly in the way they attracted participation from industry, may also have a significant role to play in accelerating the reduction of shipping emissions. To avoid the non-parties' competitive advantage gained from possible future regulations by the IMO, the functions of the port State need to be strengthened since any ship's entry into a port State is subject to the jurisdiction of that State. In this case, the port State might strengthen its legislation and enforcement of vessel entry into its port, and this arrangement could be made through improving current Memoranda of Understanding (MOUs) in the port State control regime.[111] However, trade-related measures might not be applied directly in this context. Furthermore, in view of the fact that most ships around the world are owned by private shipping companies, it is important to examine their needs and get them involved in the reduction of shipping emissions. Chapter 5 discusses this issue in more detail.

107 There are a lot of discussions on the possible conflicts or necessary coordination between trade measures and environmental concerns, but some scholars assert that trade measures are justified and legitimate in this regard. See, e.g., Birnie, Boyle and Redgwell, above n. 1, 353; Scott N. Carlson, 'The Montreal Protocol's Environmental Subsidies and GATT: A Needed Reconciliation' (1994) 29(2) *Texas International Law Journal* 211, 229; Zhongxiang Zhang, 'Multilateral Trade Measures in a Post-2012 Climate Change Regime? What Can Be Taken from the Montreal Protocol and the WTO?' (2009) 37(12) *Energy Policy* 5105, 5105.

108 Zhang, above n. 107.

109 *Montreal Protocol* art. 5(2), 9(1).

110 Green, above n. 84, 267.

111 See ch. 6, 6.5.2, ch. 7, 7.4.4.

3.2.2 *The* UNFCCC-Kyoto Protocol *Regime*

It is generally accepted that the international climate change regime, also referred to as the *UNFCCC-Kyoto Protocol* regime,[112] was established in 1992 when the *UNFCCC* was adopted, culminated in 1997 when the *Kyoto Protocol* was signed, and is currently under development.[113] There are different views on the development stages of this regime. Some scholars classify the regime into five periods,[114] while others divide it into four periods.[115] Based on the recent development of the regime, the evolution of the *UNFCCC-Kyoto Protocol* regime is divided into three stages as illustrated in Table 3.1. While the early international responses to the issue of climate change have been discussed in the first part of this chapter, this section mainly examines the establishment of the regime and the post-Kyoto efforts by the international community with a focus on the relevance this has on the international regulation of GHG emissions from international shipping. The *Paris Agreement* as the new outcome of this regime and its implications on shipping GHG emissions are analysed in a separate subsection.

112 D.M. Ong, 'International Legal Efforts to Address Human-induced Global Climate Change' in M. Fitzmaurice, D.M. Ong and Panos Merkouris (eds), *Research Handbook on International Environmental Law* (Edward Elgar Publishing Limited, 2010) 450, 451.

113 See, e.g., Yamin and Depledge, above n. 28, 22–29; Kevin A. Baumert, 'Participation of Developing Countries in the International Climate Change Regime: Lessons for the Future' (2006) 38(2) *The George Washington International Law Review* 365; Daniel Bodansky, 'The History of the Global Climate Change Regime' in Urs Luterbacher and Detlef F. Sprinz (eds), *International relations and global climate change* (Cambridge, MA: MIT Press, 2001) 23; Lavanya Rajamani, 'The Cancun Climate Agreements: Reading the Text, Subtext and Tea Leaves' (2011) 60(2) *The International and Comparative Law Quarterly* 499, 499.

114 See, e.g., Bodansky, above n. 113, 23–24. Bodansky divided the period till 1997 into five periods, namely the foundational period, the agenda-setting phrase from 1985 to 1988, a pre-negotiation period from 1988 to 1990, the formal intergovernmental negotiations phase of the *UNFCCC*, Post-Rio Developments and the Negotiation of the *Kyoto Protocol*.

115 See, e.g., Yamin and Depledge, above n. 28, 22–29. Yamin and Depledge classify the regime into three stages, namely the emergence of the climate change regime, entry into force of the *UNFCCC* and the Berlin Mandate, the post-Kyoto era, and the post-Marrakesh era.

TABLE 3.1 *Evolution of the international climate change regime*[116]

Stage of Development	Major Outcomes	Meeting Date
Early International Responses	UNGA Resolution 43/53	6 Dec 1988
	The IPCC First Assessment Report	1990
	Ministerial Declaration	29 Oct–7 Nov 1990
	UNGA Resolution 45/212	21 Dec 1990
Establishment of the Regime	**UNFCCC**	3–14 Jun 1992
	Berlin Mandate	28 Mar–7 Apr 1995
	Geneva Ministerial Declaration	8–19 Jul 1996

116 This table is compiled by the author based on the following sources: UNFCCC, *Meetings* <http://UNFCCC.int/meetings/items/6240.php> accessed 19 June 2014; UNFCCC, *A Brief Overview of Decisions* <http://UNFCCC.int/documentation/decisions/items/2964.php> accessed 19 June 2014; Yamin and Depledge, above n. 28, 22–29.

COP/CMP or Organiser	Key Elements/Contributions
UN	1. Climate change as a 'common concern of mankind'; 2. Endorsed the action in establishing the IPCC and requested it to prepare a review & recommendation on climate change.
IPCC	Global mean temperature likely to increase by about 0.3°C per decade, under business-as-usual emission scenario.
Second World Climate Change Conference	1. Countries need to stabilise GHG emissions, developed States should establish emissions targets and/or national programs or strategies; 2. Called for negotiations on a framework convention on climate change.
UN	1. Establishment of INC; 2. INC to host the negotiating and drafting of the UNFCCC.
UNCED	1. Defined an ultimate objective and principles; 2. Divided countries into Annex I, Annex II and non-Annex I, and specified general commitments to different Parties respectively; 3. **Included general obligations by all parties to promote and cooperate in the reduction of GHG emissions from the transport sector. (Art. 4(1)(c)).**
UNFCCC COP 1	1. Assessed specific commitments for Annex I Parties under the UNFCCC as 'not adequate'; 2. Launched negotiations on 'a protocol or another legal instrument' to be concluded by COP 3; 3. **Requested its SBSTA and the SBI to address the allocation and control of emissions from international aviation and shipping.**
COP 2	1. Endorsed the 1995 IPCC Second Assessment Report; called for accelerating negotiations on a legally binding Protocol or another legal instrument; **2. SBSTA negotiated allocation and control of international bunker fuels.**

TABLE 3.1 *Evolution of the International Climate Change Regime* (cont.)

Stage of Development	Major Outcomes	Meeting Date
	Kyoto Protocol (KP)	1–10 Dec 1997
Development of the Regime (Post-Kyoto Era)	Buenos Aires Plan of Action (BAPA)	2–13 Nov 1998
	22 Decisions	25 Oct–5 Nov 1999
	Bonn Agreement	13–24 Nov 2000 16–27 Jul 2001
	Marrakesh Accords	29 Oct–9 Nov 2001
	Delhi Ministerial Declaration	23 Oct–1 Nov 2002

COP/CMP or Organiser	Key Elements/Contributions
COP 3	1. Provided all parties with general commitments, and Annex I parties with individual emission targets; set flexibility mechanisms: CDM, JI, ET; Reporting and Review, Compliance system; **2. Delegated IMO the mandate to regulate GHG emissions from international shipping (Art. 2(2));** **3. Urged SBSTA to elaborate further on the inclusion of international bunker emissions in the overall GHG inventories of Parties.**
COP 4	Included 7 decisions focusing on strengthening the financial mechanism, technology transfer, adverse effects of climate change/implementation of response measures, activities implemented jointly, flexibility mechanisms, and preparation for COP/CMP. Many of these decisions or actions are to be finished before COP 6.
COP 5	Implementation of the BAPA; adoption of the guidelines for the preparation of national communications by Annex I States; capacity building, transfer of technology, and flexible mechanisms (no major conclusions).
COP 6	The Hague conference serves as Part I of COP 6.
COP 6–2	1. Adopted the IPCC Third Assessment Report of 2001; 2. Provided core elements for the implementation of the BAPA; established new Special Climate Change Fund, the Kyoto Protocol Adaptation Fund.
COP 7	Based on the Bonn Agreement, set out detailed rules, procedures, technical guidelines and work programmes, which actually completed the work of BAPA; brought to an end the post-Kyoto cycle of policy-making launched by the BAPA.
COP 8	Reiterated the need to build on the outcomes of the World Summit.

TABLE 3.1 *Evolution of the International Climate Change Regime* (cont.)

