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Analysis of policy formulation at IMO via participation of member states: a case study of green house gas emission measures

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ANALYSIS OF POLICY FORMULATION AT IMO VIA PARTICIPATION OF MEMBER STATES

A CASE STUDY OF GREEN HOUSE GAS EMISSION MEASURES

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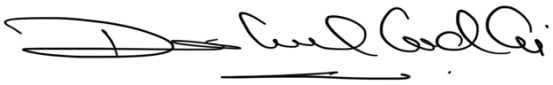
A dissertation submitted to the World Maritime University in partial fulfilment of the requirements for the award of the degree of Master of Science in Maritime Affairs

2023

Declaration

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

(Signature): 

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Supervisor's affiliation: **MSEA, World Maritime University**

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Perseverance was the only thing which stood by my side and helped me finish this work.

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Abstract

Title of Dissertation: **Analysis of Policy Formulation at IMO via Participation of Member States: A Case Study of Green House Gas Measures**

Degree: **Master of Science**

Analysis of the policy process at International Maritime Organisation (IMO) is a relatively less studied field and the research was aimed at shedding some light on this area. The dissertation was an attempt to analyse policy formulation process at IMO by examining if there existed any disparity amongst developed and developing Member States during the policy formulation stage for Greenhouse Gases (GHG) emission measures. This was undertaken by analysis of a number of submissions made by Member States using a comparative analysis method.

An indicative process for the selection of reference policy for comparison was developed using benchmarking process and applied on the entire policy domain. Using the benchmarking, Ballast Water Management (BWM) convention was recognised as policy covering similar issue and Comprehensive Revision of Standards of Training, Certification, and Watchkeeping for Seafarers (STCW) Convention and STCW Code dealing with a different issue for the comparison with GHG emission reduction measures, especially Energy Efficiency Design Index (EEDI). The data in the form of submitted documents by participating members was collected for BWM, Air Pollution from Ships (GHG Emissions Measures), EEDI and Revision of STCW Convention from various Marine Environment Protection Committee (MEPC) and Standards for Training and Watchkeeping (STW) meetings covering the period of formulation of policies using IMO Docs. The collected data was analysed under various categories for understanding the role played by developed and developing Member States in formulation of these policies.

Analysis of the data is indicative of the fact that, there was a significant disparity between developed and developing Member States during the formulation of policies concerning GHG emission reduction measures. The results are also indicative towards the fact that, Europe was the main driving force for developing GHG emission measures.

KEYWORDS: GHG Emission, Policy Analysis, Policy Formulation, Comparative Analysis, Member States, IMO.

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List of Abbreviations

AU	-	African Union
BWM	-	Ballast Water Management
BWMS	-	Ballast Water Management Systems
CBD	-	Convention on Biological Diversity
CBDR-RC	-	Common but Differentiated Responsibilities and Respective Capabilities
CMI	-	Comité Maritime International
COI	-	Conflict of Interest
COLREGS	-	International Regulations for Preventing Collisions at Sea
COP	-	Conference of Parties
EBP	-	Experience Building Phase
EC	-	European Commission
ECSA	-	European Community Shipowners' Association
EEDI	-	Energy Efficiency Design Index
EEOI	-	Energy Efficiency Operating Indicator
EU	-	European Union
FAO	-	Food and Agricultural Organisation
FOEI	-	Friends of Earth International
GHG	-	Green House Gases
GT	-	Gross Tonnage
HNS	-	Hazardous and Noxious Substances
IAPH	-	International Association of Ports and Harbors
ICAO	-	International Civil Aviation Organisation
ICC	-	International Chamber of Commerce
ICE	-	International Cargo Express
ICS	-	International Chamber of Shipping
IGO	-	Inter-Governmental Organisation
IMCO	-	Inter-governmental Maritime Consultative Organisation
IMO	-	International Maritime Organisation
INGOs	-	International Non-Governmental Organisations
INTERTANKO	-	International Association of Independent Tankers Owners
IPCC	-	Intergovernmental Panel on Climate Change
ISPC	-	International Ship and Port Security Code
ITF	-	International Transport Workers' Federation
MEPC	-	Marine Environment Protection Committee
MLP	-	Maritime Law and Policy
MSC	-	Maritime Safety Committee
NGOs	-	Non-Governmental Organisations
NMFT	-	No More Favorable Treatment
OECD	-	Organisation for Economic Co-operation and Development
REC	-	Research Ethics Committee
RINA	-	Registro Italiano Navale

RQ	-	Research Question
SEEMP	-	Ship Energy Efficiency Management Plan
SOLAS	-	International Convention for the Safety of Life at Sea
STCW	-	Standards of Training, Certification, and Watchkeeping for Seafarers
STW	-	Standards for Training and Watchkeeping
UN	-	United Nations
UNCED	-	United Nations Conference on Environment and Development
UNEP	-	United Nations Environment Programme
UNFCCC	-	United Nations Framework Convention on Climate Change
UNCTAD	-	United Nations Conference on Trade and Development
USCG	-	United States Coast Guard
WMO	-	World Meteorological Organisation
WMU	-	World Maritime University
WTO	-	World Trade Organisation

Chapter 1 - Introduction

1.1 Outline of the Chapter

The dissertation was an attempt to examine the policy formulation process at the International Maritime Organisation (IMO) by taking Greenhouse Gas (GHG) emission measures as the base policy. It is based on comparative analysis of quantifiable parameters, with participation of Member States via submission of documents being the main criterion. It is acknowledged that policy formulation at IMO is a complex process and many factors are working simultaneously, some of which are tangible and most of them are intangible. Factors such as behind the scene negotiation and international relations of various Member States are intangible in nature, which are difficult, if not impossible to quantify. During the course of this chapter, public policy as a whole and its analysis is discussed. The discussion then led into the structure and policy process followed at IMO before turning towards comparative analysis of policy and brief introduction of the process of benchmarking. The chapter concludes with the problem statement and research methodology.

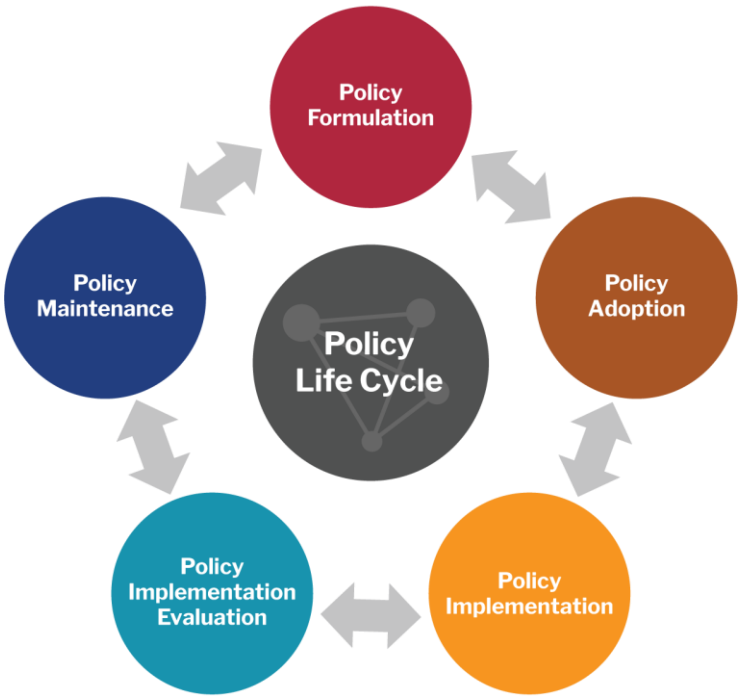
1.2 Policy Process

An all-encompassing definition of public policy does not exist. However, the following definition can be considered as the most suitable. Public policy can be defined as the cumulative actions undertaken by an individual, group of individuals, nations or any Organisation to deal with an existing problem (Louis, 2018). Also, the definition presented by Cairney (2012), states, public policy is the cumulative result of governments/organisation's actions, from the first intention to the final outcome, is also useful in understanding the role played by the government in the policy process. Figure 1 below depicts all the stages that are involved in the policy process,

highlighting the continuous nature of the process and each stage feeds to the next in a continuous loop (Cairney, 2013). All the stages of the policy are equally important. However, for this study, examination of policy formulation stage will be focused upon.

Figure 1

Stages of Public Policy Life Cycle



Note. From "Harvard Catalyst", n.d., (https://catalyst.harvard.edu/community-engagement/policy-research/unknown-61015f3cbb252-61015f57f388a-610bf6bb39406-610bf6ca02c07-610bf6d25a626/). Copyright by Harvard Catalyst.

In 1972, Lowi, developed an interesting topology for policy, which essentially divides them into four distinct categories. Table 1 below presents all four categories of policy. From the table it can be understood that the first two types of policies are

primarily used at state level as they require sovereign control over the resources which can be distributed/re-distributed. IMO mostly deals with third type of policies which are regulatory in nature, such is the case with GHG emission policies. Fourth kind can be used by a state or an Inter-Governmental Organisation (IGO) such as the United Nations (UN).

Table 1

Topology of Policy

Type of Policy	**Subject Matter Covered**
Distributive Policy	They are those policies which distribute new resources. For e.g., Education and Employability policies.
Redistributive Policy	Such policies change the distribution of existing resources. For e.g., Income Tax policy in India
Regulatory Policy	This type of policy covers regulatory activities. Most of the policies at IMO falls under this category. For e.g., Energy Efficiency Design Index (EEDI), etc.,
Constituent Policy	This type of policy establishes or reorganize institutions. For e.g., UN established IMO

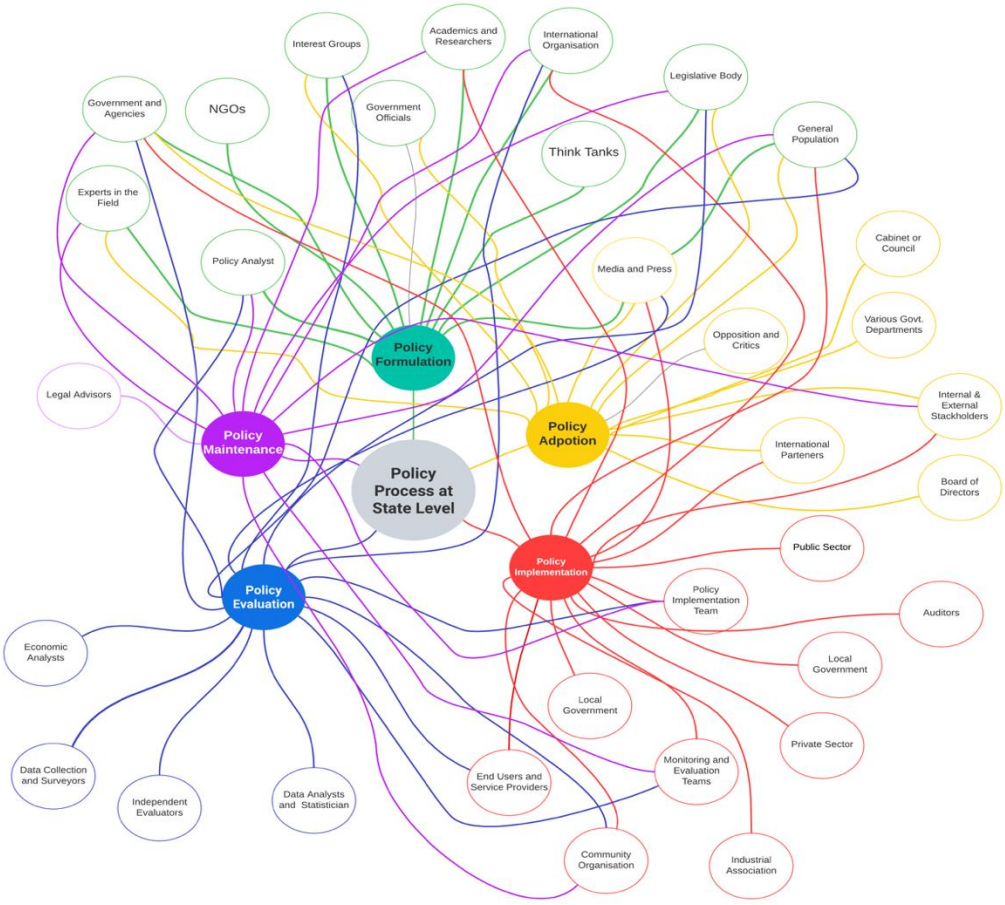
Note. Adapted from "Four Systems of Policy, Politics, and Choice," by T. J. Lowi, 1972. *Administration Review 32*(4). 298-310. (https://doi.org/10.2307/974990). Copyright 1972 by JASTOR.

Irrespective of the topology, the process for formulation of policy remains the same. Due to the interaction of various actors like political parties, pressure groups, experts in the field, Non-Governmental Organisation (NGOs), etc. at various different levels like national, regional or global, a policy process is complex in nature (Hill & Varone, 2021, p. 4). Figure 2 below depicts the interactions of various actors at state level, such interactions take place at various other levels and at times these interactions are between different levels. Various stages of the policy process are depicted in different colours; however, the main purpose of the figure is to highlight the fact that

actors participating in one stage are also involved at other stages and the policy environment is complex in nature. This is indicative of the fact that a lot of consensus building, discussions and compromises are made and agreed upon depending upon the interest of individual actors. Also, the figure brings out that, Govt. agencies, Media, Citizens, Academics and Researchers are involved in all stages of the policy process.

Figure 2

Interaction of Various Actors in Policy Process



Note. Created by the Author.

1.3 Policy Analysis

Public policy is the key tool of governments to solve public issues and/or problems via implementation of the agreed measures. This is where the problem of effectiveness arises, which can only be ascertained on evidence-based analysis. Policy analysis is a well-studied field. Briefly, this term can be defined as the field of social science which provides evidence-based results and arguments by using a set of defined methods to assist policy makers in resolving any problem that exists in the policy after its implementation (Yang et al., 2023). Table 2 summarises various forms of policy analysis which can be divided into two main streams. '***Analysis of Policy***' which deals with understanding of the policy in various aspects and '***Analysis for Policy***' which deals with improving the quality of the policy (Hill & Varone, 2021, p.4). The analysis which is conducted for the research falls under the category of ***Analysis of Policy***, study of policy content.

In this research comparative policy analysis was used for the formulation stage of GHG emission policies by IMO. Comparative policy analysis can be defined as the branch of science which aims at understanding policy outcomes and outputs using comparative methods (Radin & Weimer, 2018). Selection of a policy for comparison is one of the most challenging aspects of comparative policy analysis as there are many undefined variables (De Wee, 2022). Benchmarking method was used for defining the variables and discussions were held to validate the method itself and then the criteria were applied to the entire policy environment for selection of a reference policy for conducting comparative analysis. In section 1.7, the process of benchmarking is introduced and various types of benchmarking is discussed.

Table 2

Different Kind of Policy Analysis

Analysis of Policy	
Study of Policy Content	Used for understanding the genesis and development of a policy
Study of Policy Output	This is much like study of policy content but focus on variation of levels of expenditure or services
Study of Policy Process	This type focuses more on how policy decisions are made and how it is implemented
Analysis for Policy	
Evaluation	This can also be called as impact assessment of a policy and deals with impact of policy of population
Information for policy making	This is the field in which data is gathered for evidence-based decision making by the policy makers
Process Advocacy	This deals with improvement of policy-making systems via redistribution of tasks and responsibilities
Policy Advocacy	Introduction of specific option and ideas in policy process is the main focus of this area

Note. Created by Author, based on Hill, M., Varone, F. (2021). *The Public Policy Process* (8th ed.). Routledge.

