Protecting the Malacca and Singapore Straits from Ships’ Atmospheric Emissions through the Implementation of MARPOL Annex VI

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Abstract

The International Maritime Organization (IMO) adopted legally binding regulations for the control of ships’ atmospheric emissions under Annex VI of the International Convention for the Prevention of Marine Pollution from Ships, 1973/78. With Singapore, Malaysia and Indonesia being States Parties thereto, consequently, one of the effects in the Malacca and Singapore Straits is that it enables the Straits States, together with the IMO, to designate emission control areas for the approximately 75,000 ships transiting annually. This article examines the robust provisions of Annex VI for the marine environmental protection of the Straits and the contentious debates preceding an otherwise dead-locked technology-transfer resolution for implementing Annex VI. If implemented, Annex VI provisions will represent a unique milestone in the protection of the marine environment of the Straits which is regulated by the restrictive provisions of Part III of the 1982 United Nations Convention on the Law of the Sea.

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Keywords

Straits of Malacca and Singapore – Law of the Sea Convention – MARPOL Annex VI – sustainable global shipping – technical resolution debates

Introduction

Atmospheric shipping emissions\(^1\) are regulated by the International Maritime Organization (IMO)\(^2\) through Annex VI of the International Convention for the Prevention of Marine Pollution from Ships 1973, as amended by the Protocol of 1978 (MARPOL 73/78).\(^3\) To address global and local air pollution from ships, the IMO adopted MARPOL Annex VI by the “1997 Protocol”. This Protocol sets out specific detailed technical regulations\(^4\) which are frequently\(^5\) improved

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and amended.\textsuperscript{6} Annex VI requires flag States to use energy-efficient engines on all ships above 400 gross registered tonnage (grt) to reduce nitrogen oxide (NOx) emissions from marine engines, accompanied by a phased-in progressive reduction in sulphur oxide (SOx) emissions from bunker fuel, replacing marine bunker fuel,\textsuperscript{7} when passing through three types of emission control areas (ECAs). These are Sulphur Emission Control Areas (SECAs), Nitrogen Emission Control Areas (NECAS) and Particulate Matter Emission Control Areas (PMECAS).\textsuperscript{8} In a new Chapter 4 to Annex VI, certain mandatory measures reduce greenhouse gas emissions (GHGs) from international shipping through two features: the Energy Efficiency Design Index (EEDI), made mandatory for new ships, and the Ship Energy Efficiency Management Plan (SEEMP), a requirement for all ships. Annex VI, enforced through the International Energy Efficiency Certificate,\textsuperscript{9} entered into force on 1 January 2013.\textsuperscript{10}

Annex VI provisions on the control of atmospheric shipping emissions are ‘robust’ compared to Part III of the 1982 Law of the Sea Convention (LOSC)\textsuperscript{11} which lays down the regulatory framework for navigation and marine pollution control in straits used for international navigation, such as the Malacca and


\textsuperscript{7} Marine bunker fuel is a very poor quality of petroleum comprising a high sulphur content, volatile organic compounds, greenhouse gases and particulate matter. The various types of heavy fuel oil include: bunker crude, residual fuel oil, bunker fuel, fuel oil No. 6, industrial fuel oil, marine fuel oil and black oil. Other types of bunkers exist that are not Heavy Fuel Oils and that have a higher quality, such as diesel.


\textsuperscript{11} LOSC (n 3).
Singapore Straits (the Straits). An essential feature of Annex VI is the enabling technology-transfer resolution, the Resolution on Promotion of Technical Co-operation and Transfer of Technology relating to the Improvement of Energy Efficiency of Ships adopted at the 65th Marine Environment Protection Committee meeting\(^{12}\) (MEPC 65) of the IMO. Technical assistance for implementation of conventions is also promoted under the LOSC.\(^ {13}\) As of 19 June 2016, there are 166 States Parties, plus the European Union, to the LOSC and 152 States Parties to MARPOL Annex VI (the latter includes the United States). MARPOL represents 99.2% of merchant shipping tonnage, which is a major paradigm shift in sustainable global shipping. Indonesia, Singapore and Malaysia are States Parties to the LOSC and to MARPOL Annex VI.\(^ {14}\)

This article does not examine the issue of linkage between the 1992 United Nations Framework Convention on Climate Change (UN FCCC),\(^ {15}\) the 1997 Kyoto Protocol to the UN FCCC,\(^ {16}\) the COP 21 Paris Climate Conference, and the IMO Conventions that contain elements of potential inter-regime conflicts, for example, between the principle of ‘common but differentiated responsibility’ (CBDR) and the principle of ‘no more favourable treatment’ (MFN) of the IMO Conventions.\(^ {17}\) It examines the provisions of MARPOL Annex VI


\(^{13}\) The World Bank, Changing the Face of the Waters (The IBRD, Washington, DC, 2007) 66–67.


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that promote sustainable global shipping in the Malacca and Singapore Straits. This article enables the sub-regional States to propose to the IMO that ECAs be established in these seas for the approximately 75,000 ships transiting annually. It (1) highlights the legal regime of the Malacca and Singapore Straits under the LOSC, including the inter-play between Part III of LOSC and MARPOL Annex VI; (2) summarizes MARPOL Annex VI and Chapter 4 regulations; (3) describes debates about and strengths of the almost dead-locked technical-transfer resolution; and (4) suggests a way forward.

The Legal Regime of the Malacca and Singapore Straits under the LOSC

About 75,000 ships annually transit the narrow but 600-nautical-mile-long Straits, which feature unique and rare coastal and marine ecosystems. The Straits comprise the Strait of Malacca, which is contiguous to the Strait of Singapore, forming an international shipping route linking the Indian Ocean (via the Andaman Sea) with the South China Sea to the Pacific Ocean, and the Strait of Singapore, which connects to the South China Sea. Legally, transit passage prevails for all ships under the LOSC. The Straits have been affected by earthquakes and tsunamis. Scientific studies show increases in ocean


21 See Part III, 1982 LOSC.

acidification and resulting inability of the oceans to buffer CO₂ with deleterious consequences for marine ecosystems. This scientific phenomenon has been explained by numerous experts. Schlager highlighted that the presence of sulphur dioxide (SO₂) in the Malaysian region was caused by a mixture of emission sources, such as anthropogenic emissions from the Philippines and Singapore and emissions from shipping. Schlager detected the uplift of SO₂ into the upper troposphere by deep convection and observed that SO₂ distributions compared reasonably with the Emissions Market Assessment Committee simulations.

The effects of NOx and SOx on ecosystems and populations are well studied. At the sixty-eighth session of the UN General Assembly, the UN

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24 Capt. ES Vagslid, Technical Officer, Sub-Division for Pollution Prevention, Marine Environment Division, IMO, “Prevention of Air Pollution from Ships IMO’s role in the
Secretary-General’s Report on the Oceans and the Law of the Sea at para 132 acknowledged the adverse impacts of climate change on the oceans and coastal communities. Although shipping has benefitted some coastal State economies in the past, future predictions indicate that shipping through the Straits will increase, resulting in heavier emissions of sulphur and nitrogen compounds, thereby further harming ecosystems and human health.