Stage of Development	Major Outcomes	Meeting Date
		1–12 Dec 2003
		6–17 Dec 2004
	Montreal Action Plan	28 Nov–9 Dec 2005
		6–17 Nov 2006
	Bali Road Map (Bali Action Plan)	3–14 Dec 2007
		1–12 Dec 2008

COP/CMP or Organiser	Key Elements/Contributions
COP 9	The Milan conference adopted decisions on the institutions and procedures of the Kyoto Protocol and the implementation of the UNFCCC.
COP 10	The Buenos Aires conference completed unfinished business from the Marrakesh Accords, reassessed the building blocks of the process, and discussed future policies.
COP 11 /CMP 1	Discussed capacity building, transfer of technologies, adverse efforts of climate change, etc.; **launched negotiations on the next phase of the KP with the establishment of AWG-KP.**
COP 12 /CMP 2	Accepted Belarus as an Annex B Party under the KP.
COP 13 /CMP 3	1. Endorsed the IPCC Fourth Assessment Report of 2007; 2. Bali Road Map is made up of a set of decisions that represent the work to be done under various negotiating 'tracks'; 3. As a part of the Bali Road Map, the Bali Action Plan pointed out a process to enable the full, effective and sustained implementation of the Convention through long-term cooperative action up to and beyond 2012. It includes five categories: shared vision, mitigation, adaptation, technology and financing; 4. **AWG-LCA was established to conduct this process, and is responsible for addressing shipping emissions' reduction under the sub-item 1b(iv) addressing cooperative sectoral approaches and sector-specific actions.**
COP 14 /CMP 4	The Poznan conference launched the Adaptation Fund under the KP.

TABLE 3.1 *Evolution of the International Climate Change Regime* (cont.)

Stage of Development	Major Outcomes	Meeting Date
	Copenhagen Accord	7–18 Dec 2009
	Cancun Agreements	29 Nov–10 Dec 2010
	Durban Package	28 Nov–9 Dec 2011

COP/CMP or Organiser	Key Elements/Contributions
COP 15 / CMP 5	1. Raised climate change policy to 'the highest political level'; 2. Committed developed States to USD30 billion fast-starting financing for adaptation and mitigation in developing States for the period 2010–2012; 3. Decided to establish the Copenhagen Green Climate Fund, and a Technology Mechanism.
COP 16 / CMP 6	Integrated many of the elements of the Copenhagen Accord: 1. Took note of the mitigation targets and actions communicated by States, provided for transparency in their implementation; established new mechanisms for **the measurement, reporting and verification (MRV)** of mitigation efforts and support **for both developed and developing States**; 2. Established an Adaptation Framework, a Technology Mechanism and a Green Climate Fund; 3. Created a framework for addressing deforestation in developing States.
COP 17 / CMP 7	1. **Established a second commitment period under the KP**; 2. Agreed on long-term cooperative action under the UNFCCC; 3. Operationalised the Technology Mechanism in 2012; 4. Launched the Green Climate Fund, the Adaptation Committee; and **a new subsidiary body under the Convention (ADP)**; 5. **Amended the KP and its Annexes, added the 7th type of GHG—Nitrogen trifluoride (NF_3).**

TABLE 3.1 *Evolution of the International Climate Change Regime* (cont.)

Stage of Development	Major Outcomes	Meeting Date
	Doha Climate Gateway	26 Nov–7 Dec 2012
	Warsaw Outcomes	11–23 Nov 2013
	Lima Call for Climate Action	1–12 Dec 2014
	Paris Agreement	30 Nov–11 Dec 2015

3.2.2.1 The *UNFCCC* and its *Kyoto Protocol*

In contrast to the international regulation of transboundary air pollution and ozone depletion, climate change regulation is a much broader and more complex issue which involves all aspects of people's daily lives,[117] and has greater differentiated economic and political implications for both developed and developing countries. The success of the framework approach adopted by the *1979 CLRTAP* and *1985 Vienna Convention* led to a consensus in support of a similar approach to climate change. This consensus was formally confirmed by the 44th United Nations General Assembly (UNGA) in 1989.[118] As stated by

117 See Milke Hulme, 'The Idea of Climate Change' (2010) 19(3) *GAIA: Ecological Perspectives for Science & Society* 171, 171.

118 *Protection of Global Climate for Present and Future Generations of Mankind*, UNGA. A/RES/44/207 (22 December 1989).

COP/CMP or Organiser	Key Elements/Contributions
COP18 /CMP 8	1. Adopted the ***Doha Amendment to the KP***, which includes new commitments for annex I parties to the KP who agreed to take on commitments in a second commitment period (01/01/2013–31/12/2020), amended GHG list, and other amended articles of the KP. 2. **Terminated the AWG-LCA and AWG-KP**; 3. Transferred some issues to be considered by the SBSTA and SBI, e.g., MRV, REDD+, market and non-market mechanisms.
COP 19 /CMP 9	1. Established the Warsaw international mechanism for loss and damage associated with climate change impacts; 2. Established the Warsaw REDD+ framework.
COP 20 /CMP 10	1. Elaborated the '**Elements for a draft negotiating text**' for the 2015 agreement; 2. Adopted a decision on Intended Nationally Determined Contributions (INDCs).
COP 21/CMP 11	Adopted the *Paris Agreement* on 12 December 2015; Deferred the discussion of GHG emissions from international shipping to subsequent conferences.

the UNGA Resolution 44/207, 'a framework convention on climate was urgently required' and 'specific protocols with commitments could develop within this framework'.[119]

As discussed earlier in this chapter, the establishment of the IPCC served as a bridge between the scientific community and the political agenda. To incorporate the international consensus achieved into the drafting of a climate convention,[120] the Response Strategies Working Group of the IPCC drew up a 'Legal Measures' paper in 1989, which listed the possible elements for

119 Ibid.

120 The 'consensus' here includes both the fact that scientific evidence proves the existence of global warming and climate change, and the broad agreement that a Convention should follow the format of the *1979 CLRTAP* and the *1985 Vienna Convention*, namely the framework treaty model.

the drafting of a framework convention on climate change.[121] The document was endorsed by the Ministerial Declaration of the Second World Climate Conference in 1990.[122] In the same year, the Intergovernmental Negotiating Committee (INC) was established by the UN to host the negotiation and drafting of a framework convention on climate change, and was also required to take the work of the IPCC into consideration during this process.[123]

The *UNFCCC* was adopted in 1992 through the joint efforts of the international community. As the 'Constitution' for the international climate change regime,[124] to date the *UNFCCC* has 197 parties including 196 States and the European Union.[125] However, the bodies under the *UNFCCC* have been changing due to the termination of some temporary bodies mandated by the convention for certain periods. Figure 3.3 provides the current structure of the *UNFCCC* bodies. Except for the SBSTA and the Subsidiary Body for Implementation (SBI) which are permanent subsidiary bodies under the *UNFCCC*, most of the other subsidiary bodies exist temporarily.

The main contributions from the *UNFCCC* are shown in Table 3.1. First, the ultimate objective of the Convention and any related legal instruments is to stabilise GHG concentrations 'at a level that would prevent dangerous anthropogenic interference with the climate system' rather than reverse GHG emissions.[126] Stabilisation should be achieved within a time frame that allows ecosystems to adapt naturally, ensures that food production is not threatened and enables sustainable economic development.[127] It is difficult to infer from this Article what concentration levels and rates of change are 'safe'.[128] However, in assessing whether it is necessary to reduce GHG emissions from international shipping, for instance, the contributions of shipping GHG emissions to

121 Barrett, above n. 16, 184.

122 Ibid 184.

123 *Protection of Global Climate for Present and Future Generations of Mankind*, UNGA. A/RES/45/212 (21 December 1990) art. 1.

124 D.M. Bodansky, 'The Emerging Climate Change Regime' (1995) 20(1) *ANNUAL REVIEW OF ENERGY AND THE ENVIRONMENT* 425, 426.

125 United Nations Framework Convention on Climate Change (UNFCCC), *Status of Ratification of the Convention* <http://UNFCCC.int/essential_background/convention/status_of_ratification/items/2631.php> accessed 30 April 2016.

126 *UNFCCC* art. 2.

127 *UNFCCC* art. 2.

128 Bodansky, above n. 124, 433.

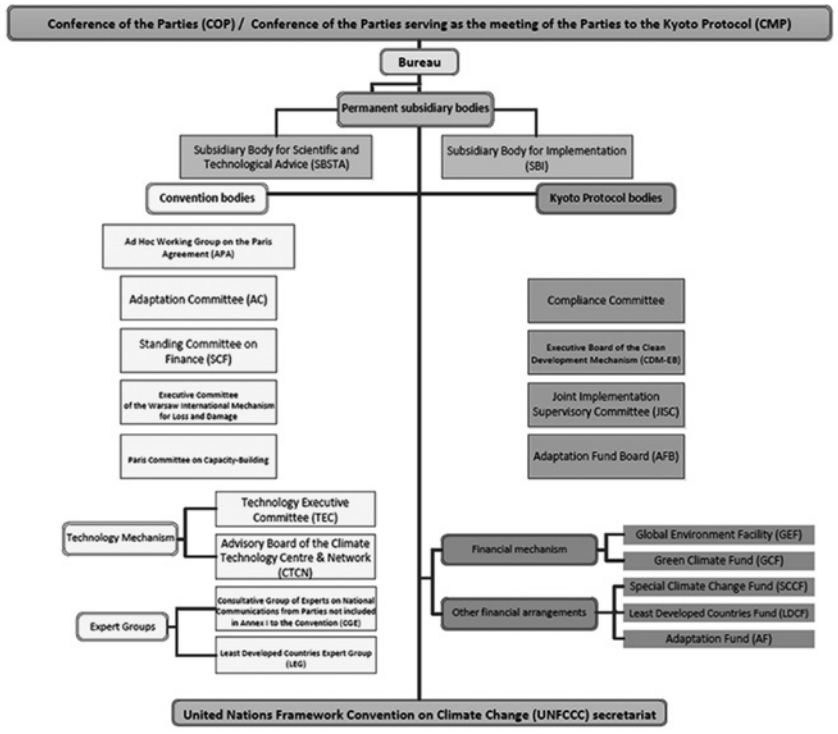

FIGURE 3.3 *Structure of the UNFCCC bodies.*[129]

global anthropogenic GHG emissions could be an important criterion. The discussions in Chapter 1 indicate that this was 2.7 per cent in 2007 and is projected to be 5.7 per cent by 2050 if such growth remains unchecked.[130] This percentage is high enough to be regulated. Second, the Convention raises several guiding principles for the parties to achieve the above objective. These principles include the principle of equity,[131] the precautionary principle,[132] the CBDR

129 UNFCCC, *Bodies* (2016) <http://UNFCCC.int/bodies/items/6241.php> accessed 22 April 2016.

130 ø. Buhaug et al., 'Second IMO GHG Study 2009' (International Maritime Organization (IMO), 2009) 1; see also ch. 1, 1.1.1.2.