1.4 Internationalisation of Public Policy

The concept of internationalisation of public policy draws its root from the formation of the very first IGO is the form of League of Nations in 1920 (Calvin, 2014). The organisation introduced mankind to the possibility of resolving issues which are beyond the control of one or more nations. However, such a solution required all nations to agree to allow an IGO to exert a certain amount of control over them. This can be best expressed by the concept of shared sovereignty which all members of the European Union (EU) have agreed for better prospects through multilevel governance (Mamudu & Studlar, 2009).

Majority of academic work on the public policy process is from a national perspective. The subject is also taught from the vintage point of national understanding. However, the process itself does not confine to any level of governance. The process can be applied to any organisation irrespective of its position or authority. Models like Punctuated Equilibrium by Baumgartner & Jones; Multiple Stream Approach by Kingdom or Cluttered Desk/Complex Vortices Model by Mejia are independent of the level of governance (Mejia, 2023, slide 10). Application of such models may require some realignment of ideas in the theory, but in principle they can be applied at international governance also. The role of actors and the impact they have changes to a great extent and the police stream may be driven by factors other than discussed in the classical public policy theory. Some factors may not be quantifiable easily, like the impact of media. But as far as the understanding of policy processes goes, they can be applied with equal validity to IGOs also.

Internationalisation of the policy process has helped us in fighting issues beyond the control of single nations, like climate change, over population or fight against hunger and poverty (Organisation for Economic Co-operation and Development [OECD], 1994, p. 16). It is therefore imperative that analysis of policy processes at IGOs level should be undertaken to determine the impact such policies have on issues discussed above.

1.5 Policy Making Process at IMO

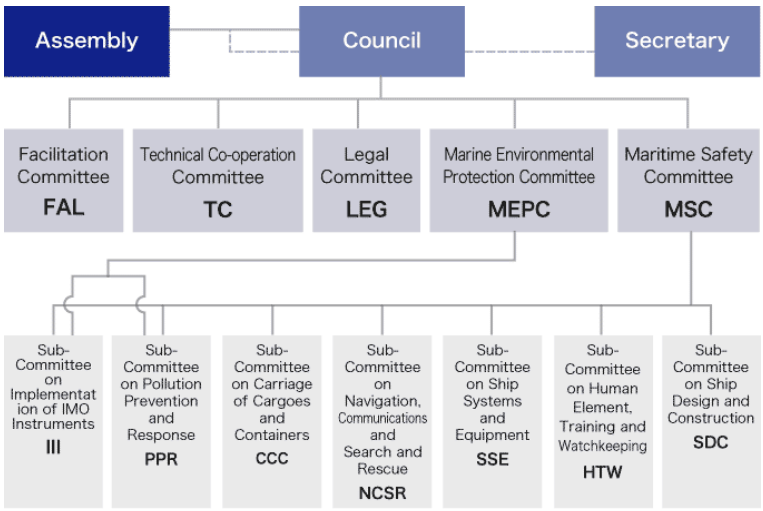
Being a specialised agency of the UN, IMO works towards ensuring safe and secure shipping and prevention of marine and atmospheric pollution from international shipping (International Maritime Organisation [IMO], n.d.a). This is achieved by creating policies, regulations and instruments for the shipping industry which can be globally accepted and implemented.

1.5.1 IMO and the Process of Policy Making

The task of regulating shipping industry is undertaken by IMO via various committees and subcommittees working along with the Secretariat and headed by the Assembly, which is the highest decision-making organ of the IMO (International Federation of Shipmasters' Associations [IFSMA], 2014). Figure 3 below shows the structure of IMO.

Figure 3

Structure of IMO



Note. From Topics at IMO, by Class NK, n.d. https://www.classnk.or.jp/hp/en/info_service/imo_and_iacs/topics_imo.html.

It is pertinent to discuss the structure and the hierarchy of various organs at IMO, as it plays a major role in the process of policy making and the time taken for formulation and implementation of a policy.

1.5.2 How Policy is Made at IMO

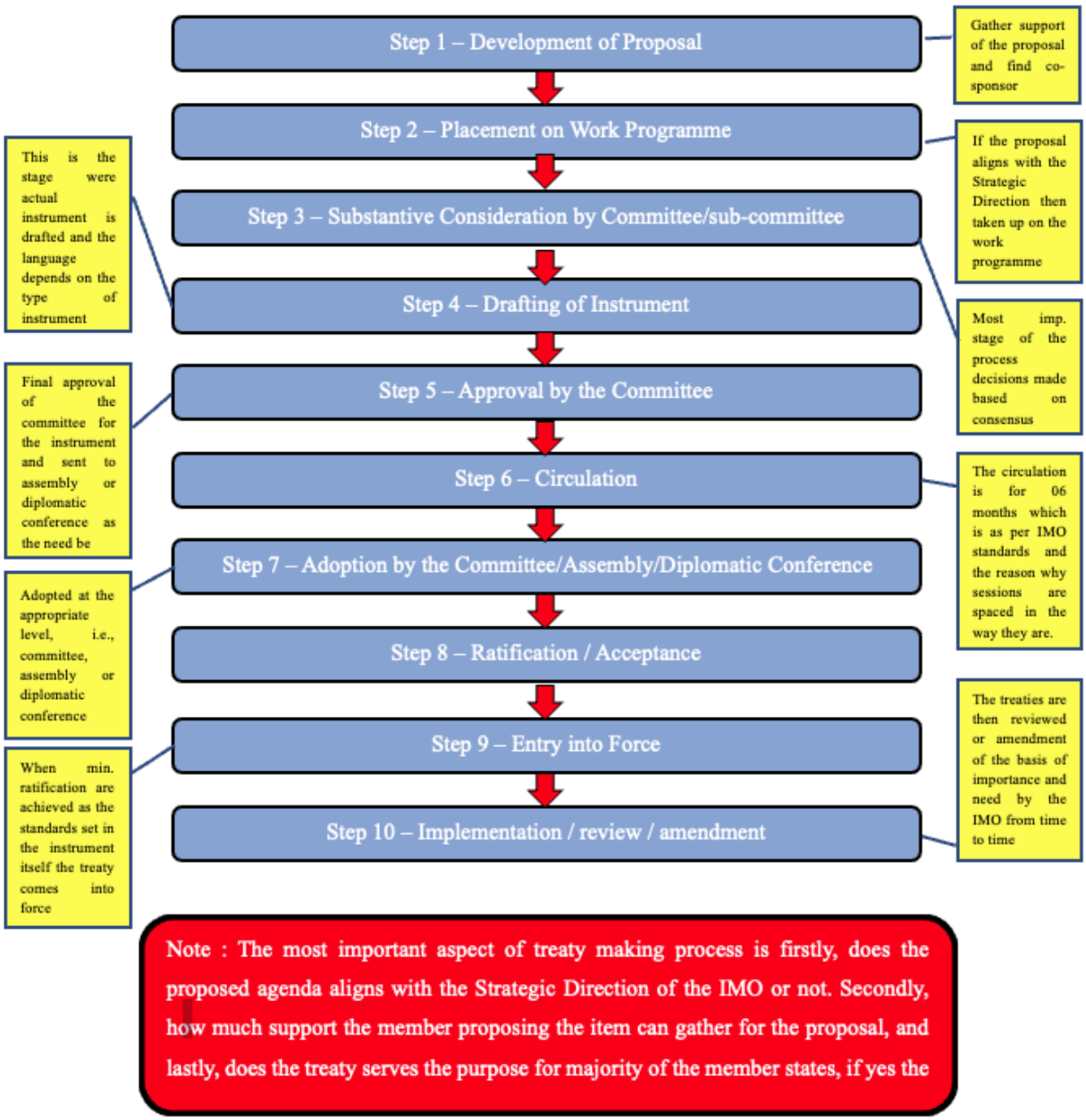
The policy making process at IMO is generally long and tedious involving actors which are very different from the actors which we have seen in figure 2. The pace at which a policy is developed and implemented at IMO differs, this depends upon many aspects like interest of Member States, NGOs, negotiating power of states, ability to reach a consensus among many other things. The process of substantive consideration by committee/sub-committee can be assumed as the most important phase. Direction and final policy output is decided at this stage. As it is a well-established fact that decision at IMO is mostly taken by consensus and not by vote, reaching a common ground on a particular issue can prove difficult and at times can result in a deadlock. During such times IMO has restored to voting, which was the case with the introduction of EEDI measures (OECD, 2014). Although, IMO follows the principle of one vote one-member as per the IMO Convention[1], certain Member States have additional leverage on the discussions as compared to others, due to the tonnage registered with them (Transparency International, 2018). For a policy to translate into a mandatory obligation, a minimum percentage of the world's fleet needs to be covered by it. This means that a Member State with a large share of the world fleet needs to ratify/accept the policy, else the policy may never enter into force even if it is adopted by IMO. Some of the examples of such policy are Fund Protocol, 2000; Cape Town Agreement, 2012; International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances (HNS) by Sea, 1996 and many more (IMO, n.d. b). Figure 4 below is a flow chart of the complete 10 step process of policy making and implementation at IMO. The process is long and tedious and requires consensus building almost at all stages. For the discussion in this research, step 3 and 4 are vital as they form the basis of formulation stage. It can be seen from

[1] Article 62; Part XIV – Although each member state has one vote, majority is counted as the members present and voting, not of the total membership of the IMO.

the figure also that they are considered the most important step in the whole process.

Figure 4

Complete Process of Policy Making at IMO



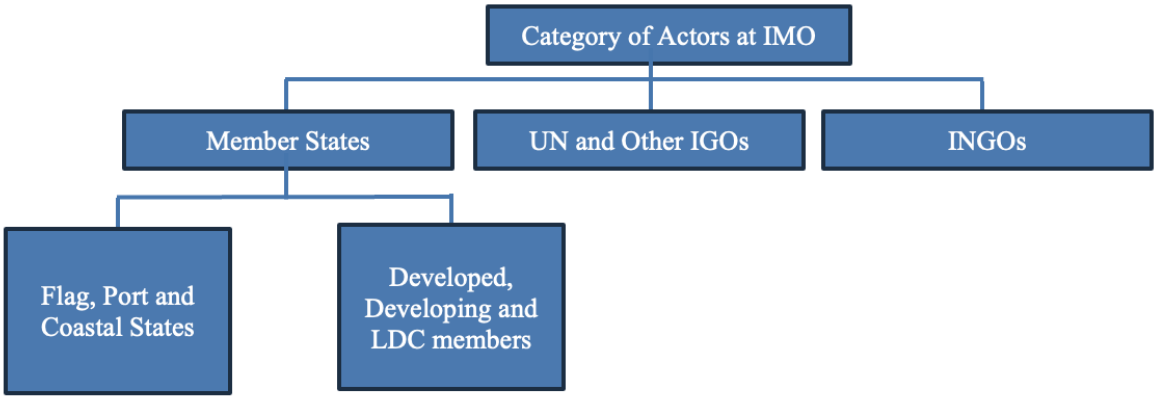
Note. Created by the Author.

1.5.3 Role of Actors in Policy Formulation

Unlike actors at the state level, actors which are involved in the policy making process at IMO are very different. Primarily they can be divided into three broad categories. Figure 5 below depicts the actors at IMO. The subcategory of Port, Coastal & Flag states and developed, developing and Least Developed Country (LDC) have special place as the same member state in different roles may support or oppose a particular policy decision depending upon the vested interest of the member state.

Figure 5

Category of Actors at IMO in Policy Making



Note. Created by Author, adapted from "*IMO Institutional Structure and Law-Making Process*," by Law Explorer, 2015.(https://lawexplores.com/imo-institutional-structure-and-law-making-process/). Copyright 2013 by Law Explorer.

1.5.3.1 Member States – Port, Coastal and Flag State

The first and foremost aspect which differs in policy making process at IMO as compared to national level is the sovereignty of Member States. Therefore, the normal dynamics of interaction which plays a vital role in the policy process at national level does not apply at IMO. However, with sovereignty comes the inherent problem of alignment of interest and reaching a consensus. This can be made clearer by considering the position of Australia as a coastal state over issues requiring stricter environmental regulation to a state like Panama which as a flag state would like more freedom for the vessels flying its flag (Law Explorer, 2015). Such situations give rise to a new dynamic as Member States are sovereign in nature, to reach a consensus the transaction cost is generally considered high (Hayer, 2016, p. 14).

1.5.3.2 Member State – Developed and Developing Country

Ever since membership of developing and LDC States reached a substantial share at IMO there has been a divide amongst developed and developing nations (Law Explorer, 2015). This has been termed as North-South divide by some scholars. This divide can best be visualised on the issues of climate change and protection of the environment such as measures for reduction of GHG emission. The two fundamental principles of Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC) enshrined in United Nations Framework Convention on Climate Change[2] (UNFCCC) and No More Favourable Treatment[3] (NMFT) observed by IMO, causes a rift between the developed and developing countries which can be seen in

[2] Article 3.1 Principles defines this concept which proposes that developed nations should be doing more for the protection of the environment as compared to developing nations.
[3] NMFT means that all ships will be treated equally irrespective of the flag state. This is a serious cause of concern for developing nations as developed countries

the polarisation of opinion on policy issues and developing nations take stand as a group instead of individual Member States (Chen, 2021). The aim of this research is to validate or invalidate the statements made in this paragraph and prove empirically whether participation of developing and developed members states stands at cross roads on issues of climate change and GHG emissions or not, also to evaluate if there is a change in the pattern of submission when a different topic is being discussed.

1.5.3.3 UN and Intergovernmental Organisations

Being a specialised agency of UN, IMO under its Convention[4] have established formal relations with many IGOs. At present IMO has granted observer status to 66 IGOs (IMO, n.d. c). Although such agencies do not have the voting right, some of them do exert a lot of influence over the Member States. For e.g., the African Union (AU) and European Commission (EC) have a significant influence over what position Member States affiliated to them take. On the other hand, UN agencies like World Trade Organisation (WTO), Food and Agricultural Organisation (FAO) and others also exert influence in the decision-making process at IMO.

1.5.3.4 International Non-Governmental Organisation

At present there are 88 INGOs with the consultative status at the IMO (IMO, n.d. d). These INGOs can make substantive contributions towards the work of organisation with their expertise in the field. Other than the contribution in policy development, they also can exert great influence in other forms. Some of the INGOs such as

[4] Article 25 and 66 and 67; speaks about the relations which IMO may and can maintain with IGOs and NGOs.

International Transport Workers' Federation (ITF), INGOs representing ship-owners and operators like Committé Maritime International (CMI), International Chamber of Commerce (ICC), International Association of Independent Tankers Owners (INTERTANKO), International Association of Ports and Harbors (IAPH), International Chamber of Shipping (ICS) are among those who have influence over the Member States as they represent interests of private players in maritime sector (Law Explorer, 2015).

The above discussion clearly brings out that, although only Member States have the right to vote at IMO, many more complex dynamics are continuously at play in discussion and deliberation of a policy. These complex and seemingly inter-related interactions between various actors is what drives the policy process.

1.6 Policy Indicators at IMO

IMO arguably regulates one of the largest private sectors in the world having vested commercial interests. The shipping industry is highly fragmented and concentrated in small pockets especially in Europe (Influence Map, 2017). When we combine this with the participation of Member States and NGOs with consultative status a dynamic appears which cannot be easily explained or understood. There are many factors which can be considered as indicators towards policy development such as lunch break discussions and international relations of Member States, member state's national priority and stand on a particular issue, lobbying efforts by NGOs such as ICS are few of the unquantifiable indicators. An indirect indicator can be the voluntary financial contribution made to the IMO; however, this is next to impossible to quantify (Influence Map, 2018). Also, delegation size, its composition, securing the chair of the committee meeting and number of submissions on a particular issue are some of the examples of quantifiable indicators (Pasraftis & Kontovas, 2020). All these factors and indicators go into driving the policy process at IMO.