25 For situation in Jamaica, Ibid., at paras 155 and 157.


causing transboundary air pollution.\textsuperscript{31} Environmental protection is important for the Straits, because in the air/sea interactions, the oceans regulate atmospheric fluxes and concentrations of oxygen and carbon dioxide through oxygen production and carbon dioxide sequestration; the oceans also act as carbon dioxide sinks.\textsuperscript{32} The Straits play a role in ocean-sourced calcium carbonate production in the formation of islands and beaches, which are important for, e.g., coastal State tourism and coastal protection (against, e.g., the effects of tsunamis and storms).\textsuperscript{33}

Besides the LOSC, the Straits are subject to the IMO Conventions and other rules of law\textsuperscript{34} and policy.\textsuperscript{35} The rule of law is recognised as one of eight principles of good governance.\textsuperscript{36} Traffic separation schemes,\textsuperscript{37} and ships’ routeing\textsuperscript{38} under Regulation V/10 of the 1974 Safety of Life at Sea Convention,\textsuperscript{39} promote safety of navigation. For marine pollution control, action plans\textsuperscript{40} are adopted under the 1990 International Convention on Oil Pollution Preparedness,

\begin{footnotesize}
\begin{enumerate}
\item WCED, \textit{Our Common Future} (Oxford University Press, Oxford, 1987), and international environmental law principles.
\end{enumerate}
\end{footnotesize}
Response and Co-operation (OPRC)\textsuperscript{41} and, for major pollution incidents,\textsuperscript{42} under the Protocol to the OPRC Convention on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances 2000.\textsuperscript{43}

\textit{Interplay between the 1982 LOSC and MARPOL Annex VI}

The inter-relationship between the LOSC, metaphorically referred to as the “constitution for the oceans”,\textsuperscript{44} and the IMO Conventions is well established.\textsuperscript{45} Articles 237 and 311 of the LOSC provide guidance on the compatibility between the LOSC and the IMO Conventions.\textsuperscript{46} Specifically, the inter-play between LOSC and MARPOL Annex VI for marine pollution control shows that the two Conventions have common objectives but different approaches, as is seen in, e.g.: the definition of air and marine pollution;\textsuperscript{47} prescriptive and enforcement powers of the Straits States; designation of special areas; and port State


\textsuperscript{46} Article 237 LOSC refers to obligations under other conventions on the protection and preservation of the marine environment. Article 311(2) states that the LOSC does not alter the rights and obligations of States Parties which arise from other agreements compatible with the LOSC.

control. This difference influences reliance on the ‘robust’ MARPOL Annex VI, rather than the restrictive LOSC approach, for environmental protection of the Straits. The IMO rules and standards may be adapted to the circumstances of States\(^4\) to eliminate sub-standard ships\(^5\) as coastal States, exercising port State control, may inspect ships’ certificates\(^6\) under LOSC Articles 218, 219 and 220. It is questioned why certain features of MARPOL Annexes I–V: (a) the designation of Special Areas, (b) adoption of special mandatory methods for the prevention of sea pollution,\(^7\) and (c) designation of Particularly Sensitive Sea Area (PSSAs), have not been applied in the Straits, as these measures fall within the scope of Part III of the LOSC.\(^8\)

### Definition of Air and Marine Pollution

The first issue in the intersection between the LOSC and MARPOL Annex VI concerns the definition of air and marine pollution. It was generally understood at the Third United Nations Conference on the Law of the Sea (UNCLOS III) that the term “marine environment” included both the atmosphere and

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\(^4\) The IMO Resolutions are globally endorsed recommendations on the implementation of technical rules and standards not included in IMO treaties which may be adopted by an IMO body, such as the IMO Assembly, the IMO Maritime Safety Committee and the IMO MEPC, for implementation in national legislation to legally bind foreign ships.


marine life. Increased CO₂ in the atmosphere means the production of more carbonic acid in the oceans, thus changing (i.e., reducing) the pH level of the oceans. Furthermore, the increase in atmospheric CO₂ and other GHGs cause the ocean's temperature to rise. MARPOL 73 does not define marine pollution, but defines a “harmful substance” in Article 2(2), similar to the LOSC definition. The LOSC allows Straits States to implement international conventions on marine pollution control in Straits and confers prescriptive jurisdiction for this purpose, but it negates enforcement jurisdiction during transit passage, which is neither to be suspended nor hampered. Strait States may take such appropriate enforcement measures where ships cause or threaten major damage to the marine environment of the Straits. However, the LOSC does not define the term “major damage.” By contrast, MARPOL Annex VI confers prescriptive and limited enforcement jurisdiction on States in ECAS established with IMO approval.

**LOSC Part III: Meaning of the Term “Other Noxious Substances”**

A literal treaty interpretation of some provisions of LOSC Part III on marine pollution control excludes atmospheric shipping emissions from its scope, contrary to the intention of the parties. Article 32(1) of the 1969 Vienna Convention on the Law of Treaties (VCLT) states that “a treaty shall be interpreted in good
faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose.” Article 31 (4) VCLT states that “a special meaning shall be given to a term if it is established that the parties so intended.” According to Article 32 VCLT, recourse may be had to the preparatory work of the treaty and the circumstances of its conclusion, to confirm the meaning resulting from the application of Article 31, or to determine the meaning when the interpretation according to Article 31 is ambiguous or obscure, or gives a result which is manifestly absurd or unreasonable. Boyle states that the LOSC must be interpreted and applied in accordance with the normal rules of treaty law, including those which allow other agreements and rules of international law to be taken into account for this purpose. For a correct interpretation, reference is made to the preparatory works of the LOSC.

Do atmospheric shipping emissions of MARPOL Annex VI fall within the scope of Article 42, Part III of the LOSC? Article 42 (1) (a) regulates passage and Article 42 (1) (b) regulates marine pollution control by giving effect to applicable international regulations regarding the discharge of oil, oily wastes and “other noxious substances in the strait.” National laws are not to be discriminatory or have the practical effect of denying transit passage. It is important that MARPOL Annex VI provisions fall within the terms of Article 42 (1) (b), allowing Straits States to interpret “other noxious substances” as including ships’ atmospheric emissions. The UNCLOS III Commentaries provide for supplementary means of interpretation which show that noxious substances are meant to include substances other than oil. An earlier version of the Article submitted by the UK at the Second Session of UNCLOS III provides Straits States with a basis for making laws to control discharge of oil or other noxious substances. In the UK proposal, Straits States had prescri-
tive and enforcement jurisdiction to initiate legal proceedings against the impugned merchant vessel for failure to comply with international regulations concerning marine pollution (primarily from oil). The Private Group on Straits subsequently endorsed the UK proposal. An examination of the UNCLOS III Commentaries on Article 42(1)(b) shows that the Article refers to “international regulations” and not to the domestic laws of States. Although the words “giving effect to” allow for interpretive discretion, Straits States cannot adopt regulations that are substantially different from, or more stringent than, the applicable international standards.

Prescriptive and Enforcement Jurisdictional Powers of Straits States

A “limited enforcement jurisdiction” in LOSC Article 233 enables States to deal with actual or threatened major damage to the marine environment. Article 233 refers to Article 42(1)(a) and (b) on actual or threatened major damage to the marine environment of a strait. For this purpose, the Straits States tried, but were unsuccessful in their efforts, to introduce a technical minimum standard for under-keel clearance of ships in relation to Article 233. Growing fears of capricious imposition of outrageous domestic laws were allayed as only international laws were to be enforced in straits used for international navigation. Article 43 calls for co-operation by agreement between user and Straits States in the prevention, reduction and control of pollution from ships. Under Article 44, Straits States cannot hamper ships in transit or suspend passage and must publicise dangers to navigation or overflight they have knowledge of.

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64 The UK proposal:

(1) Subject to the provisions of this article, a straits State may make laws and regulations:

(a) In conformity with the provisions of article 3 above (now article 41).

(b) Giving effect to applicable international regulations regarding the discharge of oil, oily wastes, and other noxious substances in the strait.

(2)–(5) . . .

65 Private Group on Straits, 1975 mimeo, article 4, reproduced in R. Platzöder, Third United Nations Conference on the Law of the Sea: Documents, Volume IV (Oceana Publications, New York, 1983); that text, with some minor drafting changes, was incorporated in the ISNT Part II (Source 8) as Article 41; ibid., at p. 372.

66 See UNCLOS III, at paragraph 42.10(c).

67 Nandan and Rosenne (n 62).

68 For Statement relating to Article 233, in its application to the Straits of Malacca and Singapore and the determination of the Under-keel Clearance of Ships (UKC) transiting those Straits with its specific reference to Article 42(1)(a), see A /CONF.62/L.145 (1982) XVI, Off. Rec. 250 (Malaysia) and Add. 1–8, ibid., at pp. 251–53.
The prescriptive powers of Straits States under the LOSC are clearer than the enforcement powers. Straits States under Article 41 (1) and (2) can designate sea lanes and traffic separation schemes. Article 41 (3) mandates sea-lanes and traffic separation schemes in straits to conform to generally accepted international regulations. Article 41 (4) requires Straits States to present such proposals to the IMO and Straits States enforcement commences only after formal adoption by the IMO. Article 41 (5) requires Straits States bordering a common strait to co-operate in the submission of joint proposals according to SOLAS Regulation V/8(f). The rules establishing vessel traffic services are found in IMO Resolutions A.851 (20) and A.857 (20), respectively. Article 41 (7) requires ships to observe sea-lanes in transit passage.