131 Or called 'intra- and intergenerational equity'. See *UNFCCC* art. 3(1).

132 *UNFCCC* art. 3(3).

principle,[133] the sustainable development principle[134] and promoting a supportive and open international economic system.[135] Most of these principles reflect more general principles of international environmental law and apply to the issue of GHG emissions from international shipping.[136] Among them, the CBDR was explicitly mentioned for the first time although it was actually applied in the *Montreal Protocol*. This principle, together with the right to sustainable development, addressed the concern from developing countries that their economic development would not be impeded due to their engagement in fighting climate change.[137] Nevertheless, the use of words 'guided' at the beginning and 'should' throughout Article 3 also indicate that these principles are 'not necessarily binding rules', although they are useful for the interpretation and implementation of the Convention.[138] Thus, it might be inferred that the application of the CBDR principle to the issue of GHG emissions from ships could be flexible.[139]

In accordance with the CBDR principle, the *UNFCCC* divides countries into three categories, namely, Annex I (OECD countries and economies in transition), Annex II (OECD countries only) and non-Annex I (mostly developing countries).[140] All parties have general commitments, including developing national inventories of anthropogenic emissions, promoting sustainable management, and reporting obligations.[141] The specific aim of returning emissions to 1990 levels by 2000 is imposed on Annex I Parties,[142] while Annex II Parties must provide financial assistance and promote technology transfer to developing countries.[143] These commitments, however, have been criticised as 'neither

133 *UNFCCC* art. 3(1)(2).

134 *UNFCCC* art. 3(4).

135 *UNFCCC* art. 3(5).

136 See ch. 2.

137 Bodansky, above n. 124, 435.

138 Birnie, Boyle and Redgwell, above n. 1, 359. Based on article 31(1) of the *1969 Vienna Convention on the Law of Treaties*, article 3 of the *UNFCCC* could be regarded as 'the context' for interpreting the *UNFCCC* or its related legal instruments including its *Kyoto Protocol*.

139 See ch. 2, 2.5.

140 However, some countries which became OECD members after the adoption of the *UNFCCC* in 1992 are non-Annex I countries (such as the Republic of Korea and Israel), and the Annex I list has not been updated. See also ch. 5, 5.4.2.

141 *UNFCCC* art. 4(1).

142 *UNFCCC* art. 4(2).

143 *UNFCCC* art. 4(3)(4)(5).

strong nor clear'.[144] This was mainly because under the Convention Annex I Parties are free to choose their different starting points, resources, economies and other individual circumstances without a uniform requirement,[145] and a certain degree of flexibility in implementing their commitments is allowed for economies in transition.[146] Furthermore, the obligations by all parties to promote and cooperate in the reduction of GHG emissions in the transport sector were included in the *UNFCCC*,[147] although they only served as general commitments. In this sense, the *UNFCCC* could also be deemed as the 'Constitution' of the GHG reduction regime from international shipping.

These commitments were identified by the First Conference of the Parties of the *UNFCCC* (COP 1) in 1995 as 'not adequate' in its strong mandate (commonly known as the *Berlin Mandate*) and negotiations on a protocol or another legal instrument were launched.[148] More importantly, it was in this conference that the SBSTA and the SBI were requested to address the allocation and control of GHG emissions from international shipping for the first time. Decision 4/CP.1 (methodological issues) of the *UNFCCC COP 1 Report* in 1995 decided:

> 1. (f) That the Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body for Implementation, *taking fully into account ongoing work* in Governments and international organizations, including the *International Maritime Organization* and the International Civil Aviation Organization, address the issue of *the allocation and control of emissions from international bunker fuels*, and report this work to the Conference of the Parties at its second session.[149]

144 Birnie, Boyle and Redgwell, above n. 1, 360.

145 *UNFCCC* art. 4(2).

146 *UNFCCC* art. 4(6).

147 *UNFCCC* art. 4(1)(c). The article provides:

> All Parties, taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances, shall:
>
> (c) *Promote and cooperate* in the development, application and diffusion, including transfer, of technologies, practices and processes that control, reduce or prevent *anthropogenic emissions of greenhouse gases not controlled by the Montreal Protocol in all relevant sectors*, including the energy, ***transport***, industry, agriculture, forestry and waste management sectors.

148 *The Berlin Mandate*, Report of the Conference of the Parties on its First Session, FCCC/CP/1995/7/Add.1 (28 March–7 April 1995) preamble.

149 *Methodological Issues*, Decision 4/CP.1, Report of the Conference of the Parties on its First Session, FCCC/CP/1995/7/Add.1 (28 March–7 April 1995) art. 1(f).

Bunker fuel is degraded residue heavy fuel oil, which has been widely used by international shipping due to its low cost.[150] In accordance with the above decision, the SBSTA and SBI were requested to work out how to allocate GHG emissions from international shipping to individual States so as to regulate this GHG emissions issue through the scheduled *Kyoto Protocol*. This is because the *UNFCCC* and its scheduled *Kyoto Protocol* are State-based agreements whereas ships engaged in international shipping are emitting during the whole voyage. However, it is technically difficult and politically sensitive to allocate shipping GHG emissions to individual States due to the transboundary nature of GHG emissions and the close linkage of international shipping with international trade. Due to the significance of this work on the allocation of emissions, it is arguable that the *UNFCCC* started its work on addressing GHG emissions from international shipping at COP 1 in 1995. To address this difficult problem, at the SBSTA 4th meeting (SBSTA 4) in 1996 the *UNFCCC* Secretariat prepared a paper that included eight allocation options for consideration by the SBSTA.[151] Then, SBSTA identified five options from these eight choices as the basis for future work on the allocation of GHG emissions from international shipping. These five options are:

150 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.

151 These eight options are:
'(1) No allocation, as in the current situation.
(2) Allocation of global bunker sales and associated emissions to Parties in proportion to their national emissions.
(3) Allocation to Parties according to the country where the bunker fuel is sold.
(4) Allocation to Parties according to the nationality of the transporting company, or to the country where a ship or aircraft is registered, or to the country of the operator.
(5) Allocation to Parties according to the country of departure or destination of an aircraft or vessel. Alternatively, the emissions related to the journey of an aircraft or vessel could be shared by the country of departure and the country of arrival.
(6) Allocation to Parties according to the country of departure or destination of passenger or cargo. Alternatively, the emissions related to the journey of passengers or cargo could be shared by the country of departure and the country of arrival.
(7) Allocation to Parties according to the country of origin of passengers or owner of cargo.
(8) Allocation to the Party of all emissions generated in its national space.'
Communications from Parties Included in Annex I to the Convention: Guidelines, Schedule and Process for Consideration, SBSTA Fourth Session, Agenda Item 5(a), Doc FCCC/SBSTA/1996/9/Add.1 (24 October 1996) p. 11.