1.7 Benchmarking Process

Benchmarking is the process used predominantly in business activities for performance evaluation, setting standards for a product, process (policy formulation included) and services with preset conditions to compare the said product with the similar but better product (Mehlman, 2023). Figure 6 below highlights all the steps that are involved in completing the process of benchmarking, a discussion covering all the steps involved in benchmarking is beyond the scope of this dissertation. The main idea for this section is to introduce benchmarking in a nutshell for a better overall grasp of the process and how the final benchmark (reference policy) is achieved.

Figure 6

Steps Involved in Benchmarking

Note. From "*Business Benchmarking: Strategic Management Approach*," K. O'Sullivan, 2018, The Knowledge Compass, Inc. (https://knowledgecompass.com/business-benchmarking-strategic-management-approach/). Copyright 2010 by The Knowledge Compass, Inc.

All five steps of the benchmarking process will not be covered. Only Step 1 and 2 i.e., Plan and Setup will be covered as the main aim is to come up with a policy with which the process of policy formulation of GHG emission policies (EEDI as an example) can be compared. Whereas step 3 (collection of data) and step 4 (analysis) will be undertaken in chapter IV. The findings of this research can be used to improve the process further or avoid the shortcomings identified during the work.

Quite a significant deviation has been observed when it comes to defining various types of benchmarking depending upon the approach taken by the author. For example, Sekhar (2011) divides benchmarking into 10 different types. On the other hand, some authors make differentiation based on the nature of benchmarking like competitive or technical (American Society of Quality, n.d.). However, for the purpose of this research the division given by Bhutta and Huq (1999), which states type of benchmarking depends on the fact, what needs to be compared and against what it is to be compared. Table 3 presents the seven most prevalent types of benchmarking along with the definitions as to what they cover. The table is divided into two main parts, ***What Needs to be Compared***, which covers three categories of process, performance and strategy and ***With What it is to be Compared***, which covers four methods of comparison, internal, competitive, function and generic. In section 3.2 a matrix is developed for validating the choice of comparative analysis using the information from the table 3 below and the results presents that for policy, comparison is the best method of analysis.

Table 3

Different Types of Benchmarking

Type of Benchmarking	Definition and Remarks
What is to be Benchmarked	
Process	Used to compare methods and process followed
Performance	Used to Compare performance measure against best in the business
Strategy	Used for benchmarking strategy, when there is a need to change the course of company via change of strategy
Against What it is to Benchmarked	
Internal	Used to make comparison between departments/division within a system (company)
Competitive (Comparative)	Used to compare performance and results against best competition
Function	This is used for compare technology/process in own field of work
Generic	Comparison of process with best process irrespective of the field

Note. Adapted from "Benchmarking – Best Practices: An integrated Approach," by M. Bhutta and F. Huq, 1999, *Benchmarking: An International Journal*, *6*, (https://doi.org/10.1108/14635779910289261). Copyright 1999 by MCB UP Limited.

1.8 Problem Statement

A quick search on the WMU library module with keywords as ***Policy*** and ***Analysis*** gives an instant hit of **758,325** results, when the word ***IGO*** is added to the search the results drop to only **15**. Furthermore, when IGO is replaced by **IMO** it further drops to **6**. When a similar search is undertaken with keywords as **Policy** and **Formulation** the results are **155,082**. Conjoining with **IGO** results drop to only **one** and replacing IGO with **IMO** the total results are **5**. Although not the most apt method of understanding the relationship between policy analysis/formulation and IMO, the

hugely contrasting results is indicative of the fact that ***the policy analysis of IMO is a less studied field***. This research is an attempt to analyse one of the quantifiable indicators of policy process at IMO which is analysis of the number of submissions made. The research will focus on GHG emissions policies and take a deeper look into EEDI for the policy formulation stage. Although the policy can be analysed from different perspectives for formulation stage, the research will focus only upon the number of submissions made by the participating members and try to examine if there exists a disparity between developed and developing Member States when issues such as GHG emission are discussed at IMO.

1.9 Research's Aim and Objectives

The aim of this research was to identify if disparity existed between developed and developing Member States during the formulation stage of policies concerning GHG emission with emphasis on EEDI. As for the objective to achieve the above-mentioned aim are as follows:

- To examine, policy formulation of GHG emission via comparative analysis method; and
- To investigate, the participation of developed and developing Member States in the policy formulation stage.

1.10 Research Questions

Following Research Questions (RQs) have been developed to achieve the aim and objectives of the research:

- How a policy can be selected for comparative analysis of GHG emission and EEDI?
- What is the percentage share of developed and developing Member States in submission of documents during the formulation stage of GHG

emission policies when compared to similar policy and policy on different issue?

1.11 Expected Results

The research was expected to yield two results which can be described as flows 1). an indicative mechanism for selection of a policy as reference for comparative policy analysis. The criteria defined for the selection of baseline policy can be adapted as per the requirement. The mechanism was developed so that it can be applied to any process of policy cycle with defined criteria; 2). it is expected to bring out whether there existed a disparity amongst developed and developing Member States during the formulation stage of policies concerning GHG emission with emphasis on EEDI. The factors which drive the actions of individual Member States are beyond the scope of this research and can be tackled by future researchers. The main aim of the research was to bring out the above-mentioned results via means of analysis of the documents/papers submitted by various Member States and other actors to the IMO during the formulation stage.

1.12 Scope and Limitations of the Research

1.12.1 Scope

The scope of this research was confined to the analysis of the submitted documents/papers by various members states to the IMO during the development of policies for GHG emission and the policy which was selected as the 'reference policy' post benchmarking; since the policies were related to marine environment protection, data for another policy was also considered such as issues related to seafarers to compare the set of results produced from two hugely varying topics. The scope was also restricted to the empirical results produced by the analysis of the data collected from IMO Docs.

1.12.2 Limitations

The collection of data for the research was only limited to the official IMO Docs for which researcher has been provided access from the university. The data collected in the form of documents submitted to IMO was analysed empirically. No other source for collection of data was utilised as other sources cannot be trusted in such matters. Also, the nature of research restricted the use of further sources as being purely empirical and desk-based review of official documents does not require other sources. The research was not designed to discuss the factors which goes into play, for the actions of members states and NGOs, such as geo-political situation present at the development stage of the policies being discussed, media coverage given to a particular topic, collations established or lobbying efforts by some NGOs behind the scenes for pushing the agenda at IMO. However, having said that, some references were made from time to time to drive a point home or in context of explaining the rationale behind certain actions of Member States. Also, discussions on how to define a developed and developing country are not undertaken as this is beyond the scope of this research, the international accepted definition given by the United Nations Development Programme's Country Classification System was used for the purpose.

1.13 Research Methodology

Developing a sound research methodology is the cornerstone of any good research, it can be defined as a systematic approach towards solving a research problem which has been identified (Ajmal, 2019). It encompasses all the work which is required to be undertaken by the researcher in order to come out with a justifiable conclusion to the research. For this research a mixed method of quantitative and desk-based review of data was considered to be optimal as the results require an empirical source and systematic review of documents and literature is required for answering research questions.

Firstly, systematic review of the existing literature on establishing the selection criteria was undertaken, keywords were used for filtering the sources and various websites and databases, access of which was provided to the researcher by the university for collection of sources were used. Various keywords such as 'policy analysis'; 'comparative policy analysis'; 'benchmarking', etc. were used for filtering the sources. Criteria for selection of policy for comparison was developed and used in elimination of unwanted policies. The entire process for selection was developed keeping in mind that the same can be used by any other researcher in future for selection of policy, by changing the criteria alone. Keeping the same consideration in mind a separate policy was also selected for comparison covering a different topic.

After selection of the policies for comparison, a quantitative method was used for answering RQ 2. More specifically all the data collection was undertaken by utilising IMO Docs for which researcher had access. Keywords such as 'EEDI'; 'Energy Efficiency'; 'Energy Efficiency Design Index', etc., were employed to filter the documents for selection, the selected documents were then catalogued and used for analysis. In addition, documents were selected from the various meetings such as MEPC, STW, etc. Keywords for the selection of documents from reference policy and one another issue not related to marine environment protection were also selected after they were finalised and the results were presented in the form of graphs and charts for ease of understanding. The outcome of analysis was then utilised for drawing conclusions at the very end.

1.14 Ethical Issues, Budget and Author's Bias

No ethical clearance was required for the research as all the data collected is from the secondary sources and research was designed for a mixed method of quantitative analysis of the data along with desk-based review of the literature. All guidelines promulgated by the Research Ethics Committee (REC) as amended on 30

May 2023 were followed during the course of the research. Also, no budget was requested for conducting the research.

Understanding author's bias is a critical aspect of any research, however, most of the time this is overlooked by the researcher and this may result in Conflict of Interest (COI). COI can occur when the personal beliefs of the author are in direct conflict with the professional obligation (Young, 2009), author's bias occurs when the results are skewed in a manner which represents the author's own perspective of the situation rather than presenting the facts as they are (Spencer et al., 2017). The author of this research is a reputable Officer of the Indian Coast Guard and has military ethos and discipline inculcated in him from a very young professional age. Author does have any affiliation with any member state other than own nation, does not work in research for private firms and has no connection with IMO other than studying at WMU. The organisation for which the author works has no direct affiliation or connection with IMO or other Member States. Also, the design of the research is developed in such a manner that the author's beliefs and bias have no impact on the empirical results of the study. Therefore, it can be concluded that there is very little or no potential bias from the author in the findings of the research.

1.15 Organisation of the Research

In this chapter we have looked at the public policy process and how such policies are analysed. Then we dived into the realm of internationalisation of policy process. The discussions have helped us understand the need for policy analysis and how it helps in improving and developing further measures to curb the problems faced by nations or the world as a whole. Since the research looks at IMO's policy, next the setup at IMO was briefly looked into via its structure and the policy making process. A very interesting discussion about the roles played by the actors in policy formulation was then undertaken. Finally, the problem statement of research along with aim and objective were brought out and the methodology which will be used for solving the

problem was discussed. The issue of ethical consideration, budget and author's bias was the final discussion in the chapter.

The research consists of five (5) chapter, following this introductory one, chapter two takes a closer look at the policy selected for analysis i.e., GHG emission measures with emphasis on EEDI through the lens of necessity for the development of such policy, narrative perception which shaped the policy and the timeline for the formulation. Third chapter will focus upon the selection of a base/reference policy for comparative analysis. Benchmarking with criteria developed in a holistic manner will be employed and each criterion will be discussed on its merits and demerits. A brief introduction to the selected policy will then be given to familiarise the reader. Analysis and findings which constitute the fourth chapter and will focus on quantitative analysis of IMO docs which were selected after due consideration for inclusion. The results were analysed and findings were presented in the same chapter. Fifth chapter was conclusion and recommendation, in which the entire research along with the findings of chapter four were summarised and recommendations based on the findings were given for consideration and future research.

Chapter II –GHG Emission Reduction Measures and the Effort by IMO

2.1 Outline of the Chapter

This chapter discusses in brief the climate change and the significance of the shipping sector for global trade. Then the discussion moves towards the main objective of the research which is IMO's efforts towards the reduction of GHG emissions from the shipping sector via initial effort of the IMO and the regulatory framework developed to tackle GHG emission from shipping. Finally, a gist of EEDI policy is presented.

2.2 Significance of Shipping to Global Trade and Climate Change

It is an undisputed fact that shipping is the backbone of global trade, with almost 80% trade by volume and 70% by value carried by the shipping sector across the world (European Community Shipowners' Association [ECSA], 2017, UNCTAD, 2022). Also, climate change is a reality, and efforts are being made by all sectors towards the reduction of GHG emission. Shipping presently amounts to 2-3% of total anthropogenic emission, which is expected to increase if the sector does not take immediate steps to reduce it (Danish Shipping Finance, 2023). A detailed discussion on climate change and significance of shipping is placed at Appendix 2 for the readers to dwell further in this matter, as an elaborate discussion on the topic is beyond the scope of this research. IMO has taken significant steps to address the issue of GHG emission from shipping over the past couple of decades and have introduced various policies to tackle it.

2.3 Problem of GHG Emission and IMO's Solutions

With over 30% of global nitrogen oxide and 9% of sulphur dioxide contributed by the shipping (International Cargo Express [ICE], 2022), it was evident that there existed a need for IMO to take steps towards reducing air pollution from ships. In the succeeding section a closer look is taken into the efforts for reduction of GHG emission and the regulatory framework which has been developed by IMO.

2.3.1 IMO's Initial Efforts Towards Reduction of GHG Emission

With the signing of Kyoto Protocol[5] in 1997, the world agreed to a common goal for reduction, International Civil Aviation Organisation (ICAO) and IMO were made responsible for reduction of GHG emission from aviation and shipping respectively. Although, Kyoto Protocol entered into force on 16 Feb 2005, IMO started work on reduction of GHG emission in Sep 1997, with adoption of the Protocol at the International Conference of Parties on MARPOL Convention (IMO, n.d. e). The MEPC was charged to develop a strategy for reduction of GHG and other marine pollutants which should include technical and operation measures. Also, at the same conference, IMO in coordination with UNFCCC established a GHG study to estimate the percentage share of international shipping in total anthropogenic emission. The results of the first GHG study was submitted in Mar 2000 to IMO and it brought out that international shipping was responsible for 1.8% of global emission (MARINEK, 2000). The study also stated that technical and operational measures have a limited potential towards reduction of emission from ships and possibilities of credit trading system should also be explored (MARINEK, 2000). Having said that, IMO continued to explore technical and operational

[5] Article 2.2 of Kyoto Protocol makes ICAO and IMO responsible agencies for reduction of GHG emissions from aviation and marine bunker fuels and urges the parties to working in coordination with both agencies.

measures for short-term implementation towards reduction of GHG emission from shipping.