MARPOL 73 applies on board national flags and in maritime zones under national authority. MARPOL 73, Article 9 (3) on “Other treaties and interpretation” provides that the term “jurisdiction” shall be construed in the light of “international law in force at the time of application or interpretation of the present Convention” (i.e., MARPOL). “International law” is interpreted as a reference to the circumstances, safeguards, and geographical zones relating to coastal, flag and port State jurisdiction. Some MARPOL provisions focus on monitoring and investigation of illegal discharges of harmful substances into the marine environment. Flag States implement the IMO Conventions on navigational safety and pollution control irrespective of the maritime zone the ship is in, except where different standards on safety requirements exist. Generally, the IMO Conventions do not regulate coastal State jurisdiction in the territorial sea, in straits used for international navigation, in archipelagic waters, and in the EEZ.

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69 See for example, LOSC Section 7 of Part XII, Articles 225, 226(2) and 228.
70 See EU case no. C-308/06., ECJ ruling on 20 November 2007, Opinion of the Advocate General. See The Queen, on the application of International Association of Independent Tanker Owners (Intertanko) and Others v Secretary of State for Transport. ECR 2008, I-04057.
71 Nordquist et al. (eds) (n 45) at p. 756. MARPOL 73/78 Annex VI, Chapter 2 on “Survey, Certification and Means of Control” in Regulation 11(6) provides that the international law regulating ship-based marine pollution in force at the time of application or interpretation of Annex VI, applies, mutatis mutandis, to the rules and standards set forth in Annex VI.
72 Nordquist et al. (eds), ibid.
73 Maritime zones are not a key jurisdictional consideration for MARPOL as they are for the 1969 Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (Brussels, 29 Nov 1969, in force 6 May 1975) 970 UNTS 211; the 1973 Protocol
**Designation of Special Mandatory Measures**

Part III LOSC does not provide for the designation of Special Mandatory Measures or PSSAs. Article 211 (6) LOSC provides that Special Mandatory Measures can be adopted for the EEZ, allowing coastal States to designate sulphur and nitrogen ECAs with the assistance of the IMO. Coastal State enforcement is recognised under Article 220 (1–8) for violations of coastal laws for pollution control in the territorial sea (Article 21 (1)) and the EEZ of a state. Straits used for international navigation are excluded from the provision.

In MARPOL Special Areas, a higher level of protection from ship-based operational discharges of harmful substances is provided in MARPOL Annex I (Prevention of pollution by oil), Annex II (Control of pollution by noxious liquid substances), Annex IV (Prevention of pollution by sewage from ships) and Annex V (Prevention of pollution by garbage) from ships in enclosed or semi-enclosed seas, which may include parts of the territorial sea, the EEZ and perhaps even the high seas. About ten Special Areas have been designated under MARPOL Annexes I, II and V so far, where coastal States are required to provide reception facilities. Rules for the designation of Special Areas and Identification of PSSAs under MARPOL are found in IMO Resolution A.927 (22) of 2001 and in the IMO Revised Guidelines for the Identification and Designation of [PSSAs] by Resolution 982 (24), respectively. Twelve PSSAs have been designated, for example, on the Great Barrier Reef, Australia.74 So far, Special Areas or PSSAs have not been considered for the Malacca and Singapore Straits.

**Port State Control to Eliminate Sub-standard Shipping**

Rules on port State control are set out in LOSC Article 218, which specifically excludes a reference to the regime of straits used for international navigation in LOSC Part III. This LOSC Part III also does not provide for port State jurisdiction. MARPOL Articles 5 (4), 6 (2) and 7 (1) regulate port State control. Straits States exercise port State control under MARPOL where the authority of the port State extends to inspecting foreign ships that voluntarily come to its ports to prevent sub-standard ships from sailing. Port States can also institute proceedings against the foreign flags in accordance with their national law. Articles 5 and 6 of MARPOL refer to certificates, inspections, detection of

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74 Nordquist et al. (eds) (n 45) at p. 818.
violations and procedures to be taken by port States. Article 7 MARPOL provides that undue delays should not be caused to ships.

Pursuant to IMO Resolution A.682 (17) of 1991, nine regional Memoranda of Understanding (MOUs) have been adopted to eliminate sub-standard shipping and promote safe, secure and efficient shipping in regional maritime jurisdictions. The port State control officers, through close coordination, verify that the condition of the ship and its equipment comply with the requirements of international regulations and standards under MARPOL and SOLAS as reflected in its domestic law. IMO Resolution A.787 (19) on Procedures for Port State Control (1995) set out the details on port State inspections, contraventions, detention and reporting requirements. When a foreign ship voluntarily enters a port, it implies acceptance by the foreign ship of the port State’s powers to exert corrective jurisdiction in order to ensure compliance with IMO regulations. The port State is under a duty to provide reception facilities for the discharge of waste. MARPOL rules always apply, in port or at sea, to survey and certification and detection of violations of international standards (of technical and discharge violations). The Resolution states that such inspections must be consistent, leading to the recognition of deficiencies of a ship, its equipment, and its crew, and to the application of control procedures. Where “clear grounds” exist for believing that the condition of the ship or its equipment does not correspond substantially with the particulars of the certificates, the port State may detain the ship. The MOUs on Port State Control serve as a back-up to flag State implementation. One such example is the MOU on Port

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75 Ibid., at p. 755.
78 Ibid.
State Control in the Asia-Pacific Region.79 The MARPOL provisions serve to implement the rules uniformly across the globe by Port State Control Officers. This is vital for Annex VI enforcement, especially for Straits States, as these States have no other means of controlling sub-standard shipping.

**MARPOL Annex VI, Chapter 4**

Annex VI comprises four chapters, of which Chapters 1–380 may be considered the first generation of environmental measures that serve to:

1. reduce emission from ships,
2. tighten emission limits,
3. designate SECAs, NECAs and PMECAs, and
4. prohibit deliberate emissions of ozone-depleting substances, which include halons and chlorofluorocarbons (CFCs).

Chapter 4 may be regarded as the second generation of technical measures that serve to reduce air pollution through improving the energy efficiency of ship engines.81 With the entry into force of Chapter 4 on 1 January 2013, ships are required to have documentation showing an EEDI, an Energy Efficiency

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80 For example, Chapter One, titled “General” has four regulations where Regulation One states that the provisions of this Annex are to apply to all ships, except where expressly provided otherwise in regulations 3, 5, 6, 13, 15, 18 and 19 of this Annex and found in the other Chapters.
Operating Index (EOI) and a SEEMP.\textsuperscript{82} Manufacturers have been building engines compliant with Chapter 4 standards since 2000. Installed marine diesel engines with more than 130kW output power are subject to different tiers of NOX control based on the ship’s construction date. There are three Tiers to date. Tier I controls on NOX requirements are for existing pre-2000 engines; Tier II controls apply to all areas other than the North American ECA and the United States Caribbean Sea ECA. Tier III controls apply to specified ships in the North American ECA and the United States Caribbean Sea ECA. In October 2008, Tiers II and III were amended and new fuel quality requirements and emission standards for new engines were introduced beginning July 2010. Annex VI requires the application of more stringent limits on Tier III engines used in large ocean-going vessels within ECAs for improved sustainable maritime transportation.

\textbf{MARPOL Annex VI} is examined from the following perspectives:

1. Designation of ECAs, SECAs and NECAs under Chapter 3.
2. Adoption of EEDI, EEOI and SEEMP standards under Chapter 4.
3. Port State control inspections under Chapter 2.

\textbf{Designation of Emission Control Areas}

MARPOL Annex VI empowers States to designate SECAs and NECAs with more stringent controls on sulphur and nitrogen emissions for Tier III NOX emission standards in seas and port areas. It also covers PM for which no standards are mentioned. A SECA is meant to reduce SOx emissions from ships and control air pollution from SOx and its attendant adverse impacts on land and sea areas. SECAs are sea/port areas with stricter requirements for bunker fuel compared to other sea/port areas. Annex VI, Chapter 4 \textit{per se} does not require reception facilities.