> Option 1: no allocation;
> Option 2: allocation to the country where the bunker fuel is sold;
> Option 3: allocation to the country of the transporting company, the country of registration of the aircraft/vessel, or the country of the operator;
> Option 4: allocation to the country of departure or destination of the aircraft/vessel (including some kind of sharing of emissions between them); and
> Option 5: allocation to the country of departure or destination of the passenger/cargo (including some kind of sharing of emissions between them).[152]

However, States failed to reach a consensus on selecting the most-favoured option for the allocation and control of GHG emissions from international shipping. This is probably because countries that would have been allocated substantial amounts of emissions from bunker fuels would be in a disadvantageous situation in international trade, and these options are not feasible for domestic implementation.[153] Due to the deadlock on the allocation issue, the *UNFCCC* delegated responsibility to the IMO to regulate the issue for shipping under Article 2(2) of its *Kyoto Protocol*. The mandate that the IMO has from Article 2(2) of the protocol not only gives the IMO such authority or responsibility, it also underpins the application of principles from both the *UNFCCC* and the *Kyoto Protocol* to this GHG emissions issue.[154] Meanwhile, GHG emissions from international shipping are neither part of national emissions nor the subject of the emission targets agreed in the *Kyoto Protocol*.[155] Since then, the SBSTA has not discussed substantial issues with regard to the regulation of GHG emissions from international shipping. However, cooperation between the Secretariats of the *UNFCCC* and the IMO has been ongoing since 1998, and these two organisations regularly exchange information regarding the regulation of GHG emissions from ships.[156]

The Geneva Ministerial Declaration adopted by the *UNFCCC* COP 2 in 1996 endorsed the newly published IPCC Second Assessment Report of 1995, and called for accelerating negotiations on a 'legally-binding protocol or another

152 Ibid. 11–13; Oberthür, above n. 34, 193.
153 Oberthür, above n. 34, 193.
154 See ch. 2, 2.5.
155 Oberthür, above n. 34, 193.
156 *Report of the Marine Environmental Protection Committee on Its Fifty-Fifth Session*, MEPC 55th Session, Agenda Item 23, IMO Doc MEPC 55/23 (16 October 2006) para. 4.28.

legal instrument'.[157] These efforts eventually led to the adoption of the *Kyoto Protocol* in 1997. The *Kyoto Protocol* is the only protocol of the *UNFCCC*; however, its entry into force experienced a lengthy and painful process until 2005. Despite this, through placing quantitative restrictions on emissions from industrialised economies, the *Kyoto Protocol* has been regarded as the culmination of international efforts to date to address the climate change problem.[158] Due to the contributions from the *Montreal Protocol*, only six types of unregulated GHGs were listed in the Protocol at that time.[159] Comparable with the *UNFCCC*, the *Kyoto Protocol* divides its parties into two groups: Annex I and non-Annex I, or generally developed and developing States.[160] The Protocol sets legally binding targets on the reduction of anthropogenic GHG emissions from Annex I States for the first commitment period from 2008 to 2012.[161] To reflect differentiated circumstances between the main industrial actors,[162] a system of differentiated targets within the rolling time scale was also agreed as Annex B to the Protocol.[163] Given the different historical and current contributions to global GHG emissions from both developed and developing States, these targets incorporate the CBDR principle and are thus acceptable for most States.

The most innovative aspect of the *Kyoto Protocol* is its so-called 'flexibility mechanisms', which were created for Parties to achieve their targets. These market-based mechanisms include Joint Implementation (JI),[164] the Clean

157 *The Geneva Ministerial Declaration*, Report of the Conference of the Parties on its Second Session, FCCC/CP/1996/15/Add.1 (8–19 July 1996), item 8.

158 D.I. Hodgkinson and R. Garner, *Global Climate Change: Australian Law and Policy* (LexisNexis Butterworths, 2008) 34–64.

159 But a seventh GHG was added to the list by the *Doha Amendment to the Kyoto Protocol* in 2012. See *Doha Amendment to the Kyoto Protocol*, adopted 8 December 2012, Decision 1/CMP.8, C.N.718.2012.TREATIES-XXVII.7.c (not yet in force).

160 To date 192 parties, including Australia, China (but excluding the USA), and the European Union have either ratified, acceded to, approved or accepted the Protocol. See <http://unfccc.int/kyoto_protocol/status_of_ratification/items/2613.php> accessed 20 June 2014.

161 *Kyoto Protocol* art. 3(1).

162 *UNFCCC* art. 4(2)(a). 'The differentiated circumstances' here refer to the 'differences in these Parties' starting points and approaches, economic structures and resource bases, the need to maintain strong and sustainable economic growth, available technologies and other individual circumstances, as well as the need for equitable and appropriate contributions by each of these Parties to the global effort regarding that objective.'

163 See Ong, above n. 112, 456.

164 *Kyoto Protocol* art. 6.

Development Mechanism (CDM)[165] and Emissions Trading (ET).[166] JI allows Annex I States to trade emission reduction units (ERUs) among themselves. ERUs can be obtained either by implementing cooperative projects to reduce GHG emissions or through establishing GHG sinks.[167] As the only flexibility mechanism available to developing States, CDM enables Annex I Parties to provide for actual GHG emission reduction projects in non-Annex I Parties, and thus receive the generated Certified Emission Reductions (CERs), either through financial sponsoring, or by technology transfer. In this way Annex I Parties can meet their emissions targets while the non-Annex I Parties will benefit from such projects.[168] ET generally allows Annex I Parties to purchase emissions credits from other Annex I Parties so as to fulfil their commitments provided that such trading is supplemental to their domestic actions.[169] In contrast to traditional 'command and control' type regulations, the above three mechanisms are more market-based. This change was interpreted as a response to the shift of the US position in dealing with the *Kyoto Protocol*.[170] However, from the perspective of international environmental law, this shift may reflect the trend of international environmental regulation. For example, to cope with GHG emissions from ships more effectively, extensive discussions on MBMs have been under way within the IMO.[171]

3.2.2.2 Post-Kyoto Efforts and Outcomes

3.2.2.2.1 *International Bunker Fuels Negotiation under the AWG-LCA*

As noted earlier, the *UNFCCC*'s SBSTA was responsible for the issue of allocation and control of GHG emissions from international shipping before the adoption of the *Kyoto Protocol* in 1997. However, after the *Kyoto Protocol* authorised the IMO to regulate shipping GHG emissions, the *UNFCCC* did not completely rely on the IMO's work in this regard. Rather, the AWG-LCA of the *UNFCCC* also discussed the issue of international bunker fuels in the context of paragraph 1b(iv) of the *Bali Action Plan*,[172] cooperative sectoral approaches

165 *Kyoto Protocol* art. 12.

166 *Kyoto Protocol* art. 7.

167 Ong, above n. 112, 456.

168 Ibid 457.

169 Birnie, Boyle and Redgwell, above n. 1, 367.

170 Ong, above n. 112, 456.

171 See, e.g., *Ensuring No Net Incidence on Developing Countries from a Global Maritime Market-Based Mechanism*, submitted by World Wide Fund for Nature (WWF), IMO Doc MEPC 63/5/6 (22 December 2011).

172 *Bali Action Plan*, Decision 1/CP.13, Report of the Conference of the Parties on its Thirteenth Session, Doc FCCC/CP/2007/6/Add.1 (14 March 2008) para. 1b(iv) ('*Bali Action Plan*').

and sector-specific actions. As seen from Table 3.1, the AWG-LCA was established as a subsidiary body under the Convention at COP 13 and CMP 3 of the *UNFCCC* process in 2007, working for long-term cooperative action under the *UNFCCC*. As such its work in relation to international bunker fuels, or GHG emissions from international shipping, did not conflict with the IMO's work. The IMO's work primarily focuses on specific technical and operational measures, whereas the AWG-LCA's work essentially involves regulatory principles, the setting of reduction targets, climate financing, preventing competitive distortions and carbon leakage, and the regulatory competence of the IMO. Theoretically, the work of the AWG-LCA could complement the IMO's work and possibly address some controversial issues that the IMO is facing, such as the regulatory principles and the IMO's regulatory competence. Nevertheless, no substantial outcomes relating to GHG emissions from international shipping had been achieved before the AWG-LCA terminated its five-year work at the Doha Climate Change Conference in 2012.

The AWG-LCA organised 15 sessions from March 2008 to December 2012.[173] Although no consensus was achieved, some of the proposals and options discussed under the AWG-LCA may contribute to the current discussions and negotiations within the IMO. Firstly, it was proposed that both the CBDR and NMFT principles could be applied to this GHG emissions issue but may not be treated equally. For instance, one option suggests that '[the regulation of GHG emissions from international shipping should be] in accordance with the principles and customary practices of the IMO, taking into account [the CBDR principle]'.[174] This means that the NMFT principle should apply, but the CBDR principle could be applied in different forms since it is only '[taken] into account' in this context. Similarly, some options suggest global levies on maritime bunker fuels, and propose that traffic on routes to and from Small Island Developing States (SIDS) and the Least Developed Countries (LDCs) should be exempt.[175] Although it is arguable that ships may change their routes

173 UNFCCC, *International Bunker Fuels under the AWG-LCA* <http://UNFCCC.int/methods/emissions_from_intl_transport/items/6141.php> accessed 20 June 2014.

174 *Cooperative Sectoral Approaches and Sector—Specific Actions in order to Enhance the Implementation of Article 4, Paragraph 1(c), of the Convention*, AWG-LCA 14th Session (Third Part), Panama City (1–7 October 2011) Option 2, p. 5.

175 *Report of the Ad Hoc Working Group on Long-Term Cooperative Action under the Convention on Its Seventh Session, Held in Bangkok from 28 September to 9 October 2009, and Barcelona from 2 to 6 November 2009*, Doc FCCC/AWGLCA/2009/14 (20 November 2009) Option 7 (para. 26), p. 102.

to avoid more stringent rules, this option provides a base for similar discussions on MBM proposals within the IMO.[176]

Secondly, it was suggested that the global emissions targets relating to international shipping be set by the *UNFCCC*, and this target could be 20 per cent below 2005 levels in 2020 on a scale consistent with the agreed two degrees objective, and this target may be achieved by means of MBMs.[177] This proposal involves both the reduction target and MBMs. Since MBMs often involve emissions reduction from different sectors,[178] it is reasonable for the *UNFCCC* to set this target due to the IMO's limited capacity in other sectors.