2.3.2 Policy Framework Adopted for Reduction of GHG Emission

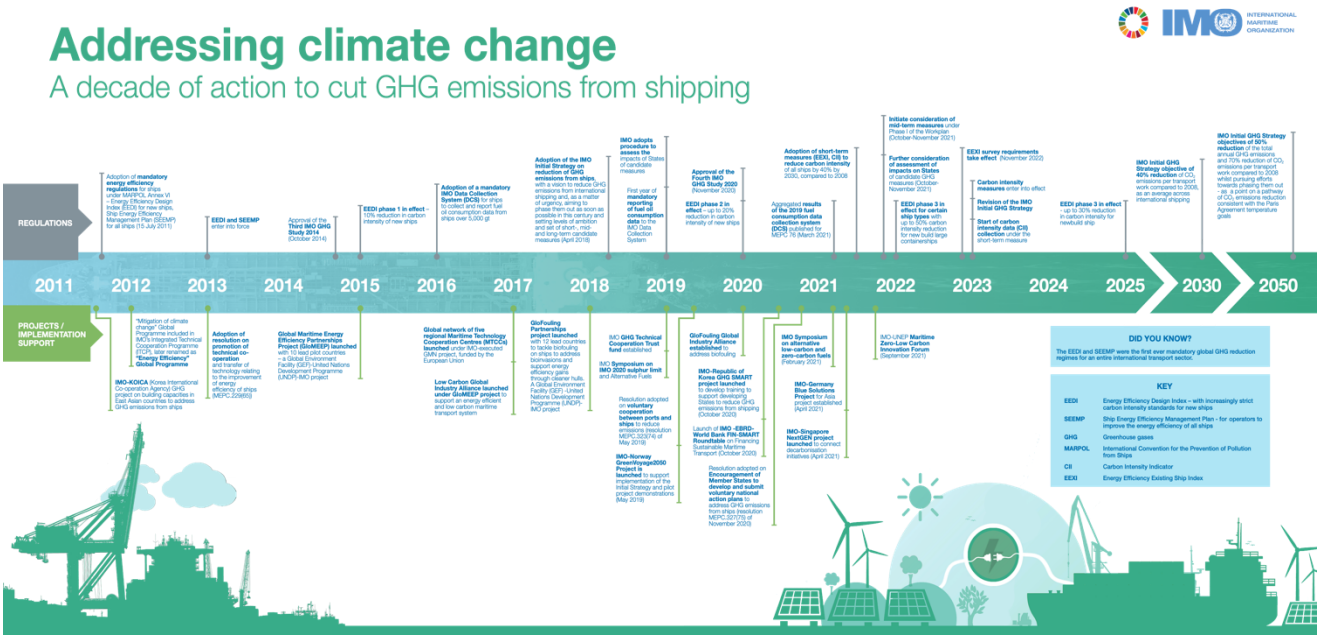
One of the very first measures adopted by IMO towards reduction of GHG emissions from international shipping via resolution MEPC.203(62)[6] dated 25 July 2011 was mandatory EEDI and Ship Energy Efficiency Management Plan (SEEMP) measures which entered into force on 01 Jan 2013 with a two-year transition period till 2015. In Oct 2016 during MECP 70 IMO adopted Data Collection System (DCS) for recording and reporting ship fuel oil consumption via resolution MECP.278[7] (70) dated 28 Oct 2016. This required all ships above 5000 Gross Tonnage (GT) to report collected data from 01 Jan 2019. Historic milestone was achieved when IMO adopted its Initial Strategy for reduction of GHGs from international shipping in 2018 at 72nd MECP session (Chircop, 2019). The idea to develop on the already existing mechanism such as mentioned above was one of the key elements of the strategy. The strategy has been recently revised during the 80th MEPC session and adopted via MECP 80/WP.12[8]. The key outcome of the policy is that the estimates have been revised in the five-year period and the revision to the efforts has been made based on the evidence-based decision making and better understanding of the present and future trends in international shipping (Comer, 2023). Both strategies divide the efforts into three categories of short-term; medium-term and long-term measures. World shipping experts agree that the only viable long-term solution for achieving net-zero carbon shipping is

[6] MEPC.203(62): Amendments to the annex of the protocol of 1997 to amend the international convention for the prevention of pollution from ships, 1973, as modified by the protocol of 1978 relating thereto (inclusion of regulations on energy efficiency for ships in MARPOL Annex VI).
[7] MEPC.278 (70): Amendments to the annex of the protocol of 1997 to amend the international convention for the prevention of pollution from ships, 1973, as modified by the protocol of 1978 relating thereto, Amendments to MARPOL Annex VI(Data collection system for fuel oil consumption of ships).
[8] The annex to the said document gives the full details of the revised strategy.

introduction of alternate fuels on a commercial scale (Carlisle et al., 2023). However, the strategy adopted provides us with various policy frameworks such as EEDI, SEEMP and DCS to name a few to act as a stop-gap arrangement for reducing the GHG emission from the shipping industry. Figure 7 below highlights the entire roadmap of IMO from adoption of EEDI policy till 2050 for addressing the issue of global warming.

Figure 7

Addressing Climate Change



Note. From "IMO's work to cut GHG emission from ships, by IMO," by IMO, n.d. f (https://www.imo.org/en/MediaCentre/HotTopics/Pages/Cutting-GHG_emissions.aspx).

2.4 EEDI Policy in a Nutshell

Being the first measures, which was introduced by the IMO as mandatory in nature, EEDI applies to all ships above 400 GT engaged in international voyages as per MARPOL Annex VI, Reg 19[9]. The policy is aimed towards the energy-efficient design of the ship and applies to all new ships and ships with major conversion. However, it does not look into the operational measures which are covered by SEEMP for existing ships (Fakhry & Bulut, 2018). As per the policy each ship is required to have its own EEDI value which depends on many factors and calculation using complex formulae which is beyond the scope of this research, however, MECP Resolution.203 (62) dated 15 July 2011, which introduced EEDI is placed as Appendix 1 to this research. The policy provides for two values of EEDI which is attained value, defined as the value achieved by a ship as per Reg 20[10] and the required value which is the maximum value allowed as per Reg 21[11] (IMO, 2011). In a nutshell both EEDI values are related as mentioned below.

$$\text{Attained EEDI} \leqq \text{Required EEDI} = (1\text{-}X/100) \times \text{Reference line value}$$

where X is the reduction factor specified in Table 1 for the required EEDI compared to the EEDI Reference line.

EEDI in principle is a goal-based measure which gives the ship designer and ship builder the freedom to achieve the required standards in the most economical and sustainable manner, however, IMO has come up with guidelines to assist in an uniform application of the policy by all stakeholders (IMO, 2016). The latest guidelines for survey and certification of EEDI was promulgated via MECP Resolution MECO.365(79) (IMO, 2022).

[9] Art 3(3) of the excludes non-commercial government owned vessels from the scope of the convention as well as EEDI.
[10] Regulation 20 of EEDI outlines the scope of application and also the method for calculation, which depends upon the guidelines promulgated by IMO from time to time.
[11] Regulation 21of EEDI outlines the scope of application and the procedure for calculation and the tables used for the same.

EEDI and SEEMP were the initial steps which IMO has taken towards reduction of GHG emission from the ships which falls under technical and operational measures in the category of short-term measures. EEDI policy has been in place for more than a decade and being the very first mandatory measure was also be analysed for achieving the aim of this research along with air pollution from ships.

2.5 Concluding Remarks

Chapter provides an overview of climate change and the significance of shipping and its pivotal role in ensuring sustainable global trade. The main aim of the chapter was to discuss IMO's effort towards reduction of GHG emission from international shipping which was discussed at length. During the course of discussion, a proactive approach of IMO for finding viable options for reducing emissions was brought out and a timeline is provided for actions taken by the IMO. At the end, EEDI policy is presented in brief for better understanding of the issue at hand. The chapter introduces how IMO has gradually worked for development of implementable policies across the globe for tackling global warming and achieving the desired aim of the Paris Agreement. The chapter was an effort for discussion of the main policies which are being looked at during this research, which is GHG emission measures with emphasis on EEDI. Discussions in the chapter were essential to gain an overall understanding of the efforts by IMO for addressing GHG emission from shipping. Having discussed the policies which are being analysed for the research, during the course of the next chapter, a method was developed and applied for selection of a specific policy as reference for comparative analysis.

Chapter III – Benchmarking for Reference Policy

3.1 Outline of the Chapter

Having elaborated on the benchmarking process in section 1.7, the chapter starts with the development of a matrix for selection of the benchmarking process best suitable for this research. A detailed discussion was held about the various criteria decided for selection of a policy for comparative analysis of GHG emission measures and EEDI. The entire process is then summarised in a flow chart. The criteria decided was then applied and finally one policy was selected. The BWM Convention is briefly introduced for better understanding. This chapter provides answer for the first RQ of the dissertation.

3.2 Selection of Method for Benchmarking

Based on the definition of various types of benchmarking presented in section 1.7, Table 3, following matrix was developed for identifying which type of benchmarking will be best suited for what type of situation. Table 4 below represents **what is to be benchmarked** and **how it will be benchmarked** on two sides of the table. Colour green represents that the style of benchmarking is of high relevance and red is indicative that a particular type of work does not fit best with a particular type of process.

Table 4

Matrix for Selection of Benchmarking

	Internal Benchmarking	Competitor Benchmarking	Functional Benchmarking	Generic Benchmarking
Performance Benchmarking	Medium Relevance	High Relevance	Medium Relevance	Low Relevance
Process Benchmarking	Medium Relevance	Low Relevance	High Relevance	High Relevance
Strategic Benchmarking	Low Relevance	High Relevance	Low Relevance	Low Relevance

Note. Adapted from "Benchmarking – Best Practices: An integrated Approach," by M. Bhutta and F. Huq, 1999, *Benchmarking: An International Journal, 6,* (https://doi.org/10.1108/14635779910289261). Copyright 1999 by MCB UP Limited

The matrix clearly indicates that for a performance or strategic benchmarking the best approach is to undertake a competitor (Comparative) benchmarking process. The aim of this research is to analyse the impact of actors in formulation of a policy at IMO, which can be translated into development of strategy for resolving a current problem. The best approach is to conduct a comparative benchmarking for the selection of policy for analysing GHG emission policies with EEDI being used as an example.

3.3 Selection of a Policy for Comparison

The concept of benchmarking had been primarily developed to assist the businesses to improve and excel in various aspects of product, processes and function (Bonnici, 2015). The process per say is not confined to businesses only. The tool of benchmarking can be applied in any organisation and in any process. In the succeeding section, various criteria were applied to filter out the vast amount of policy which exists in the world and various levels of governance. The selection of criteria and

filtration of policies have been undertaken keeping in mind the policy which need to be analysed.

3.3.1 Criteria 1 – Governance Level

The policies related to GHG Emission measures, like EEDI has been formulated at IMO (international level), therefore any policy which is not originated at international level will not be considered. This is done as the factors which play a role in the formulation stage of the policy at organisations like IMO and UN are completely different when compared to factors at national levels. Both of which have been alluded to in chapter one. However, some regional organisations like EC and AU can be considered international organisations but the geo-political climate at such organisations is quite different as compared to IMO, UNEP, etc. Geo-political situation of the world can play a major role in the formulation of policies at international organisations, however as per the limitation of the study such aspects of the process was not dwelt into during the analysis phase. Hence **policies formulated at IGOs at international level will only be considered for the process**.

3.3.2 Criteria 2 – Area of Responsibility

Various IGOs had been established to deal with issues on various aspects of human activities on our planet. Some of the IGOs deal with trade like WTO, while others deal with issues related to civil aviation like ICAO and yet some deal with hunger and food security of the world like FAO. However, since GHG emission measures (EEDI policy) deals with maritime activities and protection of the environment **only policies created by IMO and IGOs like UNFCCC, OECD, UNEP, etc., will be considered for selection**.

3.3.3 Criteria 3 – Subject Matter

Agencies like UNFCCC, UNEP and other working in the broader field of environment protection are responsible for the global effort for achieving the aim of Paris Agreement[12] in a sustainable manner. The major share of GHG emissions due to anthropogenic activities is land based and only 2.89% is attributed to the international shipping as per the 4th GHG study (IMO, 2021). Since the GHG emission policies (EEDI) are predominantly related to the ships and is to be implemented onboard vessels and does not look at the larger picture of climate change. Hence for comparison the policy should be selected from the maritime field which is to be applied onboard vessels. Only IGO which regulates vessels is IMO, **therefore policies developed only by IMO will be considered for selection**.

3.3.4 Criteria 4 – Nature of Policy

IMO's main aim is to ensure safe and secure shipping and to prevent atmospheric and marine pollution (IMO, n.d. a). This is achieved by developing and maintaining many instruments, codes and guidelines to govern international shipping (United States Coast Guard [USCG], 2023). This criterion can be further subdivided into three parts. These parts are enumerated in the succeeding sections.

3.3.4.1 Mandatory or Non-mandatory

Since the GHG emission policies are part of an instrument[13] which is mandatory in nature, therefore only conventions/instruments (being mandatory in nature) will be considered for selection and no guidelines and codes will be considered. A very important discussion

[12] Paris Agreement aims to avoid dangerous climate change by limiting global warming to well below 2^0 C and pursue efforts to limit it to 1.5^0C above pre-industrial era.
[13] EEDI, SEEMP and other policies for reduction of GHG emission measures are an amendment to the annex VI of the protocol of 1997 to MARPOL 1978.

which needs to be undertaken is the effect which a mandatory policy has towards consensus building and how they are developed. The participation of all actors is expected to be more active in development of such instruments as compared to non-mandatory ones. It is expected that under-represented actors like LDCs and SIDS are also likely to make more contribution towards development as everyone will be affected by the mandatory nature of such an instrument.

3.3.4.2 Regulatory or Technical

Also, the regulatory framework developed by IMO can be classified into two categories, i.e., Regulatory and Technical in nature. GHG Emission measures, especially EEDI is highly technical in nature and requires significant technological innovation and adoption from the market leaders for effective implementation. Further **filtering the policy for selection to only technical policy**. There is also the consideration of the fact that for technical policy to be enforced/implemented many factors play a crucial role which at times cannot be controlled or even placed in a timeframe. Such factors are availability of the required technology in a commercially viable manner, state of the specific industry for development of newer and compliant equipment/instruments. The global demand for such technology and the pressure and inclination from the maritime industry also plays a role in this matter. BWM Convention which took more than a decade to enter into force in a prime example of such determining factors. On the other hand, a policy like International Ship and Port Security Code (ISPC)[14] is purely regulatory in nature and after entering into force has a high enforcement/implementation expectation. This is one more reason for selection of a policy which is technical in nature

[14] ISPCS code developed as a response to the 9/11 attack is a mandatory instrument under the safety of Life at Sea (SOLAS) Convention in chapter XI-2.

as it keeps the overall environment and existing pre-conditions the same.

3.3.4.3 Subject Matter

Inter-Governmental Maritime Consultative Organisation (IMCO) was established in 1948 which was later changed to IMO as we know it today (International Civil Aviation Organisation [ICAO], n.d.). The organisation has a long history as some of the conventions were developed and adopted even before the existence of IMCO. Such as SOLAS, which was first adopted in 1914 post Titanic disaster (Jon, 2013). Some other examples are International Convention for the Prevention of Pollution of the Sea by Oil and other treaties related to load lines which finds its origin in 1930; and collision at sea which was first unified in 1910 (Karan, 2022; Villagrán Lara, 2019). This is indicative that some laws and regulations have been in place in one form or the other and have matured over time such as SOLAS and Convention on the International Regulations for Preventing Collisions at Sea (COLREGS). The existing regulations are widely accepted and have proven over a significant amount of time their worth and stability. On the other hand, laws and regulations on issues such as GHG emissions and marine environment protection are relatively new and are still in the experimental phase. They are being implemented as of today and various approaches are being tried to see what works best. **Since GHG emission measures (EEDI) are relatively new, which is still to see its full maturity a similar policy which can be chosen for comparison**.

3.3.5 Criteria 5 – Era of Development

Foreign relations of every member state of IMO keep changing with every other member. This is a dynamic and continuous but slow process. Global politics has also been the underlying factor for how a nation reacts with sovereign entities. Although the decisions to engage or not to engage with particular states is taken at the highest level, it has a profound impact on the day-to-day life of the general populace (Dodds, 2007, p. 3). From everyday affairs to declaring war on other nations to imposing sanctions; everything is related to geopolitics. Russia's invasion of Ukraine, every rising tension in South China Sea or any other global problem, all can be connected with geopolitics (Lederer, 2022). This also defines the foreign policy of sovereign states. This can be understood better with an example: any initiative introduced by Russia at present at any international forum is highly unlikely to gain much traction due to the present geopolitical situation regardless of the merit of the initiative. Because of the above-mentioned reason, the policy for comparison should have been developed in the similar geopolitical situation as GHG emission measures. This can be achieved by keeping the period in which the policy was developed as same. Therefore, **a policy which is developed in a similar time period will be ideal for comparison**.