The Proposal for Criteria for designation of a SECA (Regulation 14, MARPOL Annex VI) states that where two or more Contracting States to the Protocol of 1997 have a common interest in a particular area, they should formulate a coordinated proposal, as set out in Appendix III of Annex VI. The proposal shall include: a clearly delineated area for the control of SOx emissions from ships;

\begin{footnotesize}
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a description of the terrestrial and maritime areas at risk from the impacts of ship SOx emissions; an assessment of such areas; and SOx depositions and the attendant adverse impacts on the land and sea areas under consideration, such as the ecosystems, areas of natural productivity, critical habitats, water quality, human health, and areas of cultural and scientific significance, if applicable. The Proposal requires relevant information regarding meteorological conditions in the proposed area, in particular prevailing wind patterns, and on topographical, geological, oceanographic, morphological, and other conditions that may lead to an increased probability of higher localized air pollution and levels of acidification. The nature of the ship traffic in the proposed SECA, including the patterns and density of such traffic, are also required to be stated.

To sum up, the geographical limits of a SECA will include SOx emission and deposition from ships navigating in the proposed area, traffic patterns and density, and wind conditions. The sources of relevant data, including methodologies used and the control measures of the proposing contracting States, shall be identified.83 The Achilles’s heel in Appendix III is found in paragraph 2.1, i.e., a co-ordinated proposal should be formulated where two or more Contracting States have a common interest in a particular area. This is a weakness as it is possible that States may have opposite common interests, thereby slowing down the process of formulating a coordinated proposal.84

Under Annex VI, Chapter 3, Straits States have a duty to propose to the IMO the establishment of SECAs (Regulation 14) and NECAs (Regulation 13) that tie in with such terrestrial control areas for the prevention of air pollution from ships. Regulation 14 provides that the sulphur content of any fuel used on board ships shall not exceed 4.5% m/m. The Regulations include caps on sulphur content of fuel oil as a measure to control SOx emissions and, indirectly, PM emissions. Ships within SECAs using an exhaust gas cleaning system have a duty to ensure that waste streams from such equipment are not discharged into enclosed ports, harbours and estuaries, unless it can be documented by

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the ship that these will not adversely affect the States’ ecosystems, based upon
criteria communicated by the authorities of the port State to the IMO. The sul-
phur limits for fuel in a SECA before 1 July 2010 stood at 1.50% m/m, and at
1.00% m/m between 1 July 2010 and 1 January 2015. After 1 January 2015 it stands
at 0.10% m/m. In other non-secas or global areas the figures are: before 1 July
2012—4.50% m/m; between 1 July 2012 and 1 January 2020—3.50% m/m and
1 January 2020—0.50% m/m, as shown in Table 2.85 It may be postponed to
2025.86

Where m/m refers to:

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\frac{\text{weight (mass) of one component}}{\text{mass of another}} \times 100\% \quad \text{or} \quad \frac{\text{mass of one component}}{\text{total mass}} \times 100\%
\]

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<th>TABLE 2</th>
<th>Comparative sulphur discharge figures for a non-seca and a seca</th>
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<td>Outside an ECA established to limit SOx and PM emissions</td>
<td>Inside an ECA established to limit SOx and PM emissions</td>
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<td>4.50% m/m prior to 1 January 2012</td>
<td>1.50% m/m prior to 1 July 2010</td>
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<tr>
<td>3.50% m/m on and after 1 January 2012</td>
<td>1.00% m/m on and after 1 July 2010</td>
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<td>0.50% m/m on and after 1 January 2020a</td>
<td>0.10% m/m on and after 1 January 2015</td>
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**Note:** ECA refers to an emission control area that includes both sulphur
and PM emissions.

* Depending on the outcome of a review, to be concluded in 2018, as to the availability of the
required fuel oil, this date could be deferred to 1 January 2025. Note: there is no particulate
matter discharge standard. See MEPC 68/21/Add.1, Annex 5, p. 1, available at https://docs.imo

85 MARPOL 73/78, Annex VI, Regulations for the Prevention of Air Pollution from Ships,
Technical and Operational Implications, Regulation 14, Sulphur Oxides and Particulate
Matter available at http://www.dnv.com/binaries/marpol%20brochure_tcm4-383718.pdf,
accessed 28 December 2015.

86 IMO, Special Areas available at http://www.imo.org/OurWork/Environment/Pollution
IMO explained that:

SOx and particulate matter emission controls apply to all fuel oil, as defined in Regulation 2.9, combustion equipment and other devices on board, thus including main and auxiliary engines, boilers and inert gas generators. Different limits apply within [ECAs] so as to limit the emission of SOx and particulate matter and those applicable outside such areas. Ships have to limit the maximum sulphur content of the fuel oils as loaded, bunkered, and subsequently used on-board. The fuel oil sulphur limits are expressed in terms of % m/m—that is by weight.87 They are subject to a series of step changes over the years, according to Regulations 14.1 and 14.4.88

Under Regulation 13, the control of NOx emissions from ships with “Tier III” engine standards will come into force within NECAs from 1 January 2021. MEPC guidelines were adopted under Regulation 13.2.2 of MARPOL Annex VI.89 Some regions which have implemented some aspects of Annex VI are: Baltic Sea (SOx), North Sea (SOx), North American (SOx and NOx and PM) and the United States Caribbean Sea ECA (SOx, NOx and PM).

**EEDI, EEOI and SEEMP**

The EEDI, closely monitored by the IMO, is a technical design index that focuses on the hardware performance of a ship, its equipment and engines. It is less polluting and can be applied on new and retrofitted on old ships.90 EEDIs are being developed for the largest emitters and will soon be developed for all. The latter includes the most energy-intensive merchant cargo fleets, including 70% of emissions from new oil and gas tankers, bulk carriers, general

89 IMO MEPC 65 Outcome (n 12).
cargo, refrigerated cargo and container ships, as well as combination carriers (wet/dry bulk). Shipping industries are free to propose the best EEDI mechanisms that generate energy efficiency in new ships. The advantages of EEDI technology have been worked out. For example, by using the EEDI technology, a ship that can carry 18,000 TEUs generating 11,900kW of energy from 300 metric tons of fuel for maritime transportation will now use only 120 metric tonnes of fuel to transport 18,000 TEUs, saving approximately 40% in fuel consumption. With EEDI technology, the shipper can load more TEUs and travel faster. So, it is commercially more attractive, saving time and money for the shipper. Every five years, the requirements will be tightened. The IMO has explained how the EEDI works:

The EEDI provides a specific figure for an individual ship design, expressed in grams of carbon dioxide (CO₂) per ship’s capacity-mile (the smaller the EEDI the more energy efficient the ship design) and is calculated by a formula based on the technical design parameters for a given ship.91

The EEOI is an index measuring operations and is different from the EEDI. The operations of a ship are dependent on, for example, speed control,92 weather routeing,93 maintenance, optimum trim,94 and draught. Although speed and optimum utilisation of cargo spaces have different domains of application, together they contribute to a ship’s energy efficiency as indicated by the ship’s EEOI. Through these measures the IMO assists the shipping industry in the management of the environmental performance of ships.95 The EEOI enables operators to measure the fuel efficiency of a ship in operation and to gauge the effect of any changes in operation, for example, improved voyage planning. The EEOI requires optimising each time a shipper burns fuel by taking a shorter route, and reaching the destination on time as well. As energy efficiency of shipping is increased, it will also emit less GHG-CO₂ into the atmosphere. For purposes of determining shipping emissions of CO₂, the EEOI is calculated using a formula with three main variables.

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91 Ibid.
92 For effective voyage plans and ‘slow steaming policy’ of container shipping companies, see IMO-KOICA (n 90).
93 Weather routing software, individual ship modelling and ‘virtual arrival’ for tankers according to the contract for charter party and fuel savings and less emissions, and INTERTANKO and OCIMF views, see IMO-KOICA, ibid.
94 For importance of optimum trim on ships, see IMO-KOICA, ibid.
95 IMO-KOICA, ibid.
As the IMO explains, this formula produces a ratio between the environmental cost of the emissions generated and the benefit to society of the cargo carried. It is expressed as tonnes of CO$_2$ emitted for the transport of one tonne of cargo for one nautical mile. It is a Key Performance Indicator for the energy efficiency of an individual vessel and it should be used to monitor the effects of any new measures on board, such as frequent propeller cleaning. But it is still only a tool. However, the EEDI and EEOI for all ships have not been calculated by the IMO, as the EEDI and EEOI standards are not finalised and are subject to a phase-in period, after which standards will become definite.

The largest carriers of goods across the oceans have been considered for regulation. Under this regime, ships have the option of:

1. using low-sulphur fuel, or
2. engage in sea water scrubbing, an alternate technology, that cuts SOx and PM by 75% followed by
3. catalytic reduction cuts of NOx by 90%, or
4. retrofitting old engines that reduce NOx on slow-speed engines by 20% that is cheap, easy to fit and cost-effective, and
5. inserting in-engine controls that could cut NOx by 30%.