Thirdly, it was suggested that the IMO's regulatory competence, in particular relating to MBMs, should be clarified by the *UNFCCC*. One option provides that, 'all Parties in Annex I to the Convention shall pursue limitation or reduction of [GHG emissions from international shipping], working exclusively through the [IMO]'.[179] In this case, the proponents attempt to exclude other competent international bodies from regulating the shipping GHG emissions issue by any means, including MBMs. Theoretically, it is controversial whether the IMO has competence in regulating MBMs, so it might be necessary for the *UNFCCC* to clarify its view on this debate.[180] It may be inferred that these options discussed under the AWG-LCA were not adopted due to their lack of support from the main stakeholders. The responses from the main stakeholders of this issue are thus provided in the following chapters.

3.2.2.2.2 *Other Post-Kyoto Achievements and Their Implications on Shipping GHG Emissions*

Although the negotiation of GHG emissions from international shipping under the AWG-LCA was unsuccessful, the COPs and CMPs of the *UNFCCC* process have achieved outstanding outcomes and some of them may have significant implications for the regulation of shipping GHG emissions. After the adoption of the *Kyoto Protocol* in 1997, as of April 2016, 21 COPs and 11 CMPs have been

176 See ch. 4, 4.3.4.2.

177 *Cooperative Sectoral Approaches and Sector—Specific Actions in order to Enhance the Implementation of Article 4, Paragraph 1(c), of the Convention*, AWG-LCA 14th Session (Third Part), Panama City (1–7 October 2011) Options 2, 3, p. 5.

178 See ch. 4, 4.3.4.2.

179 *Cooperative Sectoral Approaches and Sector—Specific Actions in order to Enhance the Implementation of Article 4, Paragraph 1(c), of the Convention*, AWG-LCA 14th Session (Third Part), Panama City (1–7 October 2011) Option 8, p. 6.

180 The discussion of this issue is provided in Chapter 4, 4.2.

held. A broad range of matters have been discussed and various decisions made during these conferences. Table 3.1 lists the major outcomes and contributions achieved in these conferences. Based on distinct missions and achievements, the development of the climate change regime under the post-Kyoto era can be divided into three stages. The first stage includes the periods from COP 4 to COP 10, during which various unresolved issues within the *UNFCCC* and its *Kyoto Protocol* were first raised by the *Buenos Aires Plan of Action* (*BAPA*) and then discussed and supplemented in the subsequent COPs. The second stage commenced in 2005 when the *Kyoto Protocol* entered into force and the 'twin track' Convention and Protocol negotiations were launched. One of the focuses of the work in this stage had been to establish a second commitment period by means of a new Protocol, an amendment to the *Kyoto Protocol*, or a new climate change agreement after the first commitment period indicated in the *Kyoto Protocol* expired on 31 December 2012. The third stage commenced in 2015 when the *Paris Agreement* was adopted. This agreement employs a new reduction approach by means of 'Nationally Determined Contributions (NDCs)'. This section examines the first and second stages, but defers the discussion of the third stage to the next section.

In the first stage, seven important issues were put forward in the *Buenos Aires Plan of Action* (*BAPA*) and most of them were required to be finished before COP 6 in 2000.[181] To address these matters, the *Bonn Agreements* adopted in COP 6 enacted the 'core elements for the implementation of the BAPA', providing specific approaches and requirements for such implementation.[182] Nevertheless, due to the diverse interests from developed and developing States, the tasks set in the BAPA were not finished until COP 10 in 2004. During this process, the *Marrakesh Accords* adopted in COP 7 made vital contributions in successfully drafting detailed rules, procedures, technical guidelines and work programs.[183] Thus, the post-Kyoto cycle of policy-making launched by the BAPA was basically fulfilled with only minor matters

181 *The Buenos Aires Plan of Action*, Decision 1/CP.4, Report of the Conference of the Parties on its Fourth Session, FCCC/CP/1998/16/Add.1 (25 January 1999) ('*BAPA*'). These seven issues include financial mechanisms, technology transfer, adverse effects of climate change and implementation of response measures, activities implemented jointly, flexibility mechanisms, and the preparation for future COPs/CMPs.

182 *The Bonn Agreements on the Implementation of the Buenos Aires Plan of Action*, Decision 5/CP.6, Report of the Conference of the Parties on the Second Part of its Sixth Session, FCCC/CP/2001/5 (25 September 2001).

183 See *The Marrakesh Accords*, Decisions 2–14/CP.7, Report of the Conference of the Parties on its Seventh Session, FCCC/CP/2001/13/Add.1 (21 January 2002).

supplemented by the subsequent three COPs.[184] During this stage, GHG emissions from ships were not specifically discussed and no outcomes were achieved on this issue.

In the second stage, most of the COPs and CMPs have been working along with four subsidiary bodies: the AWG-LCA which was launched in Bali (COP 13) in 2007 and terminated in Doha (COP 18) in 2012, the Ad Hoc Working Group on Further Commitments for Annex I Parties under the *Kyoto Protocol* (AWG-KP) which was established in Montreal (CMP 1) in 2005 and terminated in Doha (CMP 8) in 2012, and the SBSTA and SBI (see Table 3.1 and Figure 3.3). As the two mechanisms worked in parallel, the AWG-KP worked for a second commitment for Annex B Parties of the *Kyoto Protocol* beyond the end of the first commitment period in 2012,[185] while the AWG-LCA primarily worked for long-term cooperative action under the *UNFCCC*.[186] As discussed above, the SBSTA and SBI (mainly SBSTA) organised the negotiation on the allocation and control of GHG emissions from international shipping from 1995 to 1996, and since 1998 the SBSTA has mainly exchanged information with the IMO on the regulation of shipping GHG emissions.

It was not until the Bali Climate Change Conference in 2007 that the development of a post-2012 climate change legal framework began, although the establishment of the AWG-KP at the CMP 1 in 2005 launched the negotiations for the next phase of the *Kyoto Protocol*. This was not only because of the establishment of the twin-track negotiation process,[187] but also due to the substantial contributions from the *Bali Road Map*. The *Bali Road Map* constitutes a set of decisions that represent the work to be done under various negotiating 'tracks'. In particular, the AWG-LCA's work on international bunker fuels, as discussed above, was guided by paragraph 1b(iv) of the *Bali Action Plan*, which is a part of the *Bali Road Map.*

As seen from Table 3.1, a number of outcomes have been achieved in the climate change conferences following the Bali conference in 2007. Examples are

184 Yamin and Depledge, above n. 28, 28.

185 *Consideration of Commitments for Subsequent Periods for Parties Included in Annex I to the Convention under Article 3, Para. 9 of the Kyoto Protocol*, Decision 1/CMP.1, Doc FCCC/KP/CMP/2005/8/Add.1 (2006) art. 1.

186 *Bali Action Plan* art. 1.

187 The twin-track negotiation process refers to the simultaneous negotiations under the COPs and CMPs of the *UNFCCC*.

the *Copenhagen Accord*,[188] the *Cancun Agreements*,[189] the *Durban Package*,[190] the *Doha Climate Gateway*,[191] and the *Warsaw Outcomes*.[192] The outcomes listed in Table 3.1 reflect decreased political support for the CBDR principle during global climate change negotiations. The *Copenhagen Accord* explicitly provides that combating climate change should be conducted in accordance with the CBDR principle,[193] and asserts that mitigation actions will be 'voluntary and on the basis of support' for least developed countries and small island developing States.[194] The *Cancun Agreements* require both developed and developing countries to exercise the communications obligation on measurement, reporting and verification (MRV). In particular, it even imposes greater burdens on developing countries than developed countries.[195] The *Durban Package* has been regarded as an advance to the climate regime on the

188 *Copenhagen Accord*, Decision 2/CP.15, Report of the Conference of the Parties on its Fifteenth Session, FCCC/CP/2009/11/Add.1 (30 March 2010) ('*Copenhagen Accord*').

189 *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) ('*Cancun Agreements*').

190 See *Report of the Conference of the Parties on Its Seventeenth Session, Held in Durban from 28 November to 11 December 2011*, Doc FCCC/CP/2011/9/Add.1 (15 March 2012); *Report of the Conference of the Parties Serving as the Meeting of the Parties to the Kyoto Protocol on Its Seventh Session, Held in Durban from 28 November to 11 December 2011*, Doc FCCC/KP/CMP/2011/10/Add. 1 (15 March 2012).

191 See *Report of the Conference of the Parties on Its Eighteenth Session, Held in Doha from 26 November to 8 December 2012*, Doc FCCC/CP/2012/8 (28 February 2013); *Report of the Conference of the Parties Serving as the Meeting of the Parties to the Kyoto Protocol on Its Eighth Session, Held in Doha from 26 November to 8 December 2012*, Doc FCCC/KP/CMP/2012/13 (28 February 2013).

192 See *Report of the Conference of the Parties on Its Nineteenth Session, Held in Warsaw from 11 to 23 November 2013*, Doc FCCC/CP/2013/10 (31 January 2014); *Report of the Conference of the Parties Serving as the Meeting of the Parties to the Kyoto Protocol on Its Ninth Session, Held in Warsaw from 11 to 23 November 2013*, Doc FCCC/KP/CMP/2013/9 (31 January 2014).