3.4 Summing Up of All Criteria

In section 3.3 criteria were developed and explained for the selection of a policy for benchmarking. This can be summarised in following point: -

1. The policy should be developed at international level, i.e., by an IGO.

2. The policy should be developed by an IGO which deals with maritime activities and/or environment protection.

3. The policy should have been developed by IMO.

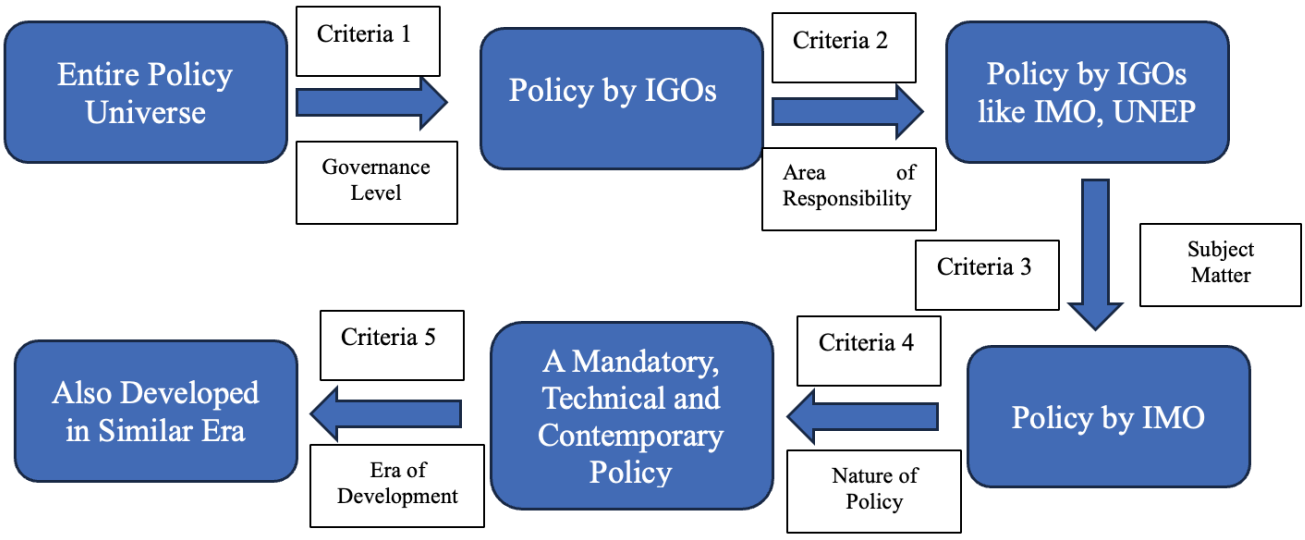
4. The policy should be a mandatory instrument of technical nature covering a contemporary issue in environment protection.

5. The policy should have been developed in a similar geopolitical environment as GHG emission measures. This can be ensured with selection of a similar time period of the development of the policy.

Figure 8 represents the flow chart showcasing the criteria and filtering of policies using the established benchmarking. The benchmarking considers the entire universe of policies for selection and with application of individual criterion at each stage the policies are filtered to finally arrive at the most apt policy for comparative analysis. Also, following a similar logic a separate policy dealing with a different issue is also selected for the comparison.

Figure 8

Flow Chart for Selection of Policy for Benchmarking



Note. Created by the Author.

3.5 Selected Policy Post Benchmarking Conditions of Comparison

As per the benchmarking criteria, policies developed by IMO will only be considered for comparative analysis of GHG emission measures. As of Oct 2022, IMO has adopted almost 50 conventions, significant number of protocols and amendments to those conventions and over 800 codes and recommendations, every one of which can be considered a policy in itself (Registro Italiano Navale [RINA], 2022). Taking into account that this policy has to be a mandatory technical policy which covers contemporary issue and has been developed in early 2000s' or 2010 not many policies qualify such scrutiny. One policy that stands out after preliminary scrutiny is the BWM Convention, 2004. Since BMW, 2004 was developed and adopted by IMO it fulfils the first three criteria. In the paragraphs below criteria 4 and 5 will be applied to see if BWM, 2004 is suitable for choosing as benchmark for comparative analysis of GHG emission measure policies (EEDI policy).

3.5.1 Nature of Policy

BWM, 2004 is a mandatory instrument of IMO which came into force on 08 Sep 2017 (DNV, n.d.). This is a highly technical policy which requires development of newer instrument and fitment onboard ships. BWM, 2004 was developed around the same time as talks on reduction of GHG emissions were taking place. The convention regulates the harmful effect of invasive species via ballast water which is an environmental protection issue and is considered to be contemporary in nature. Therefore BWM, 2004 satisfies all the conditions set out in criteria 4.

3.5.2 Era of Development

The issue of biodiversity conservation and development of international agreement for protection of marine resources was first brought out in 1992 at Rio de Janeiro during the United Nations Conference on Environment and Development (UNCED) (United Nation [UN], n.d.). The

work on the development of a mandatory instrument started in 1998 which resulted in BWM, 2004 (IMO, n.d. g). The efforts towards reduction of GHG emission was also discussed during the similar period and hence the BWM, 2004 fulfils criteria 5.

The **BWM,** 2004 **fulfils all the criteria** as set in the benchmarking process and **will be utilised for the comparative analysis** of GHG emission measures policies (EEDI policy). The following section will give a brief introduction to the BWM, 2004.

3.6 Brief Introduction to Ballast Water Management Convention, 2004

The effort of the world community to regulate the ballast water from the vessels to mitigate the problem of invasive species took form in an internationally binding instrument known as International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 in short Ballast Water Management Convention, 2004 (Bobka, 2018). BWM Convention is the regulatory framework which deals with the issue of transfer of invasive species through ships. IMO started work on addressing the issue of invasive species as early as 1991 where MEPC adopted "*International Guidelines for preventing the introduction of unwanted aquatic organisms and pathogens from the ships' ballast and sediment discharges*"[15] (IMO, 1991). This initial effort finally resulted in the introduction of the BWM Convention in 2004 after 14 years of negotiations and development of the instrument.

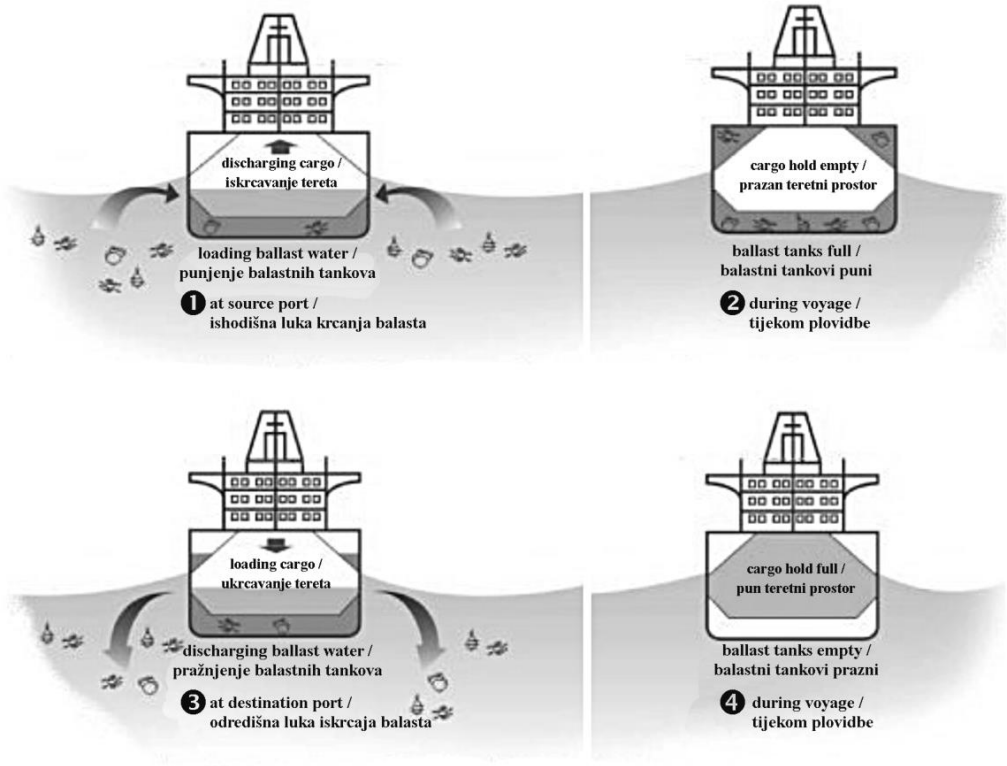
3.6.1 Origin of the Problem

Ballast water is a necessity for ships to maintain trim, list and ensure safety of the ship. Ships ballasts when not carrying any cargo and then de-ballast before loading cargo. Figure 9 shows the complete process of ballast water cycle and highlights how invasive species are transferred via ships.

[15] Via IMO resolution MEPC.50(31) dated 04 July 1991.

Figure 9

Ballast Water Cycle



Note. From "An Approach to Ship Water Ballast Management by Continuous Flow-through Method," Fafandjel et al., 2011, Strojarstvo (https://hrcak.srce.hr/file/113023). Copyright 2011 by Fafandjel et al.

At present about 10 billion tonnes of water is used by shipping in the form of ballast each year; this equates to movement of approximately 7,000 marine species every day around the world (GEF et al., 2010; Yilmaz & Bilgin, 2022). One of the first ever occurrences of invasive alien species can be traced back to the appearance of Asian phytoplankton algae Odontella in 1903 in the North Sea (Castro, 2012, p. 5). However, not much focus was given to the issue till the mid-1980s. This can be attributed to the fact that there was no

international body which could have taken specific interest or action in this field. It was not until 1970s that scientists showed interest in detail analysis of the subject which drew attention of the global community on the issue resulting in the adoption of the very first version of the later internationally recognised "Code of Practice on the Introductions and Transfers of Marine Organism" (Gollasch & David, 2019). However, attention was drawn towards this topic in the mid-1980s with the introduction of zebra mussels in the Great Lakes and the major environmental and economic destruction caused by them (Kim, 2013; MacPhee, 2007, p. 34; Ricciardi, 2022). This was then brought to the attention of IMO by the Member States affected by the invasive species. It can be seen clearly that Member States who have the resources to conduct research and bring issues to the notice of IMO are generally developed nations like in this case it was Canada and Australia.

3.6.2 IMO's Effort for Resolving the Issue

In response to mitigate the problem, IMO in 1991 issued its first guidelines as mentioned in section 3.6 above. Also, at the same time UNCED highlighted the need for collective action to resolve the issue of conservation of biodiversity and protection of marine resources in the 1992 Rio de Janeiro conference. In the next year, IMO via assembly resolution[16] requested the MEPC and Maritime Safety Committee (MSC) to keep the above-mentioned guidelines under review with a view of developing a legally-binding instrument in future (IMO, 1993). Following which MEPC established a Ballast Water Working Group in 1994 to work on the development of a convention. Continuing its work, IMO adopted new set of guidelines replacing

[16] Resolution A.774(18) dated 04 Nov 1993, issued at IMO's 18th General Assembly titled "Guidelines for preventing the introduction of Unwanted Aquatic Organisms and Pathogen from Ships' Ballast Water and Sediment Discharge" was one of the first steps taken to develop a legally-binding instrument for ballast water management.

the older version to address the issue of ships' ballast water[17] (IMO, 1997). The work on development of Convention continued till 2004, during this period various other important events such Conference of Parties (COP) 4 to the Conservation of Biological Diversity (CBD) in 1998 during which decision was taken towards conservation and sustainable use of marine resources[18] (Convention on Biological Diversity [CBD], 1998). Also, during COP 6 to the CBD decision on alien species that threatens ecosystem, habitats or species, including guiding principles on invasive species[19] (CBD, 2002). Finally, 2002 World Summit on Sustainable Development which also urged an all-out effort from everyone to develop measures to address invasive alien species in ballast water at a faster pace (International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004). Due to the immense international pressure BWM, 2004 was introduced as an independent convention as compared to the initial plan of adding an annex to MARPOL 76/78.

3.6.3 BWM Convention in a Nutshell

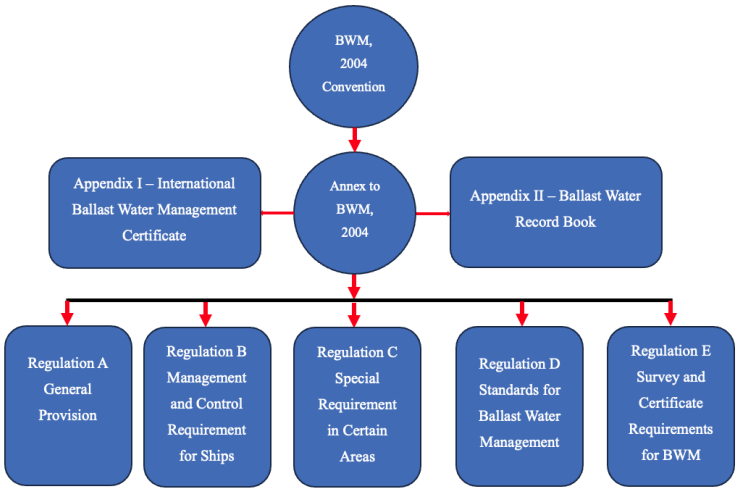
The International Convention for the Control and Management of Ships' Ballast Water and Sediments which was signed at a Diplomatic Conference held at London on 13 Feb 2004 was the final outcome of almost 14 years of development and negotiations at various levels (Lindholm, 2018; Stalls et al., 2019, p. 10). BWM, 2004 Conventions consist of 22 articles and one annex. There are two appendices to this annex which deal with international ballast water management certificate (Appendix I) and form of ballast water record book (Appendix II). The annex itself is divided into five

[17] Resolution A.868(20) dated 27 Nov 1997, issued at IMO's 20th General Assembly titled "Guidelines for the Control and Management of Ships' Ballast Water to Minimise the Transfer of Harmful Aquatic Organism and Pathogens" was the approach which IMO took in 1997, which was in accordance with the agenda 21 UNCED. Also, it was in this resolution that a timeframe was established for adoption of mandatory instrument by 2000 along with guidelines for uniform and effective implementation.
[18] Decision IV/5 of the COP 4 on CBD.
[19] Decision VI/23 of COP 6 on CBD.

sections numbered A to E which contain regulations about various aspects of the convention. Section A which is titled "General Provision" covers definitions, applicability, exceptions and exemptions. This section gives the overall picture of who and where this convention is required to be followed. Section B, titled "Management and Control Equipment for Ships" has six regulations in all and covers management plan, conditions for ballast water exchange and record keeping. Next is section C which deals with "Special Requirement in Certain Areas", this is the smallest section only having three regulations covering additional measures required in special areas. Section D "Standards for Ballast Water Management" deals with the technical specification of standards which needs to be maintained for both ballast water exchange and ballast water performance. This section also covers the approval mechanism of Ballast Water Management Systems (BWMS). Final section covers the requirement for survey and certification of the ships and the BWMS. The full text of the convention is placed at Appendix 3 to this research. Figure 10 below gives the complete outline of the convention.

Figure 10

Outline of BWM, 2004 Convention



Note. Created by the Author.

Various codes and guidelines have been introduced since the adoption of BWM, 2004 Convention. However, since the aim of this research is to only analyse the factors which played a role in the development (formulation stage) of the policy, those additions are beyond the purview of this dissertation. However, it is pertinent to mentions that following the Experience Building Phase (EBP) established by MEPC in 2017 for an evidence-based systematic review of the BWM, 2004 Convention (United Nations Conference on Trade and Development [UNCTAD], 2022) the process for review of the convention has been started and at MEPC 80, a report was submitted by the correspondence group on review of BWM Convention[20] (IMO, 2023). This is indicative of the fact that the policy is already in the policy maintenance phase of the policy cycle.

3.7 Concluding Remarks

In this chapter we developed a matrix for identifying the best suitable approach for analysis of the policies at hand. Using the matrix, it was found out that, for strategic benchmarking, comparative benchmarking is the best approach. Using the information, criteria for benchmarking were developed and applied on the entire universe of policy available to us. On completion of the process BWM, 2004 Convention came out as the policy which is best suited for conducting comparative analysis of GHG emission measures policies. In the end a brief introduction to the BWM, 2004 convention was given and latest developments in the field were also discussed. This chapter directly answers the first RQ which talks about the method for selection of a policy for comparative analysis. The validity of this selection was further checked during chapter IV when the similarity in submission with respect to GHG emission measure policies were analysed.

[20] MEPC 80/4/4 dated 17 March 2023.