For shipping companies in developing countries, the switch to such sophisticated shipping technology, EEDI and EEOI, is only possible with technical cooperation and technology transfer from ship and engine builders.

Entry-into-force dates for the EEDI for new ships under construction have also been considered by the IMO: currently, there are flexibilities up to six and a half years after the entry into force on 1 January 2013 (i.e., until 1 July 2019), during which the IMO may waive this requirement. The EEDI is extended to roll-on roll-off (ro-ro) cargo ships (vehicle carriers), liquefied natural gas

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97 Vagslid (n 24).
98 Ibid.
(LNG) carriers, cruise passenger ships with non-conventional propulsion, ro-ro cargo ships and ro-ro passenger ships. Some ships are excluded. The IMO has also developed Guidelines for compliance with the EEDI requirements for bulk carriers, gas carriers, bulk head carriers, and containers to control atmospheric emissions from ships. At MEPC 66, held in early 2014, the Committee adopted the 2014 Guidelines on the method of calculation of the attained EEDI for new ships by Resolution MEPC.245(66), and the 2012 Guidelines on survey and certification of the EEDI, as amended (Resolution MEPC.214(63)). The Working Group at MEPC 67, held in October 2014, were instructed to further develop and finalise the draft 2014 Guidelines on survey and certification after taking into account various country position papers.
further amendments for air pollution guidance and requirements were agreed and entrusted to working groups. Similarly, at MEPC 67, working groups were tasked with other technical matters, such as the development of Interim Guidelines to maintain the manoeuvrability of ships in adverse conditions and to review the status of technological developments under Regulation 21.6 of MARPOL Annex VI. Other developments include the establishment of an


See also MEPC 68/21/Add.1 Annex 7, page 1, Resolution MEPC.262 (68) (adopted on 15 May 2015) "Amendments to the 2013 Interim Guidelines for determining minimum propulsion power to maintain the manoeuvrability of ships in adverse conditions (Resolution MEPC.232 (65), as amended by Resolution MEPC.255 (67))", available at http://www.uscg.mil/imo/mepc/docs/MEPC68-report.pdf, accessed 11 May 2016.

EEDI database, where data are presented in a format that maintains the anonymity of the ship. The EEDI and the EEOI are for new ships.

In a SEEMP, a ship has to be operated in an energy-efficient way, a responsibility shared between seafarers and others, for example, the company that operates the ship. The steps that may be taken in its fleet management include, amongst others, avoiding long voyages made in ballast and improving cargo handling capability so that loading and discharging takes less time. Each ship’s energy management can be optimised by the consumption and production patterns of energy of those on board, because unlike main engines, auxiliary power runs 24 hours a day at sea and in port. In passenger ships, this goes up to 30% of total power consumption. For example, in passenger ships laundry could be operated at night on passage when other demand is low.

In the implementation of SEEMP for shipping on an organised and practical basis, from January 2013 it is mandatory for every ship to have its own SEEMP. The SEEMP follows IMO guidelines for compliance, helps the industry improve its energy efficiency performance with each plan tailored to the characteristics of each individual ship, and adopts a four-step process of continuous improvement through planning, adoption of energy-efficient measures (EEMS), implementation of a monitoring system, and evaluation of effectiveness. In SEEMP, each individual seafarer, with the support of the shipping company and shore-side operations, has the potential to make an impact. The guidance on the development of the SEEMP for new and existing ships incorporates best practices for fuel-efficient ship operation, as well as guidelines for voluntary use of the EEOI for new and existing ships. Chapter 4 requires ships identified by IMO periodically to comply with emission reduction targets through EEDI. Together, the EEDI, EEOI and SEEMP enable ships’ atmospheric emissions to be cut down drastically.

108 IMO-KOICA (n 90).
109 Ibid.
110 Ibid.
111 Ibid.
113 Ibid.
Port State Control Inspections
Port State control inspections are laid down in the Rules on Compliance of Chapter 2 of MARPOL Annex VI entitled “Survey, certification and means of control.” Upon passing the surveys, the ship is issued an “International Air Pollution Prevention Certificate” by the flag State under Regulation 6 of Chapter Two which is valid for up to five years under Regulation 9 of Chapter Two. Or it may be issued by any other party to Annex VI at the request of the flag State under Regulation 7 of Chapter Two. It has the same force and effect as a certificate issued under Regulation 6, by the flag State. Non-State Parties to Annex VI cannot issue such a certificate (vide Regulation 8 of Chapter 2). Regulation 10 of Chapter 2 provides that a port State can detain a ship in a port or at an offshore terminal under the jurisdiction of another party to the Protocol of 1997 when its master or crew are unfamiliar with the operational requirements under Annex VI relating to essential ship-board procedures for the prevention of air pollution from ships. The ship is allowed to sail when it is Annex VI-compliant.

Likewise, under Annex VI, due process in Regulation 11 on “Detection of violations and enforcement” requires that when a violation of this Annex is detected, a report shall be forwarded to the flag State for any appropriate action under its national laws based on the evidence submitted for this purpose. It then imposes a duty on the flag State to show that the non-compliance has been rectified. Similarly, other States Parties to Annex VI may also inspect the ship if they receive reports from member States Parties. The flag State has to be informed of such actions. Compliance with and enforcement of these treaty obligations is through stopping a non-compliant ship from sailing or by invalidation of the Air Pollution Prevention Certificate issued by the flag State. Under the “NOx Technical Code,” the ship operator (not the engine manufacturer) is responsible for in-use compliance.

MEPC 65 Debates on Resolution on Promotion of Technical Co-operation and Transfer of Technology Relating to the Improvement of Energy Efficiency of Ships to Enable the Implementation of Regulation 23 of MARPOL Annex VI

To facilitate the implementation of Annex VI, Chapter 4, the IMO adopted a Resolution on Technical Transfer, which may not be unique, as it is found in other multilateral agreements. This Resolution is adopted under Regulation 23 of Annex VI. It is in accord with LOSC Part XII, Section 3 on Technical Assistance (Articles 203 and 237). The Resolution assists developing States
to implement the mandatory provisions of Chapter 4 on control of air pollution from new and old ships through new ship design and machinery, as well as through better engine performance and efficiency, but it still allows some old practices. It requests the IMO, through its various programmes, to provide technical assistance in the transfer of energy-efficient technologies to developing countries and assist with funding for capacity building, which includes training and education of personnel and establishment of new institutions to initiate monitoring and assessment of ships’ atmospheric pollution. In this context, an earlier precedent, the IMO-Korean International Cooperation Agency (KOICA) Project on Ships’ Energy Efficiency and GHG Emissions—Outputs and Outcomes of the First Major Technical Co-operation Project, is helpful. In this Resolution, the IMO agreed to the mitigation target on the amount of air pollution that is desirable and through this much-heralded Resolution agreed in principle on the optimal cost-effective policy to achieve this.\textsuperscript{115} A technical IMO Resolution is legally binding if the States Parties intend it to be so.

Debates on the Draft IMO Resolution and Summary of Key Points of Disagreement

The debates centred around the following arguments: first, should technical assistance be given to developing States only or also cover developed States and, second, should the politics of climate change be kept apart from this Resolution or were the challenges of climate change in the UNFCCC,\textsuperscript{116} the Kyoto Protocol to the UNFCCC,\textsuperscript{117} and the CBDR principle an intrinsic part of this Resolution as atmospheric shipping emissions were part of the global GHG discussions of which IMO was now in charge. MEPC member States, depending on their country position towards the climate change issue, were careful to examine each proposal to see what it actually meant and how it served the purpose of technology transfer in Annex VI. This section explores these views to better understand the technical Resolution.

US Proposal and Japanese Counter-Proposal

The US proposal at MEPC 65 (MEPC 65/4/19), which differed from their submission to MEPC 64, required more precision in energy efficiency measures and for that purpose the US changed the efficiency metric to joules of fuel energy/service hour. It suggested a potential change to what the MEPC was measuring in terms of CO\textsubscript{2} emissions (Joules vs CO\textsubscript{2} emissions). In the opinion of the US, such a position allowed for “uniform quantity even across different fuels.” Where ships wanted to use more sophisticated methods, that would be acceptable as well. It was important to make sure that data were fed to an electronic database coordinated by an outside organisation, keeping the administrative burden on port States to a minimum. In the US proposal, flag States would check this periodically, so as not to have to set up machinery to survey the data again and use existing EEDI certificates. In this manner, there would be limited use of port State controls. The US was looking for support to work out the technical details.