193 *Copenhagen Accord* art. 1.

194 *Copenhagen Accord* art. 5.

195 Rajamani, above n. 113, 509, 513. In accordance with the *Cancun Agreements*, *UNFCCC* non-Annex I States are required to submit their national communications every four to five years, whereas Annex I States only need to do this every four years. Stathis Palassis, 'Climate Change and Shipping' in Robin Warner and Clive Schofield (eds), *Climate Change and the Oceans: Gauging the Legal and Policy Currents in the Asia Pacific and Beyond* (Edward Elgar Publishing Limited, 2012) 200, 206. However, Palassis argues that

grounds that: it ended the uncertainty of the future of the *Kyoto Protocol* by extending it for a second commitment period from 2013 to 2020, established a roadmap for adopting a post-2020 climate regime applicable to all and fulfilled the promise of the *Cancun Agreements*.[196] However, the *Durban Package* decisions do not contain a reference to the CBDR principle or even 'equity'.[197] It is thus argued that the weakened role of the CBDR principle, in particular the interpretation of 'differentiation', in the above decisions or statements represents 'a shift towards greater parallelism between developed and developing countries'.[198] Or in other words, 'differentiated responsibility' might be replaced by 'symmetry' as a guide for a future climate regime.[199]

From an international law perspective, most of the above decisions and statements are soft law in nature and the CBDR principle is currently applicable to the issue of climate change based on the *UNFCCC* and its *Kyoto Protocol*. Furthermore, most developed countries support a broader interpretation of 'differentiation' rather than to simply abandon the CBDR principle. For example, at the Durban climate change conference in 2011, developed countries insisted that any reference to the CBDR principle must be qualified with a statement that 'this principle must be interpreted in the light of contemporary economic realities'.[200] This might be interpreted as meaning that the current Annex I countries list should be updated to suit changed economic situations. Based on the current Annex I countries list, some OECD countries (such as the Republic of Korea and Israel) and well-developed countries (Singapore as an example) are treated as developing countries.[201] Additionally, non-Annex I States may also need to be sub-categorised into SIDS, LDCs, large developing countries and other developing countries to reflect their differing economic situations and regulatory interests.[202]

---

the *Cancun Agreements* affirmed the role of the IMO as the appropriate international organisation regulating GHG emissions from international shipping.

196 Lavanya Rajamani, 'The Durban Platform for Enhanced Action and the Future of the Climate Regime' (2012) 61(2) *International and Comparative Law Quarterly* 501, 515.

197 Ibid. 507.

198 Lavanya Rajamani, 'The Climate Regime in Evolution: The Disagreements that Survive the Cancun Agreements' (2011) 5(2) *Carbon & Climate Law Review* 136, 144.

199 Rajamani, above n. 196, 502.

200 Ibid. 508.

201 See ch. 7, 7.6.3.

202 See Rajamani, above n. 196, 517–518. Due to differing situations of developing countries, Rajamani asserts that the differentiation between developing countries should be based on 'self-perception' by individual developing countries.

3.2.2.3 The *Paris Agreement* and its Implications for GHG Emissions from International Shipping

At the Durban Climate Change Conference, held in November and December 2011, parties to the *UNFCCC* agreed to launch the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) with a mandate to develop a 'protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties'.[203] This universal climate change agreement was scheduled to be adopted in the Paris climate change conference in December 2015, and to be implemented from 2020.[204] After years of doubt and indecision, the *Paris Agreement* was eventually adopted on 12 December 2015. Meanwhile the Ad Hoc Working Group on the Paris Agreement (APA) was established to prepare for the entry into force of the Agreement and for the convening of the first section of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA) as well as other scheduled work.

The *Paris Agreement* has been regarded as successful for a number of reasons. The Agreement is the first multilateral environmental agreement to recognise human rights, climate justice and the right to health, and it explictly acknowledges climate change as 'a common concern of humankind'.[205] Besides, it aims to hold the increase of global average temperature to well below 2 degree Celsius and pursue efforts to limit the temperature increase to 1.5 degree Celsius above pre-industrial levels.[206] In addition to the committed financing of US$100 billion per year starting in 2020 to be provided to developing countries, the Agreement creates the concepts of the Intended Nationally Determined Contributions (INDCs) and Nationally Determined Contributions (NDCs) to enable countries to submit their self-determined national climate commitments. According to the Agreement, each Party's NDCs shall be reviewed every five years and should 'represent a progression' from previous

203 *Establishment of An Ad Hoc Working Group on the Durban Platform for Enhanced Action*, UNFCCC Decision 1/CP.17, Doc FCCC/CP/2011/9/Add.1 (2011) para. 2. There are different views and interpretations on these forms of agreement. See, e.g., 'another legal instrument' could be an amendment under Article 15, a new or an amended annex under Article 16, an amendment to the Kyoto Protocol, or an implementation agreement similar to a protocol; 'an agreed outcome with legal force' could be unilateral declarations by Parties, or COP decisions. Xolisa Ngwadla, Achala C. Abeysinghe and Adéyêmi Freitas, *The 2015 Climate Agreement: Lessons from the Bali Road Map* (2012) <http://www.eurocapacity.org/downloads/2015ClimateAgreement.pdf> accessed 21 June 2014, p. 7–8.

204 UNFCCC, *The Doha Climate Gateway* (2012) <http://UNFCCC.int/key_steps/doha_climate_gateway/items/7389.php> accessed 21 June 2014.

205 *Paris Agreement* preamble.

206 *Paris Agreement* art. 2(1)(a).

commitments.[207] Parties to the Agreement are also bound to transparency framework,[208] which together with the obligation to undertake and communicate the NDCs represents the legally-binding portion of the Agreement. The above features of the Agreement send a clear signal for decarbonisation to policy makers, investors and the business community.

The participation of 195 countries assured the adoption of the *Paris Agreement* on 12 December 2015. Before that, 161 countries and country blocs, representing some 95 per cent of global GHG emissions and 98 per cent of global population, had submitted their INDCs.[209] As of 22 April 2016, 188 countries that had submitted their INDCs were collectively responsible for over 99 per cent of global GHG emissions in 2010 of all the Parties to the *UNFCCC*.[210] It appears that the *Paris Agreement* has received wide support from international community in jointly tackling climate change. On 22 April 2016, 175 Parties (174 countries and the European Union) signed the *Paris Agreement* and 15 countries deposited their instruments of ratification during the signing ceremony, which reveals that largest number of countries to ever sign a multilateral agreement on the day of its opening for signature.[211]

The *Paris Agreement* is not perfect and there are some challenges attached to its implementation. First, the non-legally binding nature of the NDCs regulated under the *Paris Agreement*, together with the insufficient sum of all existing NDCs, makes it difficult for the international community to reach its goal of GHG emissions reduction. Theoretically the *Paris Agreement* is a treaty within the meaning of the *Vienna Convention on the Law of Treaties*,[212] and it can contain both binding and non-binding provisions based on whether legal obligations are created.[213] According to the *Paris Agreement*, the communication

207 *Paris Agreement* art. 4(3)(9).

208 *Paris Agreement* art. 13.

209 Bianka Kretschmer, Felix Fallasch, *From Paris to Songdo: How the Green Climate Fund's New Strategic Vision Supports the Paris Agreement* (7 April 2016) < http://climateanalytics.org/blog/2016/from-paris-to-songdo> accessed 2 May 2016.

210 Australian-German Climate and Energy College, *INDC FactSheets* (22 April 2016) <http://www.climate-energy-college.net/indc-factsheets> accessed 2 May 2016.

211 UNFCCC, *Record Support for Advancing Paris Climate Agreement Entry into Force* (22 April 2016) <http://newsroom.UNFCCC.int/paris-agreement/closing-paris-agreement-signing-press-release/> accessed 2 May 2016.

212 *Vienna Convention on the Law of Treaties*, opened for signature 23 May 1969, 8 ILM 679 (entered into force 27 January 1980) art. 2(1)(a).

213 Daniel Bodansky and Lavanya Rajamani, *Key Legal Issues in the 2015 Climate Negotiations* (June 2015) <http://www.c2es.org/docUploads/legal-issues-brief-06-2015.pdf> accessed 2 May 2016.

of NDCs is legally binding, but their contents and targets are not and there is no legal mechanism to ensure the implementation of these commitments. Meanwhile, research indicates that the sum of all existing NDCs, if fully implemented, leads to an increase in global temperatures of approvimately between 2.7 and 3 degrees Celsius above pre-industrial levels by the end of this century.[214] These will be serious limiting factors to achieving the goal of limiting temperature rise to 2 or 1.5 degrees Celsius.

Second, uncertainties remain as to the grant of financial assistence and technological transfer provided under the *Paris Agreement*. The US$100 billion per annum funds, which was set to be reached by developed countries in 2020, has been extended in the Decision 1/CP.21 through 2025.[215] This indicates less financial support from developed countries compared to their previous commitments, and there is uncertainty as to whether the fiancial assistence will be continued or increased beyond 2025. Furthermore, it has not been made clear where the funds will come from, how much contributions are to be provided by developed countries or industrialising countries, and how to allocate them between poor countries.[216] Regarding the transfer of technologies, the absence of the provisions on protecting the intellectual property rights under the Agreement might make it difficult for the private sector in developed countries to invest in or transfer the technologies that they own to developing countries.[217] Given that many developing countries, India as an example, have set their INDCs conditional on finance and technologies being made available, it will be difficult for the Agreement to be implemented.