Chapter IV – Analysis and Findings

4.1 Outline of the Chapter

Chapter was divided into two major sections. In the first section the analysis of the collected data was undertaken. Four categories of policy, i.e., EEDI, Air Pollution from Ships (holistic approach towards the measures for GHG reduction), Ballast Water Management Convention (reference policy after benchmarking) and STCW (policy representing different topic for discussion) were analysed based on the number of submissions made by the Member States. The collected data was filtered based on the procedure developed in section 4.2. Discussions were also held for other categorisation of data collected such as submissions by IGOs/NGOs when compared to Member States; submissions by the Secretariat and Working Groups. The data for such discussions are placed at appendices as it is beyond the scope of this research, but the discussions shed some light on the matter at hand. In the second section, the findings of the analysis are presented. The analysis of the collected data and findings answers the second RQ and help achieve second objective of the research.

4.2 Method of Data Selection

The data used for the analysis was derived from the secondary source using IMO Docs. To examine level of participation during the formulation of policy, four different categories were selected for analysis. The categories include Ballast Water Management, Air Pollution from Ships, EEDI and Comprehensive Review of STCW Convention and STCW Code. The analysed documents were part of the submission made to MEPC and STW over a period of time during which the policies were formulated and was considered valid for our discussion. The documents were selected based on two criteria. First, the submission made by participants and Secretariat during

the meeting sessions. Second, various combination of keywords like 'Ballast Water Management'; 'BMW'; 'EEDI'; 'Energy Efficiency'; 'Energy Efficiency Design Index'; 'Welfare'; 'Seafarer'; STCW; etc., were used for filtering the documents. Results of the analysis for all four categories are presented in graphical form with explanation in the succeeding paragraphs. During the course of analysis, the documents were further divided into categories which can be used for understanding the level of participation of Member States. A matrix with four level was developed for filtering the desired documents, these levels can be defined as follows: -

- First, division is based on the submission of documents by **participating members, Secretariat and Working Group**. Only submissions by participating members were considered for analysis.

- Second, the division was based on the submission by a **Member States and IGOs/NGOs**. For answering second RQ only submissions made by the Member States were considered. However, further research can be conducted in the participation of IGOs/NGOs and how it affects policy formulation at IMO.

- Third, the division was based on the submissions made by the **developing or developed Member States**. Analysis and discussion were focused on the parity of participation and factors which led to such participation were beyond the scope of this research.

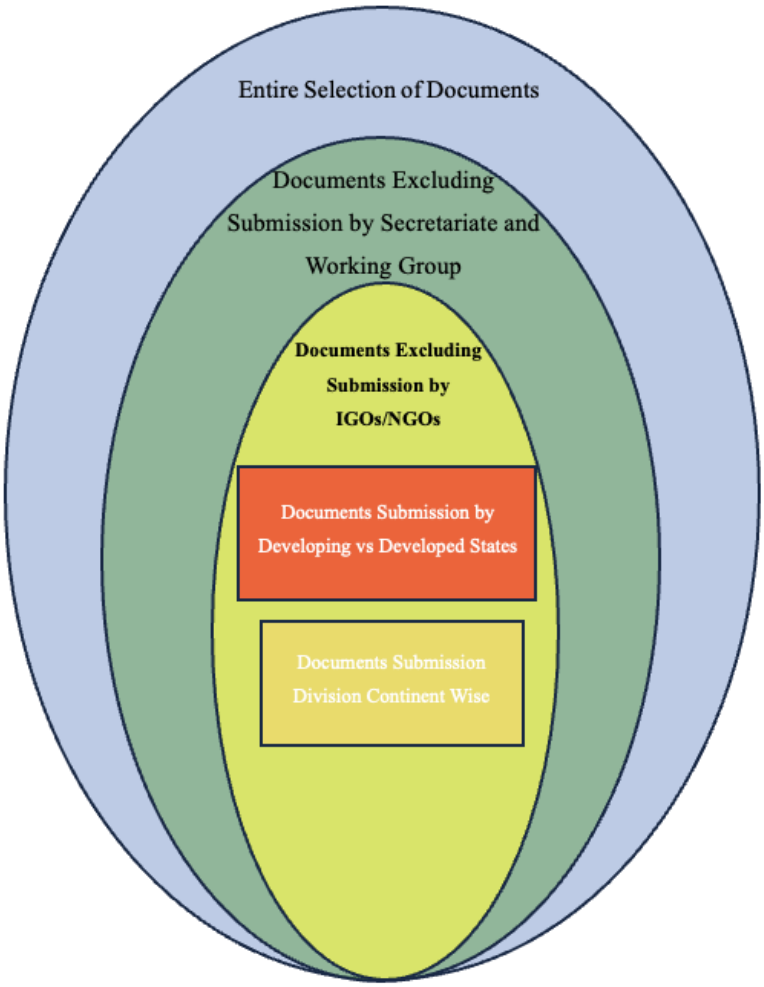
- Fourth, the distribution of the document submission was looked through the geographical lens. Data was represented on a world map for a worldwide view for understanding the document submission.

- Finally, the IGOs/NGOs submissions were analysed. Although not part of the research, the analysis brings out some important points which can be used for further studies.

Figure 11 below showcases the use of matrix for filtering the documents for the analysis.

Figure 11

The Matrix for Filtering the Selected Documents



Note. Created by the Author.

4.3 Consideration for Collection of Data

Since the aim of this research was to analyse participation of Member States during the formulation of policy at IMO, documents were collected from the

committee and sub-committee sessions for the analysis. Various consideration taken into account for selection of documents are enumerated in the succeeding paragraphs: -

4.3.1 Ballast Water Management

The BWM Convention was developed from the late 1990's till 2004 when the convention was adopted by the IMO. Hence, documents from 1998 till 2004 were only considered for selection. This includes MEPC 39 to 49 covering the time period from 1998 to 2004. However, digital documents for the meetings are only available from MEPC 43 and beyond. Documents from MEPC 39 to 42 were not included, however, the documents collected from MEPC 43 to 49 provide a large enough sample to bring out the trends in the submissions made and were considered adequate. A total of **176 documents** were submitted during the course of this period, submissions are from all participating members which includes Member States, IGOs/NGOs, Secretariat and Working Group.

4.3.2 Air Pollution from Ships

The main aim of this research was to analyse the participation of Member States during the policy formulation stage with GHG emission measures and EEDI policy as the example. However, the EEDI policy falls under the larger ambit of air pollution from ships. Therefore, to ensure that the trends represented by the EEDI policies were in conformity with the larger policy for reduction of GHG emission, the topic of Air pollution from ships was also analysed. The period covered under this topic is from 2000 to 2011. This includes MEPC 45 to 62 covering the whole period starting from work towards the reduction of GHG emission till adoption of EEDI policy. A total of **533 documents** were selected under this topic which was a larger sample

size for understanding the overall interest of participating members leading up to the formulation and adoption of EEDI policy.

4.3.3 EEDI

For selection of documents only covering EEDI various keywords were used such as 'EEDI', 'Energy Efficiency' and 'Energy Efficiency Design Index'. The first two keywords yielded some unnecessary results such as documents containing word proc**eedi**ng and also documents submitted for Energy Efficiency Operating Indicator (EEOI). To ensure relevance of the documents' selection, keyword 'Energy Efficiency Design Index' was finally used. This yielded a total of **61 documents** which covered the time period from 2009 (MEPC 59) to 2011 (MEPC 62).

4.3.4 Comprehensive Review of STCW Convention

To answer the second research question, which looks into the participation based on the topic being discussed, a different broader topic was required for analysis. Since all three-topic discussed above cover marine environment protection, for diversity of topic, seafarers and agenda related to them was selected for analysis. The topic was further narrowed done to STCW, since STCW was adopted in 1978 and no digital copies of documents submitted by participating members were available, the comprehensive review of STCW convention was selected, which provides similar settings as policy formulation stage and was undertaken in the similar era as other policies discussed to keep geo-political factors constant during the analysis. The documents selected cover the period from 2007 (STW 38) to 2010 (STW 41). A total of **214 documents** were selected for the analysis.

4.4 Analysis of the Data

In this section collected data is analysed, for the convenience the collected data is not presented here but placed at appendices **4 to 7**. The analysis is undertaken as per the matrix developed in section 4.2. Since the main aim of research is to examine the participation of developed and developing Member States, graphs for step 1 & 2 and participation of IGOs/NGOs are placed at appendices **8 to 10**, as it is beyond the scope of this present discussion. However, results are discussed in this section as the analysis of the results have some bearing on the findings of the research presented at the end of this chapter.

4.4.1 Participating Members V/s Secretariat

The documents submitted by the Secretariat and Working Groups for all four topics ranged from 16 to 24%, with exception of EEDI where no submissions were made by the Secretariat. Submissions made by the Secretariat and Working Group mostly include reports on the work undertaken, outcome of the studies and administrative work. The graphs are placed at Appendix 8.

4.4.2 Members States V/s IGOs/NGOs

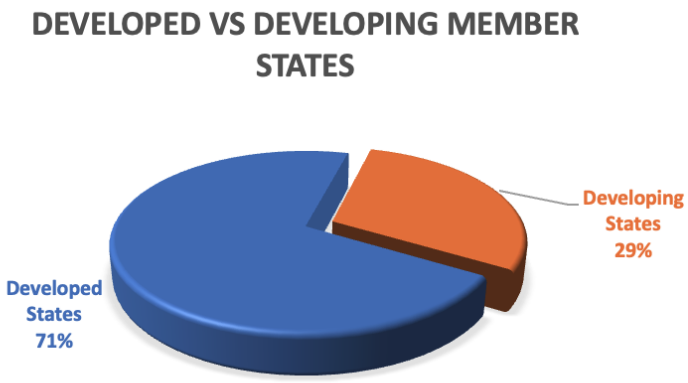
With the exception of BWM where the submissions by the IGOs/NGOs was 13%, all other topics had submissions ranging from 33 to 43%. This is a significant share and represents the interests and concerns of non-participants such as shipping companies, ports, independent tanker owners, environmental organisations such Friends of Earth International (FOEI), seafarers trust, etc. in policy discussion at IMO. For air pollution from ships out of 406 submissions by participating members 131 documents were submitted by the IGOs/NGOs. Graphs are placed at Appendix 9.

4.4.3 Developed vs Developing Members States

The graphs presented in figures 12 to 15 represents the percentage share of documents submitted by the Developed vs Developing Member States post exclusion of the submissions made by the Secretariat and IGOs/NGOs.

Figure 12

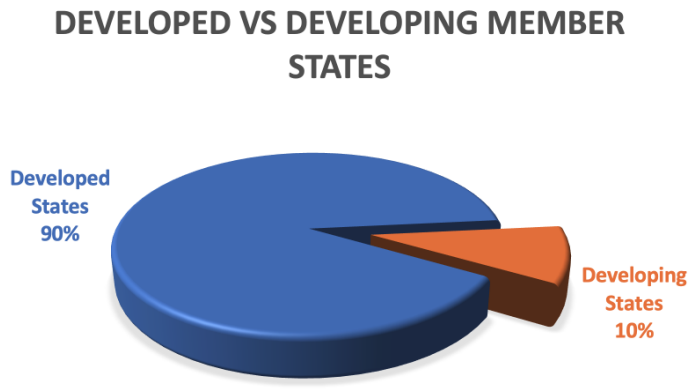
BWM – Percentage Share of Document Submission – Developed V/s Developing Member States



Note. Created by the Author.

Figure 13

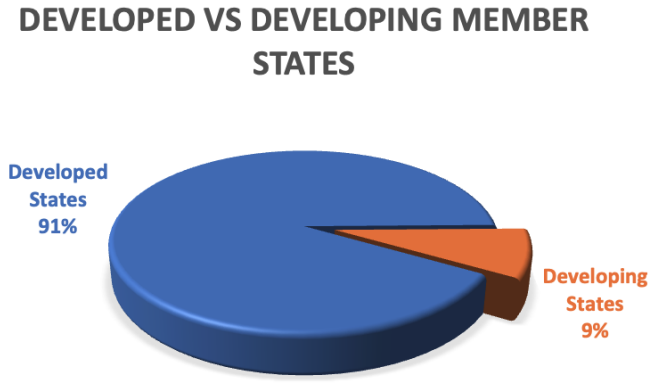
Air Pollution from Ships – Percentage Share of Document Submission – Developed V/s Developing Member States



Note. Created by the Author.

Figure 14

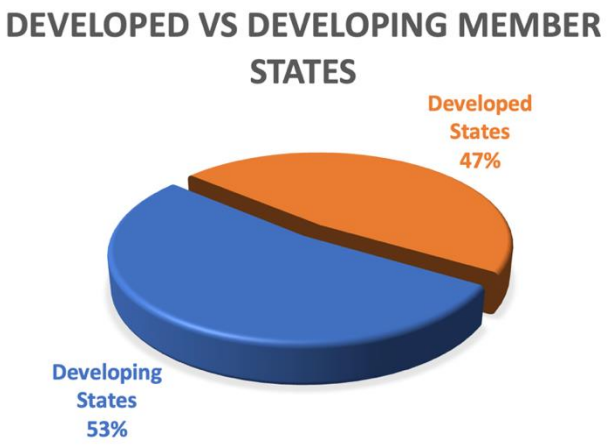
EEDI – Percentage Share of Document Submission – Developed V/s Developing Member States



Note. Created by the Author.

Figure 15

STCW – Percentage Share of Document Submission – Developed V/s Developing Member States



Note. Created by the Author.

With the exception of BWM the participation of developing countries in issues related to marine environment protection ranges from **9-10%.** The greater percentage in BWM can be attributed to the participation of Brazil during the discussion who submitted **22 documents** out of 130 total submissions. For discussion, if the submission of Brazil is neglected then the percentage of submission by developing countries drops to **15% only**. In contrast to the issue related to marine environment protection, when seafarers' issues were analysed, a well-defined change can be seen in the trend of submission with developing nations sharing **53 %** of the total submission of 112 documents. The presented data is a clear indicative of fact that, there exists a disparity amongst developed and developing Member States when topics of marine environment protection is discussed. However, when the topic of STCW is discussed, developing states are proactive and shares equal number of submissions as compared to developed states. This can be attributed to many factors such as lack of resources for participation in issues which are technical

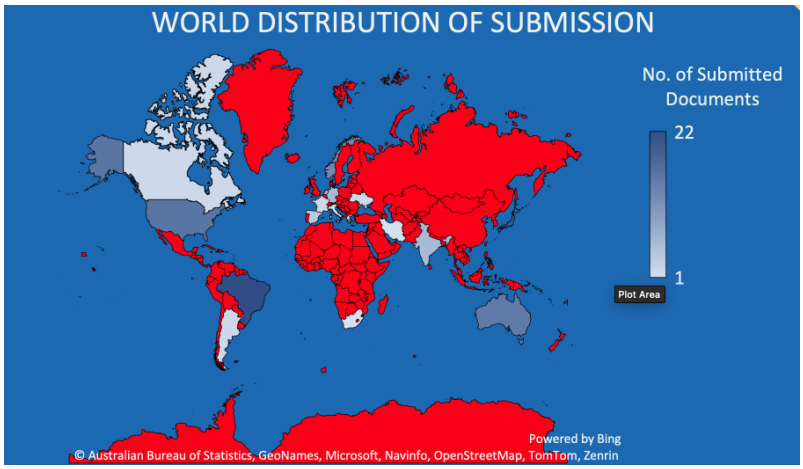
in nature, priorities of the countries like India and Philippines being the largest labour supplying states and many others.

4.4.4 Distribution of Document Submission Worldwide

The graphs presented in figures 16 to 19 represent the worldwide distribution of document submissions where red in figure 16 and black in 17 to 19 is indicative of non-participation of Member States.