Japan countered the US proposal by challenging the premise of the question, that is, the US was increasing energy efficiency only to reduce CO\textsubscript{2} emissions. The US replied that it was a more straightforward measurement method.

\textsuperscript{116} United Nations Framework Convention on Climate Change (n 15).
\textsuperscript{117} Kyoto Protocol to the United Nations Framework Convention on Climate Change (n 16).
Japan responded that they would not object to using CO₂ if that was the wish of the Committee, but this was just another option.\footnote{118 For “Comments on document MEPC 65/4/19 on enhancing energy efficiency in international shipping submitted by Belgium, Canada, Denmark, Germany, Japan, Norway and the United Kingdom”, see IMO MEPC 65/4/30, 22 March 2013, available at https://imo.amsa.gov.au/secure/papers/2013/mepc65/4-30.pdf, accessed 11 May 2016.}

The MEPC was asked to consider the metric as the US had defined it. The hard questions intended to be answered by the expert group in this debate were:

- Which ships would be covered and would they all be covered by all phases of the proposal?
- Would all ships face the same required reduction?
- What happened if a ship was found to be out of compliance? What were the consequences?
- How did the proposal take early adopters into account?
- Did it make sense to completely remove any measure of cargo carried?
- Why were service hours chosen over other potential alternatives?
- Would not a measure based on service hours create an incentive to reduce payload or have more ballast legs?

The final thoughts on the draft MEPC Resolution was that a phased approach was a cautious one where the amendments were carefully written. If the pilot phase revealed a problem, then it had to be fixed before the standards became mandatory. Relevant to the industry, data collection was the foundation of the proposal, which included opportunities for adjustments to be made to the program as necessary and on the basis of mandatory reviews.

**MEPC Working Group**

The MEPC Working Group worked on MEPC document 65/J/8 and examined MEPC document 65/4/1, which dealt with the Draft MEPC Resolution on Promotion of Technical Co-operation and Transfer of Technology relating to the improvement of energy efficiency of ships. The Executive Summary of that document describes the background and reproduces the text of draft MEPC Resolution as discussed at MEPC 64. Two options were provided in this document.

Option One agreed that developed States should provide the necessary financial, technological and capacity-building support through a variety of ways for developing States to enhance the means of implementation of
Chapter 4 of MARPOL Annex VI. Option 2 (paragraph 6) was similar to the South African proposal. Option 2 requested member states to provide support to all States that requested assistance in EEDI technology transfer, research and development, training and exchange of information and technical cooperation for improvement of energy efficiency for ships (MEPC 64/4/1, Annex page 3).

South African Proposal and Responses: (IMO Audio, 13 May 2013, Afternoon Session and 14 May 2013 Morning Session)

Against the MEPC document 65/4/1 that triggered much debate on the contents in these two Options, South Africa submitted a compromise document entitled “Draft Compromise MEPC Resolution on Promotion of Technical Co-operation and Transfer of Technology relating to the improvement of energy efficiency of ships”—MEPC 65/4/33, 22 March 2013 and an amendment to this Draft Compromise MEPC resolution, MEPC 65/4/33/Corr.1, 16 May 2013 which amended preambular paragraph 3 of the Draft Resolution which took cognizance of principles such as the no-more favourable treatment and CBDR. The reference to developed nations, technical co-operation, technology transfer and respect for intellectual property rights were treated differently. The South African middle ground met with a lot of support. The USA, the UK, Canada, Denmark, Nigeria, Japan, Finland, Ireland, Bolivia, Marshall Islands, Sweden, Republic of Korea, Belgium, Singapore, Cyprus (modified), Mexico, Russia, Estonia, Chile, Brazil, Italy, Togo, Ghana, Bangladesh, Netherlands, and Australia supported the South African proposal as a middle ground, even though many of them believed that technical assistance through the IMO is not confined to developing States, but is also applicable to developed States.

India believed that this proposal represented a fundamental deviation from the spirit and letter of the UNFCCC and the CBDR and went against the fundamental principle of climate change. However, India, Saudi Arabia, Argentina, Angola, Egypt, Peru, Poland, and Venezuela had differing opinions on the subject. Brazil did not agree with the Cyprus suggestion to use the South African text as the basis, because it would negate everything that had been done so far. MEPC document 65/4/1 was the result of hard work by the delegates and so Brazil was not prepared to abandon this text. Brazil maintained that the fundamental paragraph of that document must remain as 65/4/1 and it should be maintained as the base text. As technical assistance was expected from developed States, Brazil was prepared to go along with the Chilean delegation who proposed the addition of “developed States and member States with an ability to do so,” as it was a positive step towards developing a text. Singapore considered that the phrase “Member States with an ability to do so” was a concrete
measure and could provide a concrete deliverable, which gave weight to this resolution. India had earlier pointed out that at the UNFCCC and at the IMO, the member States were by and large the same, so their positions/stances could not be different between the two.

The Chairman had earlier pointed out that consensus was not unanimity and noted that support for Document 65/4/1 was split right down in the middle in terms of support. Those who preferred the South African proposal preferred Option 2 and others Option 1. The majority in a ratio of 19:9 could live with the South African proposal. The Chairman agreed that although it was not ideal, one could live with the compromise text. The discussion focussed on Chile’s suggestion, which urged developed States and member States with the ability to do so to find their way to a compromise text. Brazil noted that the South African proposal was weaker than Regulation 23 and therefore wanted something more strongly worded, to which the Chair replied that Regulation 23 was mandatory and it would always remain strongly worded. China reminded the meeting that when considering the implementation of MARPOL Annex VI, China requested technical and financial assistance for developing countries. It was also stressed that in the future, this Annex would be relied on for financial and technical assistance to developing countries. All these aspects have not been reflected in this resolution. China, India and Brazil were similarly aligned. India did not want climate change discussions deviating between one forum and another by not abiding by the principles of the UNFCCC and the Kyoto Protocol.

The Chairman stated that the Secretariat’s document 65/4/1 would be the basis of the final Resolution that would take into account the hard work put in by Russia and South Africa for compromises in other paragraphs. Russia pointed out that their document was based on the Secretariat’s document and therefore contained nothing new. China pointed out that the new text would be based on the Secretariat’s text, and on the Russian and South African proposals. China and India pointed out that they too had opinions of their own and were happy to discuss them in the ensuing Working Group deliberations. The amalgamated text was then considered.

On the last day of the Conference the developed and developing States did not agree on technology transfer as reflected in document J/10. The Chairman gave the States several options on technology transfer, as the States were basically agreed on this, but it needed fine-tuning. At this point, the Chairman felt it was unfair to drop the work and start from scratch. Instead it was suggested that existing paragraphs would be used and solutions would be found on the placeholders (those bracketed terms and phrases). Some of the suggested changes in J/10 were to use the term “Being cognisant” in the preamble which
would connect all the principles effectively, rather than the term “enshrined” which may not reflect the status quo. Arguments on this point had a certain circularity (See IMO Audio, Friday 17 May 2013, MEPC 65/22, Annex 5, pp. 1–2). The Chairman said that the Japan/US/Australia joint statement would allow ‘us’ (the MEPC) to move forward constructively on the important substantive work ahead. This resolution called for support actions that would implement obligations under Regulation 23 of Chapter 4, Annex VI. They have always been committed to capacity building to enhance capacity of ships and will actively engage in the ad hoc working group on the transfer of technology and enable access to it. The move forward was on the basis of the Chairman’s understanding that the fourth preambular paragraph expressed understanding—it contained principles that were relevant to the Convention. Under both the IMO and MARPOL Conventions, the principles of non-discrimination and no-more-favourable treatment apply. Now specifically re the US, as a country implementing commitments under the UNFCCC and not the Kyoto Protocol, the US would not associate itself with the reference to the Kyoto Protocol in this paragraph (See IMO Audio, Friday, 17 May 2013 and MEPC 65/22, Annex 5, p. 3).