The lack of substantive review and strengthening INDC ambition levels for the 2020–2025 period is another deficiency existed in the *Paris Agreement*. It is arguable that this period could become 'lost period' for increasing mitigation

214 Maxim Shrestha, 'COP 21 and the Paris Agreement: Achievement or Half measure?' (5 February 2016) (No. 028) *RSIS Commentary* 2; Marie Kurdziel, Thomas day, et al., *Challenges and Lessons Learned in the Preparation of Intended Nationally Determined Contributions* (*INDCs*) (1 March 2016) <http://mitigationpartnership.net/sites/default/files/challenges_lessons_indcs.pdf> accessed 2 May 2016, p. 3.

215 *Decision 1/CP.21 Aoption of the Paris Agreement*, Doc FCCC/CP/2015/10/Add.1 (29 January 2016) para. 53.

216 Shrestha, above n. 214.

217 Munjurul Hannan Khan, *Opinion: Paris Agreement—Opportunities and Challenges for Developing Countries* (23 February 2016) <http://cdkn.org/2016/02/opinion-paris-agreement-opportunities-and-challenges/?loclang=en_gb> accessed 2 May 2016.

ambition.[218] Similarly, Article 8 of the Agreement addresses the Loss and Damage associated with climate change impacts. However, this Article does not 'provide a basis for any liability or compensation' due to the strong requirement from the US.[219]

One crucial issue that the *Paris Agreement* does not address is GHG emissions from international shipping. Nevertheless, this does not mean that GHG emissions from international shipping will be completely subject to the IMO rather than the *Paris Agreement*. Instead, the *Paris Agreement* has some important implications for this shipping emissions issue.

Firstly, the 'Negotiation Text' for the *Paris Agreement* provides provisions relating to GHG emissions from international shipping, and it is projected that the subsequent conferences of the *UNFCCC* and its *Paris Agreement* will continue to discuss this matter.

At the Geneva Climate Change Conference in February 2015, States agreed on the 'Negotiating Text' for the Paris Climate Agreement (Nov/Dec 2015). The text provides:

> 23bis. [In meeting the 2 degree objective, Parties agree on the need for global sectoral emission reduction targets for international aviation and maritime transport and on the need for all Parties to work through the International Aviation Organization (ICAO) and the International Maritime Organization (IMO) to develop global policy frameworks to achieve these targets].[220]

This is an unequivocal endorsement of the setting of reduction targets for the international shipping sector and the central role of the IMO in achieving reductions. The February 2015 meeting also gave support for the establishment of a levy scheme:

218 PPMC, *Transport @ COP 21 Paris* (6 December 2015) <http://www.kas.de/wf/doc/kas_43927-1522-2-30.pdf?160119103248> accessed 2 May 2016, p. 20.

219 *Decision 1/CP.21 Aoption of the Paris Agreement*, Doc FCCC/CP/2015/10/Add.1 (29 January 2016) para. 51; International Center for Climate Governance, *International Climate Policy* (No. 39, January 2016) <http://www.iccgov.org/wp-content/uploads/2016/01/ICCG-International-Climate-Policy-Magazine-39.pdf> accessed 2 May 2016, p. 5.

220 *Outcomes of the United Nations Climate Change Conferences held in Lima in December 2014 and in Geneva in February 2015*, Note by the Secretariat, MEPC 68th Session, Agenda Item 5, IMO Doc MEPC 68/5 (18 February 2015) para. 17.

> 47.5 Option (a):
> c. In establishing the levy scheme, ICAO and IMO are encouraged to take into consideration the needs of developing countries, particularly the LDCs, SIDS and countries in Africa heavily reliant on tourism and international transport of traded goods.[221]

It seems increasingly likely that a MBM/Levy scheme will be adopted. If the subsequent *Paris Agreement* had adopted a levy scheme to reduce GHG emissions from ships, the IMO would have utilised this mandate to develop implementing regulations. This would also terminate the current debates on whether the IMO has the competence to regulate MBMs.[222] Therefore, the 'Option' above is attractive because it can address the current legal debate but also contribute to the further reduction of GHG emissions from international shipping. However, after being included in earlier drafts of the Agreement, all references to these rapidly growing GHG emissions from international shipping had been removed from the final *Paris Agreement*. As things currently stand, it can be inferred that the UNFCCC defers the dicussion of this shipping GHG issue to the subsequent COPs, CMPs or CMAs. The efforts of climate change mitigation in the land transport sector might be compromised if equally abitious actions on tackling GHG emissions from international shipping are not taken.[223]

Secondly, during the period of post-2020 and beyond the CBDR principle will still be applicable to the IMO's regulation on GHG emissions from international shipping although the *Kyoto Protocol* that provided the IMO with a GHG mandate will expire then. As discussed in Chapter 2, the CBDR principle is running through the *UNFCCC* and its *Kyoto Protocol*, which enables the application of the CBDR principle to the shipping GHG emissions issue due to the IMO's GHG mandate delegated by Article 2(2) of the *Kyoto Protocol*. With the expiry of the second commitment period in 2020, the *Kyoto Protocol* will be replaced by the *Paris Agreement*. However, the IMO's GHG mandate will not be terminated before it is accomplished even though the *Kyoto Protocol* that gave it this mandate will expire. Furthermore, the *Paris Agreement* is still an agreement under the *UNFCCC* and the CBDR principle has been corporated into this Agreement in a consistent manner. For instance, the CBDR principle

221 Ibid. para. 18.

222 Article 2(2) of the *Kyoto Protocol* has been regarded as a bit vague in that it does not recognise the explicit competence of the IMO, or define the precise measures that the IMO might adopt to address the GHG emissions issue. Thus some shipping associations have requested the *UNFCCC* to address this problem. See ch. 4, 4.2.

223 PPMC, above n. 218, 21.

is explicitly stipulated in the preamble, Article 2(2) and Article 4(3)(19) and implied in Article 4(4) of the *Paris Agreement*. Accordingly, the CBDR principle that applies in the *UNFCCC*, its *Kyoto Protocol* and *Paris Agreement* should continue to be applicable to the IMO's further regulation on GHG emissions from international shipping.

Thirdly, the *Paris Agreement* represents the evolution of the CBDR principle from the differentiation based on Annexes to the *UNFCCC* to a regime of flexible self-differentiation,[224] which will have an impact on the reduction of GHG emissions from international shipping. Under the *UNFCCC* regime, Annex I States to the *UNFCCC* (developed States) have compulsory reduction obligations whereas non-Annex I States to the *UNFCCC* (developing States) are exempt from compulsory reduction commitments. However, some developed States asserted that this type of differentiation should not be applied to the adoption of the Paris climate agreement. For example, On 12 February 2014 the US released its positions on a 2015 climate agreement suggesting that the CBDR principle should be interpreted differently during the period of post-2020 and beyond. It asserted that national efforts will be differentiated based on a range of factors, including 'circumstances, level of development, mitigation opportunities, capabilities', and so on, but it would not support 'a bifurcated approach to the new agreement, particularly one based on groupings that may have made sense in 1992 but that are clearly not rational or workable in the post-2020 era'.[225] Meanwhile, developing States insisted that the CBDR principle should be incorporated into the forthcoming Paris climate agreement. For instance, as the largest GHG emitter in the world, China declared in 2011 that it would not participate in a legally binding climate agreement before 2020, but would agree to participate in such an agreement after 2020 under certain conditions including the grant of financial assistance and technological transfer provided by developed States.[226]

224 Clément Bultheel, Romain Morel, et al., *COP21: Success at 'the End of the Beginning'* (18 December 2015) <http://www.i4ce.org/wp-core/wp-content/uploads/2015/12/15-12-18-I4CE-Climate-Brief-38-COP211.pdf> accessed 3 May 2016, p. 2.

225 The United States of America, *U.S. Submission on Elements of the 2015 Agreement* (12 February 2014) <https://UNFCCC.int/files/documentation/submissions_from_parties/adp/application/pdf/u.s._submission_on_elements_of_the_2105_agreement.pdf> accessed 3 May 2016.

226 China's Xinhua News Agency, *China Sets Conditions on Binding Climate Change Commitment after 2020* (6 December 2011) <http://english.peopledaily.com.cn/90883/7667257.html> accessed 3 May 2016. During the Durban climate change conference in 2011, China asserted that these conditions include 'new carbon-cutting pledges by rich nations in the second commitment period under the Kyoto Protocol, a fast launch

Eventually a compromise concerning the proper interpretation of the CBDR principle was reached in 2015. The *Paris Agreement* adds the element of 'in light of different national circumstances',[227] which drew from a 2014 US-China joint announcement on climate change,[228] to the end of the CBDR and respective capablities. While the Agreement requires developed States to 'take the lead' in tackling climate change,[229] the concept of NDC has been created to reflect a more flexible regime that is based on specific conditions of each State rather than on groups of States. Namely, each State determines its 'fair contribution' based on its respective capabilities and in light of its 'different national circumstances'.[230] Accordingly, the *Paris Agreement* only mentions developed and developing States rather than referring to the Annexes to the *UNFCCC*. Furthermore, the Agreement encourages developing State Parties to provide financial support to other developing State Parties voluntarily.[231] These are the new features of the CBDR principle embodied in the *Paris Agreement*.