Figure 16

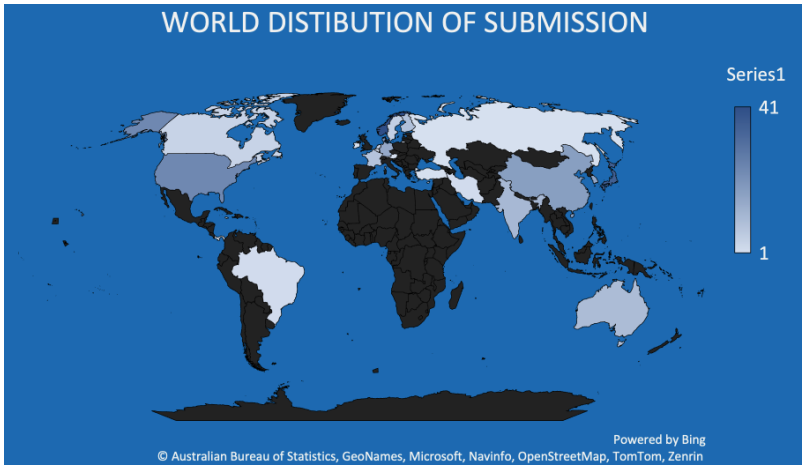
BWM – Document Submission – Worldwide Distribution



Note. Created by the Author.

Figure 17

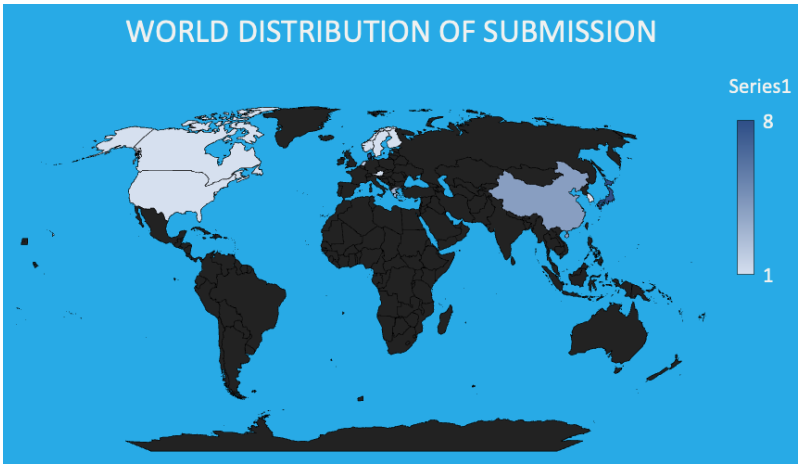
Air Pollution form Ships – Document Submission – Worldwide Distribution



Note. Created by the Author.

Figure 18

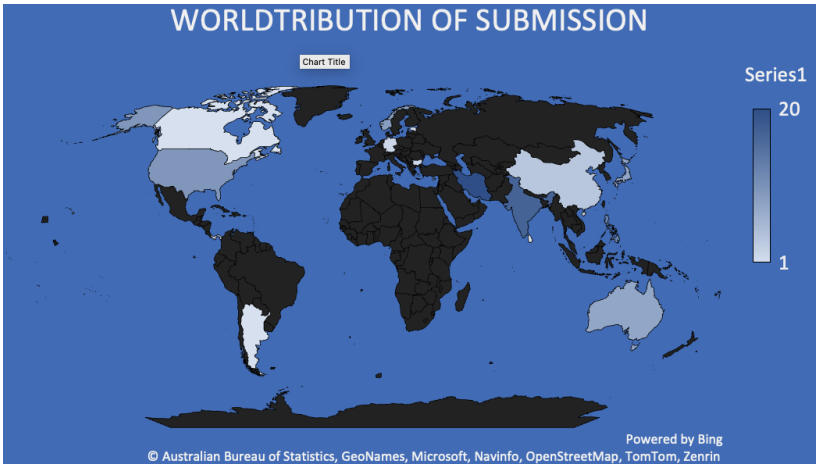
EEDI – Document Submission – Worldwide Distribution



Note. Created by the Author.

Figure 19

STCW – Document Submission – Worldwide Distribution



Note. Created by the Author.

A similar trend is highlighted by the four figures above which is showcasing the distribution of submission worldwide. For issues related to marine environment protection higher participation of European countries, USA, Japan, China and South Korea was brought out. With minor participation from Australia, India and other nations. From Latin American states, only Brazil and Argentina have shown some participation, with African states remaining inactive when it comes to submission of documents at IMO. When viewed from different perspective almost 85 to 90% of the document submissions towards marine environment protection topics were from European Countries, US, Japan, China and South Korea, whereas rest of the world only contributed in minor capacity. The situation changes when the topic of seafarers is discussed, the percentage share of Europe drops to 19% and US was also not very active in discussion on topics such as comprehensive revision of STCW Convention. The rest of the world sharing 62% of the total submission.

4.4.5 Participation of IGOs and NGOs

Although not part of the research, the analysis of distribution of submissions by various IGOs/NGOs presents very interesting results. Like for BWM 55% of the submissions were made by FOEI, IACS and ICS, whereas organisations like UNESCO and EC only shared 15%. EC submitted the largest number of documents with all member nations as co-sponsors during the comprehensive review of the STCW Convention. This is indicative of the fact that NGOs are being utilised as an outlet for representing ideas and concerns which individual Member States cannot propose. Also, NGOs have provided a voice to the non-participating actors who have a major interest in the policy which will be promulgated by IMO like individual tanker association INTERTANKO and others. This also provides the required counterbalance to the policy making process where only Member States have the right to decide upon the policy. By submission of documents major shareholders in the maritime industry convey their view point and concerns at the international organisation. A detailed analysis of any of the above data can be conducted to understand in depth the role which is played by the IGOs/NGOs at IMO. Graphs are placed at Appendix 10.

4.5 Findings of the Analysis

During the course of this analysis a total of **984 documents** were reviewed out of which 200 documents were submitted either by the Secretariat or a Working Group and were not considered for the analysis process. Remaining 784 documents were further subdivided into Member States and IGOs/NGOs, 234 documents were submitted by various IGOs/NGOs which leaves us with a grand total of **550 documents** submitted by Member States. Findings of the Analysis are elaborated in the succeeding paragraphs: -

4.5.1 Role of IGOs/NGOs

With more than 40% share of all the documents submitted, it is evident that IGOs/NGOs play a significant role in shaping policy at IMO and also provides voice to more important and influential members of the maritime industry ranging from Ship Owners to Port Authority. Anyone who has an interest in the shipping sector is represented at the IMO by IGOs/NGOs. Also, depending upon the topic which is being discussed, participation of NGOs changes, IACS, ICS and INTERTANKO were amongst top 5 NGOs when it comes to submission of documents on issues related to marine environment protection. This is understandable as any policy decision which comes out will have a direct impact on their members. On the other hand, when issues related to seafarers were discussed, the European Commission comes out as the IGO submitting the highest number of documents followed by ITF and ISF which is understandable. The analysis is the by-product of the research and does not directly link to the research questions. However, analysis of the role played by IGOs/NGOs at IMO in specific settings can be further examined and studied in detail.

4.5.2 Varied Response Rate of Developing and Developed Member States Depending Upon the Issue Being Discussed

Analysis of Member States participation brings out that developing nations were less active in submission of documents when the issues on marine environment protection were discussed at IMO during the policy formulation stage. Out of **439 documents** submitted by the Member States towards the policy formulation of BWM, Air Pollution from Ships and EEDI only **68 documents** were submitted by the developing countries. Out of these 68 documents submitted, 22 documents were submitted by Brazil during BWM policy formulation, taking those out, the total number is **46 documents** which is about 10% of the total submission. The trends are very similar in nature for

BWM and policies related to GHG emissions like EEDI. However, when the topic is changed to Comprehensive Revision of STCW Convention, developing countries showed much better participation. Out of 112 total submissions, developing nations submitted 59 documents as against 53 documents by developed nations. This can be attributed to the fact that; major labour supplying countries are developing states and they have vested interest in issues related to seafarers. This finding provides direct result to second RQ and proves that participation of Member States largely depends upon the topic which is being discussed.

4.5.3 Role Played by Europe in Formulation of Policy Related to Marine Environment Protection

Out of **439 documents** submitted by Member States towards all three issues related to marine environment protection, European countries have been the most active participant with a total of **192 submissions**. Adding another 5 documents submitted by the EC the total comes out to be 197 which is 45% of the total submission. This is indicative of the fact that European countries have invested heavily towards the resolution of problems which are faced due to global warming and have invested significant amount of resources towards development of policies to protect the environment and reduction of GHG emission from international shipping. This is also indicative of the fact that Europe also has monopoly over the formulation process of policies concerning marine environment protection. Further studies can be conducted to analyse the impact which Europe has on policy formulation at IMO and how the submissions are distributed within Europe.

4.5.4 Case of African States

Two very distinct issues were analysed as part of this research and depending upon the priorities of each member state, participation in

formulation of policy can be understood. However, out of **550 documents** submitted by the Member States for all four issues discussed, only **one in number document** was submitted by any African nation (South Africa for BWM). This is an unintended outcome of the research and can be further analysed as to the reasons for the same, especially when various aids and support is provided to the African countries towards capacity building and training of experts in the field of maritime, WMU being a prime example.

4.6 Concluding Remarks

This chapter clearly brings out that, there exists a disparity in the participation of Member States depending upon the topic which was discussed. Developed nations have proven to be more active in formulation of policy which are concerned with marine environment protection as compared to developing nations who are more active in issues related to seafarers, role played by European states stands out in the process, where the participation is almost 45% in marine environment protection issues and drops significantly to 19% when issues related to seafarers such as revision of STCW convention was discussed. Also, the similarity of output of the collected data for EEDI and BWM is indicative of the fact the method developed for selection of policy via benchmarking process is effective and can be utilised for different models. Finally, the case of African nations is brought out, which highlights non-participation of African countries in all the four policy issues discussed at IMO. This chapter provides empirical evidence for the second research objective via means of answering the second RQ.

Chapter V – Summary and Recommendations

5.1 Summary of the Dissertation

This research was an attempt to analysis policy formulation at IMO taking the example of GHG emission measures (EEDI policy), in broader sense the case can be considered for issues pertaining to marine environment protection. As it was brought out in chapter I, many factors influence the formulation of policy, some of them are tangible in nature like the size and composition of delegations for a particular meeting, number of submissions made by the stakeholders and to a certain extent the number of times representatives have spoken and what was the comment made by them during the discussion on any particular issue. Most of the factors are intangible, role of media, backdoor channeling, coffee break discussions and many more. Each individual aspect can be analysed w.r.t. each individual member at IMO, let it be a Member State or an IGO/NGO. Given the constrains of time and resources, this research focused on the number of submissions made by the Member States at the policy formulation stage. Comparative analysis method was used for analysing the participation of Member States. A benchmarking process was developed and applied on the entire policy universe to select best suitable policies for comparison of GHG emission measure policies as a whole and specifically EEDI as one of the policies.

Benchmarking resulted in the selection of BWM, 2004 conventions as the best suited policy for comparative analysis and also applying the same criteria Comprehensive Revision of STCW Convention and STCW Code was selected as a policy which is covering a different aspect, reasons for selection were explained in chapter III and IV.

RQ 1 which dwelled into the process of selection of a policy for comparative analysis of GHG emission measures was elaborated and answered in chapter III. Detailed discussions were held and an indicative method was developed for selection of a policy for comparative analysis. The validity of the process was assessed with the results obtained in chapter IV. The similarity in the trends of submissions towards formulation of BWM, Air Pollution form Ships and EEDI gives definitive proof that the method developed via benchmarking process is valid and functional.

RQ 2 aimed at analysing the percentage share of document submissions by developed and developing Member States at the formulation stage of a policy, was answered in chapter IV where analysis of four different issue were undertaken and the results were presented. Participation of developing nations was found to be very low in issues related to marine environment protection when compared to developed nations. However, when issue related to seafarers in the form of Comprehensive Revision of STCW Convention and STCW Code was analysed the participation of developing nations exceeded developed nations. This is indicative of the fact that, participation from developed and developing nations largely depends upon the issue being discussed at IMO.

5.2 Fulfilment of the Aim of the Research

The aim of the research was to examine if there existed any disparity between the developed and developing Member States during the formulation of policies concerning GHG emission measures via analysis of the number of documents submission using comparative analysis. It can be seen from the results that, developing Member States participation was very low when issues of GHG emissions were discussed at IMO. The percentage share lies between 10-15% of the total submissions. Further validity is given to the finding by analysing the data for Comprehensive Revision of STCW Convention and STCW Code, where participation of developing Member States was 53% of the total submissions. Therefore, it can be concluded that **yes there existed a disparity between developed and developing Member States**

during the formulation stage of policies concerning GHG emission reduction measures.

5.4 Summary of the Findings of the Research

Findings of the research were presented in chapter IV. Presented below is the summary of those findings.

- IGOs/NGOs despite having no voting rights at IMO, have submitted a considerable number of documents during the formulation stage of policies. The contribution ranges from 33 to 43% on all topics. Other than providing voice to the interested parties in maritime industry, IGOs/NGOs also act as a powerhouse for pushing the agenda at IMO.

- Depending on the issue being discussed, participation from developed and developing Member States varied quite significantly. With about 10-15% participation in issues related to GHG emission reduction measures to 53% participation in issues related to seafarers, developing Member States have made their priorities clear.

- Role played by European nations in driving the cause for formulation of GHG emission reduction measures was also brought out. Their participation was at 45% during such discussions. However, when issue related to revision of STCW Convention was discussed it dropped to 19%.

- Non-participation of African nations at the formulation stage of policies concerning GHG emissions, BWM and also towards revision of STCW Convention was an unintended outcome of the research.

5.5 Recommendations for Further Research

The research has led to identification of many other fields which can be further explored and a deeper understanding of the topic can be achieved. The identified areas for further research are enumerated below.

(a) A detailed study can be undertaken in the role played by IGOs/NGOs is the policy formulation of GHG emission measures based on the data presented at Appendix 10.

(b) A study can be conducted for examining the reasons for European state's higher participation in driving the policy formulation of GHG emission measures at IMO.

(c) The non-participation of African states can further be tested in other issues such as safety, security, digitalisation, etc., if the case proven to be the same in other fields, then the case can be further studied for the reasons of non-participation of African nations during formulation stage of policy at IMO.

(d) Similar comparative analysis can be conducted for other stages of policy cycle and also for different issues which are being discussed at IMO.

This research provided a little glimpse into the policy formulation process at IMO when issues concerning GHG emission reduction measures were discussed. It was brought out that European nations due to many factors, discussions on which was beyond the scope of this research were the driving force in development of policies regulating emissions from shipping sector. Developing states had no to little say in the matter, which is indicative due to low participation by them in the process. There can be many causes for this disparity, however, lack of resources and research capabilities can be considered amongst the prime factors.