Denmark, the Netherlands, and the UK appreciated the efforts, supported the resolution generally, and welcomed the operative paragraphs on technical co-operation in order to assist developing member States to comply with the new resolution. It was not an acceptance of the Conventions other than those within the IMO; only the latter should govern the work of the IMO. Neither did it accept that the UNFCCC principles (CBDR and capabilities) and its Kyoto Protocol should be used in IMO Regulations (See IMO Audio, Friday, 17 May 2013 and MEPC 65/22, Annex 5, p. 5).

India endorsed its views that sustainable development was the only way forward to address these climate change issues. India thanked developed States for realising the importance of the mention of these Conventions. By accepting the UNFCCC and CBDR, India said they were recognising the historical realities of the developed and developing countries in the global environmental situation and the current realities. The same position was adopted by India in all fora. It strongly requested mechanisms to assess and monitor the implementation of this resolution so that it reached developing nations. India pointed out that development must remain at the centre of the global discourse, should not impose further burdens, and must not impoverish further. It cited the principle of equity—convergence in per capita emissions. India concluded that the first collective step towards this and implementation of the resolution would also take place in the same spirit (See IMO Audio, Friday, 17 May 2013 and MEPC 65/22, Annex 5, pp. 5–6).
Norway was pleased that it set an excellent standard for true global co-operation and adoption of a better co-operation agreement re climate change re air pollution (See IMO Audio, Friday, 17 May 2013 and MEPC 65/22, Annex 5, p. 7). Argentina approved the strengthening of international law through this process. However, it emphasised the need to have a correct translation of the word enshrined—‘consegrado’ (See IMO Audio, Friday, 17 May 2013 and MEPC 65/22, Annex 5, p. 8)

China tried hard to make a concession/sacrifice in the position of many countries. China was especially concerned over the intellectual property (IP) issue, because the protection of the Intellectual Property rights is of great importance for technology transfer as it would affect technology transfer. Therefore, China hoped that all delegations present would try to co-operate in future to implement this resolution which reflected many years of hard work. The resolution introduced the CBDR principle in the text. This had to provide a very good foundation for further consideration on GHG emissions. China was willing to, under this principle, to actively participate in the conversation in relation to GHG emissions. Special mention was made of the US and Denmark’s statements that were in the process of the negotiation. China felt their suffering during the discussion and expressed appreciation on the finalisation of the resolution. It hoped that everyone would keep this spirit of compromise and guide the IMO further in the GHG emission reduction. China also requested the inclusion of its statement in the final report (see IMO Audio, Friday, 17 May 2013 and MEPC 65/22, Annex 5, pp.4–5).

Brazil said that the express cognisance of the UNFCCC and Kyoto Protocol, in particular the principle of CBDR, is an important step for ensuring consistency of climate change actions under IMO, in relation to the international climate change regime. It also pointed out that the adoption of the technical resolution was a clear signal that the IMO rendered its full support to the international response to climate change and the UNFCCC process, which was particularly relevant to the Durban Platform on Enhanced Action, to conclude the 2015 agreement under that Convention, applicable to all parties. It has
now entered a phase for the implementation of technical measures—already adopted—and must focus on this challenge. Developed countries must provide the financial and technical support to developing countries to increase these standards. Brazil also requested the inclusion of its statement in the final report, (see IMO Audio, Friday, 17 May 2013 and MEPC 65/22, Annex 5, p.4).

Canada focussed on the operative substance of this resolution and said they had been working with Finland and others in moving forward with capacity-building activities, building on the excellent work of KOICA and the IMO Secretariat; it was willing to speak to them about this. Canada also aligned itself with the US statement (see IMO Audio, Friday, 17 May 2013 and MEPC 65/22, Annex 5, p. 4).

Venezuela pointed out that its position and its concern about proceeding with this had been clear since inception. It aligned itself with China and at the same time acknowledged the great efforts by all parties. Venezuela maintained its commitment to ensure that all parties were as satisfied as possible with this result. It congratulated everyone in this herculean process, especially the Secretariat, member States, the leader of this committee and the Chairman. The UNFCCC and its Kyoto Protocol were the only instruments which were universal and binding in the area of climate change. Venezuela associated itself with the Argentinian comment on the use of the appropriate terminology (see IMO Audio, Friday, 17 May 2013 and MEPC 65/22 at p. 24, paragraph 4.14; MEPC 65/22, Annex 5, p. 8).

Sweden stressed that technical co-operation and technology transfer for the improvement of energy efficiency of ships and their application of Regulation 23 of Chapter Four, Annex VI were high-priority concerns for the nation. It took the commitment according to Regulation 23 very seriously and therefore Sweden decided to donate USD$25,000 to finance measures under Regulation 23 (see IMO Audio, Friday, 17 May 2013 and MEPC 65/22 at p. 24, paragraph 4.15).

Saudi Arabia looked forward to further co-operation with the IMO to further activate this resolution through respecting previous resolutions (see IMO Audio, Friday, 17 May 2013). Peru underscored the fact that as it was vulnerable to the effects of climate change, it was in solidarity with the multilateral effect which was in keeping with the UNFCCC. It acknowledged the recent adoption of this resolution by acclamation, the work on meaningful measures to reduce these emissions and the climate of co-operation and friendship which prevailed between each and every group (see IMO Audio, Friday, 17 May 2013).

See also all IMO audio sessions including IMO Audio, 13 May 2013, afternoon session and 14 May 2013 morning session, available at https://docs.imo.org/Category.aspx?cid=47&session=65&dtid=8, accessed 18 May 2016.
Chile was confident that this resolution would open a new chapter in the annals of the IMO and was gratified at the content of the revised document, as it reflected the spirit of co-operation which had to prevail in the IMO (see IMO Audio, Friday, 17 May 2013).

The Secretary-General of IMO pointed out that a landmark resolution was achieved. The IMO was a forum for co-operation, coordination and policy that would form the basis for international standards. In the last five (5) years, there has been a demonstration of some difficulty in this debate and finally the issue of technical transfer for energy efficiency under MARPOL by acclamation was achieved. He praised all efforts and expressed appreciation at the spirit of co-operation on the anniversary of the IMO headquarters and assured everyone that he would put in his utmost effort to support implementation of the resolution (see IMO Audio, Friday, 17 May 2013).

This Resolution could work along the lines of the IMO-KOICA Project on Ships’ Energy Efficiency and GHG emissions—Outputs and Outcomes of the First Major Technical Cooperation Project (2011–2013). It focussed on technical co-operation and capacity-building needs. Under the IMO-KOICA Partnership, the IMO submitted a proposal for capacity-building partnership and received a grant of US$700,000 from KOICA, from May 2011–April 2013. Learning from the IMO-KOICA experience is necessary as Annex VI implementation is likely to lead to a new management approach for the Straits that might reveal gaps in personnel/capacity-building in the critical mass of scientists, administrators and ocean managers in the Straits States. From an industry perspective, to address the operational measures for energy efficiency, the shipping industry in the three Straits States would probably need to engage the company operating the ship and its seafarers to co-operate in these measures to achieve significant benefits.120

The Way Forward

As Singapore, Malaysia and Indonesia have ratified MARPOL Annex VI, they are required to submit a coordinated proposal for the designation of SECAs and NECAs in the Straits to the IMO, set up an administrative mechanism and adopt national legislation implementing Annex VI provisions. The national legislation must reflect the MFN principle so that non-State parties to MARPOL

120 These measures are for example, auxiliary electrical route management, slow steaming, cargo capacity utilisation, and just in time operation, source: IMO-KOICA (n 90).
Annex VI would not be in a more favourable position than States Parties.\textsuperscript{121} Being flag States, they are required to implement EEDI regulations on their ships which are above 400 grt and each ship must possess an EEDI certificate which shows its energy efficiency in terms of carbon, sulphur and nitrogen atmospheric emissions. This will also include an EEDI calculation for:

- ro-ro cargo ships (vehicle carriers);
- cruise passenger ships with non-conventional propulsion;
- LNG carriers;
- ro-ro passenger ships;
- ships not propelled by mechanical means; and
- establishment of an EEDI database and energy efficiency measures.

**Administrative Authority for the Straits**

The practical implementation of Annex VI in the Straits requires setting up an administrative and technical authority responsible for MARPOL Annex VI. This invites a discussion of four matters, namely, the role of the current Tripartite Technical Experts Group of the Straits, the future agency for pollution prevention (to be named the Straits Pollution Prevention Authority), the designation of ECAS, technology transfer and the new data collection system for measuring fuel consumption of ships.