The international shipping industry has responded to the adoption of the *Paris Agreement* in a timely manner. In February 2016, the International Chamber of Shipping (ICS) submitted a proposal to the 68th MEPC meeting of the IMO. It suggested that the IMO should adopt an Intended IMO Determined Contribution on behalf of the international shipping industry and report it to the *UNFCCC* meetings in the future. It took the view that this would mirror the commitments or the INDCs that the Parties to the *UNFCCC* have made for their national economies and this language is also consistent with the language used in the *Paris Agreement*.[232] It is understandable for the ICS to propose this non-legally binding commitment rather than the sector's binding reduction target which the IMO had been discussed about previously. It becomes less likely for

---

of the Green Climate Fund agreed on in Cancun under a supervisory regime, implementing the consensus of adaptation, technology transfer, transparency, capability building and other points agreed upon in the former conferences as well as appraising developed countries' commitment during the first period of the Kyoto Protocol'.

227 See, e.g., *Paris Agreement* preamble, arts. 2(2), 4(3)(19).

228 The White House of the USA, *U.S.-China Joint Announcement on Climate Change* (12 November 2014) <https://www.whitehouse.gov/the-press-office/2014/11/11/us-china-joint-announcement-climate-change> accessed 3 May 2016, para. 2.

229 *Paris Agreement* art. 4(4).

230 See, e.g., *Paris Agreement* arts. 2,3.

231 *Paris Agreement* art. 9(2).

232 *Proposal to Develop an 'Intended IMO Determined Contribution' on CO2 Reduction for International Shipping*, submitted by International Chamer of Shipping (ICS), MEPC 69th Session, Agenda Item 7, IMO Doc MEPC 69/7/1 (12 February 2016) paras 7,8.

the international shipping industry, a comparatively cost effecitve and clean method of transportation, to adopt more strigent measures than those in other sectors to reduce its GHG emissions. To some extent this can be seen as a negative impact of the *Paris Agreement* on the reduction of GHG emissions from international shipping within the IMO. Currently it is unknown which step that the IMO is going to take as to the setting of the reduction target for the international shipping sector. However, it is clear that the evolved CBDR principle under the *Paris Agreement* will play a role in the IMO's further regulation on the reduction of shipping GHG emissions.

Finally, the objective of reduction set by the *Paris Agreement* reveals the significance of reducing GHG emissions from interational shipping, and the IMO has responded to the enhanced transparency requirement stipulated under the Agreement. As discussed above, current exisiting NDCs will lead to the temperature rise of 2.7 or 3 degrees Celsius above pre-industrial levels by 2100. In order to reach the 2 degrees Celsius threshold, ambitious reductions efforts made by the international shipping and aviation industries, which are currently excluded from the reduction commitment under the *Paris Agreement*, would possibly fill in the gaps existed in current NDCs-based regime. Meanwhile, Article 13 of the *Paris Agreement* specifies the establishment of 'an enhanced transparency framework for action and support, with built-in flexibility which takes into account Parties' different capacities and builds upon collective experience'.[233] This provision aims to address the widespread concerns on the absence of a detailed MRV mechanism as required under the *Cancun Agreements*.[234] It is projected that this transparency framework will be elaborated in the subsequent *UNFCCC* and its *Paris Agreement* process. Furthermore, this framework also creates the basis for a similar transparent MRV system in the international shipping industry.

Indeed, as a response to the unilateral EU Regulation on Monitoring, Reporting and Verification (MRV),[235] the IMO had been discussing a similar data collection system for global application before the adoption of the EU MRV Regulation in July 2015. The IMO had obtained general support from its member States and agreed that it was imperative to develop a global data

233 *Paris Agreement* art. 13(1).

234 Bultheel, Morel, et al., above n. 224.

235 In June 2013, the European Commission developed a proposal for an EU Regulation on Monitoring, Reporting and Verification (MRV) and submitted it to the European Parliament and the Council. Consequently, the MRV Regulation 2015/757 was adopted and came into force on 1 July 2015.

collection system for international shipping.[236] However, it was ageed at the IMO in May 2015 that the development of a data collection system for ships should employ a three-step approach (data collection, data analysis and decision making), and it is premature to decide whether this system should be voluntary or mandatory.[237] It seems that the regulatory process on the data collection system within the IMO will be lengthy. Nevertheless, the adoption of the *Paris Agreement* has accelerated this process. At the 69th MEPC meeting in April 2016, the IMO approved mandatory data collection requirements for ships engaged in international shipping. Under this system, ships of 5,000 gross tonnage (GT) or above will be required to collect consumption data for each type of fuel they use, and the data will then be reported to flag State after the end of each year. Flag State will issue a Statement of Compliance to the ship, and tranfer the data to the IMO. Based on the data analysis, the IMO will determine whether any further measures are needed to enhance energy efficiency and address GHG emissions from international shipping.[238] This move has been regarded by the IMO as sending 'a clear and positive signal about the Organization's continuing commitment to climate change mitigation'.[239] This probably also indicates that the interaction between the *UNFCCC* process and the IMO GHG regime will continue. The absence of GHG emissions from international shipping under the *Paris Agreement* will not prevent it from discussing and addressing this shipping GHG issue in its subsequent conferences.

3.4 Conclusion

This chapter has examined the responses from the UN to the issue of GHG emissions from international shipping. Faced with the aggravating situations of climate change around the world, the UN made timely institutional and legal responses and these responses have significant implications for shipping emissions. To cope with climate change, the UN established a number of institutions. Among them, the IPCC underpins the combating of GHG emissions from shipping by means of its Assessment Reports; the UNEP and WMO raise

236 *Report of the Marine Environment Protection Committee on Its Sixty-Seventh Session*, MEPC 67th Session, Agenda Item 20, IMO Doc MEPC 67/20 (31 October 2014) para. 5.7.

237 *Report of the Marine Environment Protection Committee on Its Sixty-Eighth Session*, MEPC 68th Session, Agenda Item 21, IMO Doc MEPC 68/21 (29 May 2015) paras 4.8, 4.10.

238 IMO, *IMO Takes Further Action on Climate Change* (22 April 2016) <http://www.IMO.org/en/MediaCentre/PressBriefings/Pages/11-data-collection-.aspx> accessed 4 May 2016.

239 Ibid.

awareness of the need to tackle the issue and implement outcomes within the international climate change regime; the *UNFCCC* and its COPs and CMPs, especially its subsidiary SBSTA and AWG-LCA, provide crucial platforms for different countries to negotiate on the issue of international bunker fuels. Furthermore, unilateral actions by individual States or the EU to reduce shipping emissions should be considered.

The UN came to establish an international legal framework on climate change with the *UNFCCC* and its *Kyoto Protocol* as its core element. During this process, the *1979 CLRTAP* and *1985 Vienna Convention* provided a 'framework treaty' model for future international environmental agreements. The precautionary principle and the spirit of cooperation revealed from the *Vienna Convention* paved the way for future conventions. Additionally, three innovative approaches adopted by the *1987 Montreal Protocol* might be particularly valuable to the issue of shipping emissions, namely, a more flexible arrangement, a well-designed application of the CBDR principle and gaining participation and investment from industry.

An international climate change regime has been established and continues its development. In particular, the SBSTA worked on the allocation and control of GHG emissions from international shipping from 1995 to 1996, but failed to reach consensus in adopting an option on the allocation of GHG emissions. Since 1998 the SBSTA has exchanged information with the IMO as to the regulation of GHG emissions from ships. The subsequent AWG-LCA started to work on international bunker fuels under the *Bali Action Plan* in 2008. It worked on regulatory principles, the setting of reduction targets and the IMO's competence. However, no substantial outcome had been achieved before the AWG-LCA terminated its work at the Doha Climate Change Conference in 2012. Currently, regulatory measures to reduce shipping GHG emissions mainly rely on the work of the IMO.

The adoption of the *Paris Agreement* in December 2015 has been treated as a success in that it is an important step in the evolution of climate governance and a reaffirmation of environmental multilateralism. However, there are some challenges attached to its implementation. Particularly the non-legally binding nature of the NDCs has made it difficult for the international community to realise the purpose of the Agreement. The *Paris Agreement* does not address GHG emissions from international shipping. Nevertheless, it has some significant implications for this shipping emissions issue. Among them, the CBDR principle will still be applicable to the IMO's regulation on GHG emissions from international shipping during the post-2020 era; the NDC-based responsibilities represent the evolution of the CBDR principle from the Annexes-based differentiation to the flexible self-differentiation. As responses

to the *Paris Agreement*, the international shipping industry is considering to adopt an Intended IMO Determined Contribution while the IMO has approved mandatory data collection system for the ships of 5,000 GT and above. It is expected that the interaction between the *UNFCCC* process and the IMO GHG regime will continue.