**The Tripartite Technical Experts Group\textsuperscript{122} and the Straits Pollution Prevention Authority**

Established in 1975, the Tripartite Technical Experts Group (TTEG) comprises experts from the maritime administrations of Indonesia, Malaysia and Singapore to promote navigational safety, protect the marine environment, and facilitate the movement of ships in and through the Straits. The three Straits States, referred to as ‘littoral States,’ have introduced:

1. the Routeing System which incorporates a Traffic Separation Scheme (TSS) to enhance navigational safety and marine environmental protection in the Malacca and Singapore Straits. Approved by the IMO in 1977,  

\textsuperscript{121} SY Snyder, “EPA’s Category 3 Marine Emissions Standards: Mimicking MARPOL Annex VI or Mocking the Clean Air Act” (2005) 71(2) Brooklyn Law Review 1065–1107.

it was implemented in 1981. The Straits States also installed new aids to navigation to support the TSS.

2. In 1993, the mandatory ship reporting system (or STRAITREP) was introduced in the Straits; it was implemented in 1998. Through this effort, shore-based authorities can update transiting ships on the traffic situation and assist in search and rescue responses in the Straits.

3. In 2007, the Co-operative Mechanism on Safety of Navigation and Environmental Protection of the Malacca and Singapore Straits was introduced as a co-operative measure between user States and key stakeholders for navigational safety and marine environmental protection of the Straits. The TTEG does not seem to have adopted any anti-pollution control measures under LOSC Article 42 (1) (b). In addition, if the States Parties re-consider the scope of the TTEG for marine pollution control based on new geo-political factors, then setting up The Straits Pollution Prevention Authority may be considered. Its scope would cover the Malacca and Singapore Straits for the implementation and enforcement of MARPOL Annex VI and could include other anti-marine pollution conventions and protocols. The new authority should also undertake port State control. The human, institutional and technological capacity needs of this authority would need to be addressed with assistance of the IMO and other international, regional, and non-governmental organisations and the industry. The duration of this entity could be in perpetuity until otherwise decided, with financial assistance from the Straits States and perhaps flag States.

**Designation of Emission Control Areas**

MEPC 68 has set out the criteria for the designation, implementation and operationalisation of the ECAs for SOx, NOx and PM. For the designation of ECAs, such as SECAs and NECAs, in the Straits, the three Straits States will need IMO approval and assistance through technology transfer. For examination of the SOx and PM content, the Straits States are required to develop the critical mass of scientists, administrators and ocean managers. For the discharge of substantive obligations under MARPOL Annex VI, the proposed Authority could seek IMO’s assistance for: capacity-building; conduct of workshops; development of training tools; technical assistance in the transfer of energy-efficient technologies; and contributions from various organisations to enhance the effective implementation of Chapter 4 of MARPOL Annex VI.123 The proposed authority

could benefit from IMO’s Ad hoc Expert Working Group on the Facilitation of Transfer of Technology for ships (IMO: AHEWG-TT) to study Annex VI effects and the new data collection system to be established to measure fuel consumption of ships.\textsuperscript{124}

\textbf{New Data Collection System for Measuring Fuel Consumption by Ships}

MEPC 67 considered the basics of a data collection system for fuel consumption by ships\textsuperscript{125} to track and verify the efficiency gains in the sector and to

\textsuperscript{124} IMO MEPC 65/22, Annex 4, at p. 2; MEPC 67/WP.1 at p. 32. At MEPC 67, the AHEWG-TT highlighted the significant progress it had made in holding regional workshops organised by the Secretariat to support capacity building in relation to technology transfer, encouraging Member States where possible to make further contributions in this regard.

assess the need for further efficiency measures. The purpose and use of the data were to be determined before the data collection system was confirmed. It was to be voluntary without limiting the freedom of operation of ships. An alternative view was that the data collection system should be mandatory because the success of any system depended on full global participation and the quality of data was more important than quantity. However, this matter is still under consideration.¹²⁶

Conclusion

This article examined the protection of the Malacca and Singapore Straits from ships’ atmospheric emissions through the implementation of MARPOL Annex VI as a comparative study of several parameters between the LOSC and MARPOL Annex VI, and it showed that the robust provisions of MARPOL Annex VI were more promising in this regard. For purposes of implementation and enforcement of the legal requirements of MARPOL Annex VI, the

establishment of a new authority, the Straits Pollution Prevention Authority, was considered, with input from the IMO, as greater scientific knowledge was required in the designation of ECAs, because it is the sum total of the national and international efforts that will succeed in reducing atmospheric shipping emissions. However, the submission of a co-ordinated common proposal by the Straits States for this purpose may prove to be the weakness in this triangulated effort, inasmuch as it is a strength of Annex VI. So far, no co-ordinated proposal designating ECAs for the Malacca and Singapore Straits has been announced, although recent efforts in this direction did not materialise at the IMO. For enforcement purposes, the MFN principle of the MARPOL Convention should be adopted in national legislation, recalling the famous principle set out in *Cunard Steamship Co., Ltd. v. Mellon.* In a Note by the IMO to the thirty-ninth session of the Subsidiary Body for Scientific and Technological Advice (SBSTA 39), on “Emissions from fuel used for international aviation and maritime transport: Update on IMO’s work to address emissions from fuel used for international shipping,” it was pointed out that these mandatory measures addressed ship types were responsible for 70% of GHG emissions from international shipping.

The given SOx/NOx standards that are to be met in SECAs and NECAs are not mere peripheral matters that are attached to ECAs. The role of good science is paramount and humankind must continue to take a hard look at the environmental consequences. The description of the negotiating background to the Annex VI Technology Transfer Resolution, critical to the successful implementation of Annex VI, shows that the Straits States did not advance any particular stance in the Resolution debates based on their geographical location, although the Straits States bear a greater risk, with impacts not only on

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127 262 U.S. 100 (1923).
human health, given the high density of shipping and coastal population living along the coastline of the Straits, but also on the marine environment. Through IMO’s Technology Transfer Resolution, the Strait States can reduce emissions considerably for the benefit of the various ecosystems in ports, coastal towns and cities, as seen from the IMO-KOICA project, and from the actions that seafarers can take within their own ship’s SEEMP.¹³⁰ If MARPOL Annex VI is not implemented in the Straits for whatever reason, the deleterious and hazardous effects of atmospheric shipping emissions on various ecosystems, and the local communities, will continue resulting in shattered ecosystems. Based on studies concluded in the US and China, the probability that Straits States suffer from a causal link between inefficient shipping and its deleterious and hazardous atmospheric emissions adversely affecting various ecosystems and a pathway of effects analysis suggests that coastal populations suffer bad lung health consequently.¹³¹ This situation may be redressed by controlling various shipping emissions (SOx, NOx, PM, and volatile organic matter) through SECAs and NECAs in the Straits. Although not all the answers are available today and new concepts within Annex VI are still undergoing some form of change, as the atmosphere is a common concern of humankind,¹³² the IMO must be commended for the adoption of MARPOL Annex VI and the breakthrough it achieved in overcoming a dead-locked Resolution at MEPC 65, on the environmental pathway from the Brundtland Report to the World Summit on Sustainable Development in International Environmental Law, with hope

¹³⁰ IMO-KOICA (n 90).
fixed on the UN principles of good governance, including the rule of law for ocean governance.

The adoption of MARPOL Annex VI is considered a major advance over early international environmental law, generally regarded as “soft law” (as opposed to legally binding rules of international law), found in the Brundtland Report, also known as Our Common Future, that was published by the World Commission on Environment and Development in 1987 and accepted by the United Nations General Assembly. This was followed by the 1992 UN Conference on Environment and Development in Rio de Janeiro, Brazil, also referred to as the Rio Summit and the Earth Summit where the principles of sustainable development were set out for the first time. The Earth Summit adopted the Rio Declaration on Environment and Development, Agenda 21, a global plan of action for sustainable development and three instruments of environmental governance, namely, the UN Framework Convention on Climate Change, the Convention on Biological Diversity, and the non-legally binding Statement of Forest Principles. Since then environmental conferences called the 1997 Earth Summit+5 in New York and the 2002 World Summit on Sustainable Development (WSSD) in Johannesburg have been held to review the progress made by nations which unfortunately had been unsuccessful.

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136 Drexhage and Murphy (n 133).