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Appendix 1 – Energy Efficiency Design Index Policy

ANNEX 19

RESOLUTION MEPC.203(62)

Adopted on 15 July 2011

AMENDMENTS TO THE ANNEX OF THE PROTOCOL OF 1997 TO AMEND THE INTERNATIONAL CONVENTION FOR THE PREVENTION OF POLLUTION FROM SHIPS, 1973, AS MODIFIED BY THE PROTOCOL OF 1978 RELATING THERETO

(Inclusion of regulations on energy efficiency for ships in MARPOL Annex VI)

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee (the Committee) conferred upon it by international conventions for the prevention and control of marine pollution,

NOTING article 16 of the International Convention for the Prevention of Pollution from Ships, 1973 (hereinafter referred to as the "1973 Convention"), article VI of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (hereinafter referred to as the "1978 Protocol") and article 4 of the Protocol of 1997 to amend the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (hereinafter referred to as the "1997 Protocol"), which together specify the amendment procedure of the 1997 Protocol and confer upon the appropriate body of the Organization the function of considering and adopting amendments to the 1973 Convention, as modified by the 1978 and 1997 Protocols,

NOTING ALSO that, by the 1997 Protocol, Annex VI entitled Regulations for the Prevention of Air Pollution from Ships was added to the 1973 Convention (hereinafter referred to as "Annex VI"),

NOTING FURTHER that the revised Annex VI was adopted by resolution MEPC.176(58) and entered into force on 1 July 2010,

RECOGNIZING that the amendments to Annex VI and inclusion of a new chapter 4 intend to improve energy efficiency for ships through a set of technical performance standards, which would result in reduction of emissions of any substances that originate from fuel oil and its combustion process, including those already controlled by Annex VI,

RECOGNIZING ALSO that adoption of the amendments to Annex VI in no way prejudges the negotiations held in other international fora, such as the United Nations Framework Convention on Climate Change (UNFCCC), nor affect the positions of the countries that participate in such negotiation,

HAVING CONSIDERED draft amendments to the revised Annex VI for inclusion of regulations on energy efficiency for ships,

1. ADOPTS, in accordance with article 16(2)(d) of the 1973 Convention, the amendments to Annex VI, the text of which is set out in the annex to the present resolution;

2. DETERMINES, in accordance with article 16(2)(f)(iii) of the 1973 Convention, that the amendments shall be deemed to have been accepted on 1 July 2012, unless prior to that date, not less than one third of the Parties or Parties the combined merchant fleets of which constitute not less than 50 per cent of the gross tonnage of the world's merchant fleet, have communicated to the Organization their objection to the amendments;

3. INVITES the Parties to note that, in accordance with article 16(2)(g)(ii) of the 1973 Convention, the said amendments shall enter into force on 1 January 2013 upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article 16(2)(e) of the 1973 Convention, to transmit to all Parties to the 1973 Convention, as modified by the 1978 and 1997 Protocols, certified copies of the present resolution and the text of the amendments contained in the Annex;

5. REQUESTS FURTHER the Secretary-General to transmit to the Members of the Organization which are not Parties to the 1973 Convention, as modified by the 1978 and 1997 Protocols, copies of the present resolution and its Annex; and

6. INVITES the Parties to MARPOL Annex VI and other Member Governments to bring the amendments to MARPOL Annex VI to the attention of shipowners, ship operators, shipbuilders, ship designers, marine diesel engine and equipment manufacturers as well as any other interested groups.

ANNEX

AMENDMENTS TO MARPOL ANNEX VI ON REGULATIONS FOR THE PREVENTION OF AIR POLLUTION FROM SHIPS BY INCLUSION OF NEW REGULATIONS ON ENERGY EFFICIENCY FOR SHIPS

CHAPTER 1

GENERAL

Regulation 1

Application

1 The regulation is amended as follows:

"The provisions of this Annex shall apply to all ships, except where expressly provided otherwise in regulations 3, 5, 6, 13, 15, 16, 18, 19, 20, 21, 22 and 23 of this Annex."

Regulation 2

Definitions

2 Paragraph 21 is amended as follows:

"21 *Tanker* in relation to regulation 15 means an oil tanker as defined in regulation 1 of Annex I or a chemical tanker as defined in regulation 1 of Annex II of the present Convention."

3 The following is added at the end of regulation 2:

"For the purpose of chapter 4:

22 "Existing ship" means a ship which is not a new ship.

23 "New ship" means a ship:

.1 for which the building contract is placed on or after 1 January 2013; or

.2 in the absence of a building contract, the keel of which is laid or which is at a similar stage of construction on or after 1 July 2013; or

.3 the delivery of which is on or after 1 July 2015.

24 "Major Conversion" means in relation to chapter 4 a conversion of a ship:

.1 which substantially alters the dimensions, carrying capacity or engine power of the ship; or

.2 which changes the type of the ship; or

.3 the intent of which in the opinion of the Administration is substantially to prolong the life of the ship; or

.4 which otherwise so alters the ship that, if it were a new ship, it would become subject to relevant provisions of the present Convention not applicable to it as an existing ship; or

.5 which substantially alters the energy efficiency of the ship and includes any modifications that could cause the ship to exceed the applicable required EEDI as set out in regulation 21.

25 "Bulk carrier" means a ship which is intended primarily to carry dry cargo in bulk, including such types as ore carriers as defined in SOLAS chapter XII, regulation 1, but excluding combination carriers.

26 "Gas carrier" means a cargo ship constructed or adapted and used for the carriage in bulk of any liquefied gas.

27 "Tanker" in relation to chapter 4 means an oil tanker as defined in MARPOL Annex I, regulation 1 or a chemical tanker or an NLS tanker as defined in MARPOL Annex II, regulation 1.

28 "Container ship" means a ship designed exclusively for the carriage of containers in holds and on deck.

29 "General cargo ship" means a ship with a multi-deck or single deck hull designed primarily for the carriage of general cargo. This definition excludes specialized dry cargo ships, which are not included in the calculation of reference lines for general cargo ships, namely livestock carrier, barge carrier, heavy load carrier, yacht carrier, nuclear fuel carrier.

30 "Refrigerated cargo carrier" means a ship designed exclusively for the carriage of refrigerated cargoes in holds.

31 "Combination carrier" means a ship designed to load 100% deadweight with both liquid and dry cargo in bulk.

32 "Passenger ship" means a ship which carries more than 12 passengers.

33 "Ro-ro cargo ship (vehicle carrier)" means a multi deck roll-on-roll-off cargo ship designed for the carriage of empty cars and trucks.

34 "Ro-ro cargo ship" means a ship designed for the carriage of roll-on-roll-off cargo transportation units.

35 "Ro-ro passenger ship" means a passenger ship with roll-on-roll-off cargo spaces.

36 "Attained EEDI" is the EEDI value achieved by an individual ship in accordance with regulation 20 of chapter 4.

37 "Required EEDI" is the maximum value of attained EEDI that is allowed by regulation 21 of chapter 4 for the specific ship type and size."

CHAPTER 2

SURVEY, CERTIFICATION AND MEANS OF CONTROL

Regulation 5

Surveys

4 Paragraph 1 is amended as follows:

"1 Every ship of 400 gross tonnage and above and every fixed and floating drilling rig and other platforms shall to ensure compliance with chapter 3 be subject to the surveys specified below:

.1 An initial survey before the ship is put into service or before the certificate required under regulation 6 of this Annex is issued for the first time. This survey shall be such as to ensure that the equipment, systems, fittings, arrangements and material fully comply with the applicable requirements of chapter 3;

.2 A renewal survey at intervals specified by the Administration, but not exceeding five years, except where regulation 9.2, 9.5, 9.6 or 9.7 of this Annex is applicable. The renewal survey shall be such as to ensure that the equipment, systems, fittings, arrangements and material fully comply with applicable requirements of chapter 3;

.3 An intermediate survey within three months before or after the second anniversary date or within three months before or after the third anniversary date of the certificate which shall take the place of one of the annual surveys specified in paragraph 1.4 of this regulation. The intermediate survey shall be such as to ensure that the equipment and arrangements fully comply with the applicable requirements of chapter 3 and are in good working order. Such intermediate surveys shall be endorsed on the IAPP Certificate issued under regulation 6 or 7 of this Annex;

.4 An annual survey within three months before or after each anniversary date of the certificate, including a general inspection of the equipment, systems, fittings, arrangements and material referred to in paragraph 1.1 of this regulation to ensure that they have been maintained in accordance with paragraph 5 of this regulation and that they remain satisfactory for the service for which the ship is intended. Such annual surveys shall be endorsed on the IAPP Certificate issued under regulation 6 or 7 of this Annex; and

.5 An additional survey either general or partial, according to the circumstances, shall be made whenever any important repairs or renewals are made as prescribed in paragraph 5 of this regulation or after a repair resulting from investigations prescribed in paragraph 6 of this regulation. The survey shall be such as to ensure that the necessary repairs or renewals have been effectively made, that the material and workmanship of such repairs or renewals are in all respects satisfactory and that the ship complies in all respects with the requirements of chapter 3."

5 Paragraph 2 is amended as follows:

"2 In the case of ships of less than 400 gross tonnage, the Administration may establish appropriate measures in order to ensure that the applicable provisions of chapter 3 are complied with."

6 A new paragraph 4 is added after existing paragraph 3 as follows:

"4 Ships to which chapter 4 applies shall also be subject to the surveys specified below, taking into account Guidelines adopted by the Organization[1]:

.1 An initial survey before a new ship is put in service and before the International Energy Efficiency Certificate is issued. The survey shall verify that the ship's attained EEDI is in accordance with the requirements in chapter 4, and that the SEEMP required by regulation 22 is on board;

.2 A general or partial survey, according to the circumstances, after a major conversion of a ship to which this regulation applies. The survey shall ensure that the attained EEDI is recalculated as necessary and meets the requirement of regulation 21, with the reduction factor applicable to the ship type and size of the converted ship in the phase corresponding to the date of contract or keel laying or delivery determined for the original ship in accordance with regulation 2.23;

.3 In cases where the major conversion of a new or existing ship is so extensive that the ship is regarded by the Administration as a newly constructed ship, the Administration shall determine the necessity of an initial survey on attained EEDI. Such a survey, if determined necessary, shall ensure that the attained EEDI is calculated and meets the requirement of regulation 21, with the reduction factor applicable corresponding to the ship type and size of the converted ship at the date of the contract of the conversion, or in the absence of a contract, the commencement date of the conversion. The survey shall also verify that the SEEMP required by regulation 22 is on board; and

.4 For existing ships, the verification of the requirement to have a SEEMP on board according to regulation 22 shall take place at the first intermediate or renewal survey identified in paragraph 1 of this regulation, whichever is the first, on or after 1 January 2013."

[1] Refer to Guidelines on Survey and Certification of the Energy Efficiency Design Index.

7 Paragraph 4 is renumbered paragraph 5.

8 Paragraph 5 is renumbered paragraph 6.

Regulation 6

Issue or endorsement of a Certificate

9 The heading is amended as follows:

"***Issue or endorsement of Certificates***"

10 The following sub-heading is added at the beginning of the regulation:

"International Air Pollution Prevention Certificate"

11 Paragraph 2 is amended as follows:

"2 A ship constructed before the date Annex VI enters into force for that particular ship's Administration, shall be issued with an International Air Pollution Prevention Certificate in accordance with paragraph 1 of this regulation no later than the first scheduled dry-docking after the date of such entry into force, but in no case later than three years after this date."

12 The following is added at the end of the regulation:

"International Energy Efficiency Certificate

4 An International Energy Efficiency Certificate for the ship shall be issued after a survey in accordance with the provisions of regulation 5.4 to any ship of 400 gross tonnage and above before that ship may engage in voyages to ports or offshore terminals under the jurisdiction of other Parties.

5 The certificate shall be issued or endorsed either by the Administration or any organization duly authorized by it[2]. In every case, the Administration assumes full responsibility for the certificate."

Regulation 7

Issue of a Certificate by another Party

13 Paragraph 1 is amended as follows:

"1 A Party may, at the request of the Administration, cause a ship to be surveyed and, if satisfied that the applicable provisions of this Annex are complied with, shall issue or authorize the issuance of an International Air Pollution Prevention Certificate or an International Energy Efficiency Certificate to the ship,

[2] Refer to the Guidelines for the authorization of organizations acting on behalf of the Administration, adopted by the Organization by resolution A.739(18), as may be amended by the Organization, and the Specifications on the survey and certification functions of recognized organizations acting on behalf of the Administration, adopted by the Organization by resolution A.789(19), as may be amended by the Organization.

and where appropriate, endorse or authorize the endorsement of such certificates on the ship, in accordance with this Annex."

14 Paragraph 4 is amended as follows:

"4 No International Air Pollution Prevention Certificate or International Energy Efficiency Certificate shall be issued to a ship which is entitled to fly the flag of a State which is not a Party."

Regulation 8

Form of Certificate

15 The heading is amended as follows:

"***Form of Certificates***"

16 The following subheading is added, and the existing regulation is renumbered as paragraph 1:

"International Air Pollution Prevention Certificate"

17 The following new paragraph 2 is added at the end of the regulation:

"International Energy Efficiency Certificate

2 The International Energy Efficiency Certificate shall be drawn up in a form corresponding to the model given in appendix VIII to this Annex and shall be at least in English, French or Spanish. If an official language of the issuing Party is also used, this shall prevail in case of a dispute or discrepancy."

Regulation 9

Duration and Validity of Certificate

18 The heading is amended as follows:

"***Duration and Validity of Certificates***"

19 The following subheading is added at the beginning of the regulation:

"International Air Pollution Prevention Certificate"

20 The following is added at the end of the regulation:

"International Energy Efficiency Certificate

10 The International Energy Efficiency Certificate shall be valid throughout the life of the ship subject to the provisions of paragraph 11 below.

11 An International Energy Efficiency Certificate issued under this Annex shall cease to be valid in any of the following cases:

.1 if the ship is withdrawn from service or if a new certificate is issued following major conversion of the ship; or

.2 upon transfer of the ship to the flag of another State. A new certificate shall only be issued when the Government issuing the new certificate is fully satisfied that the ship is in compliance with the requirements of chapter 4. In the case of a transfer between Parties, if requested within three months after the transfer has taken place, the Government of the Party whose flag the ship was formerly entitled to fly shall, as soon as possible, transmit to the Administration copies of the certificate carried by the ship before the transfer and, if available, copies of the relevant survey reports."

Regulation 10

Port State Control on Operational Requirements

21 A new paragraph 5 is added at the end of the regulation as follows:

"5 In relation to chapter 4, any port State inspection shall be limited to verifying, when appropriate, that there is a valid International Energy Efficiency Certificate on board, in accordance with article 5 of the Convention."

22 A new chapter 4 is added at the end of the Annex as follows:

"CHAPTER 4

REGULATIONS ON ENERGY EFFICIENCY FOR SHIPS

Regulation 19

Application

1 This chapter shall apply to all ships of 400 gross tonnage and above.

2 The provisions of this chapter shall not apply to:

.1 ships solely engaged in voyages within waters subject to the sovereignty or jurisdiction of the State the flag of which the ship is entitled to fly. However, each Party should ensure, by the adoption of appropriate measures, that such ships are constructed and act in a manner consistent with chapter 4, so far as is reasonable and practicable.

3 Regulation 20 and regulation 21 shall not apply to ships which have diesel-electric propulsion, turbine propulsion or hybrid propulsion systems.

4 Notwithstanding the provisions of paragraph 1 of this regulation, the Administration may waive the requirement for a ship of 400 gross tonnage and above from complying with regulation 20 and regulation 21.

5 The provision of paragraph 4 of this regulation shall not apply to ships of 400 gross tonnage and above:

.1 for which the building contract is placed on or after 1 January 2017; or

.2 in the absence of a building contract, the keel of which is laid or which is at a similar stage of construction on or after 1 July 2017; or

.3 the delivery of which is on or after 1 July 2019; or

.4 in cases of a major conversion of a new or existing ship, as defined in regulation 2.24, on or after 1 January 2017, and in which regulation 5.4.2 and regulation 5.4.3 of chapter 2 apply.

6 The Administration of a Party to the present Convention which allows application of paragraph 4, or suspends, withdraws or declines the application of that paragraph, to a ship entitled to fly its flag shall forthwith communicate to the Organization for circulation to the Parties to the present Protocol particulars thereof, for their information.

Regulation 20

Attained Energy Efficiency Design Index (Attained EEDI)

1 The attained EEDI shall be calculated for:

.1 each new ship;

.2 each new ship which has undergone a major conversion; and

.3 each new or existing ship which has undergone a major conversion, that is so extensive that the ship is regarded by the Administration as a newly constructed ship

which falls into one or more of the categories in regulations 2.25 to 2.35. The attained EEDI shall be specific to each ship and shall indicate the estimated performance of the ship in terms of energy efficiency, and be accompanied by the EEDI technical file that contains the information necessary for the calculation of the attained EEDI and that shows the process of calculation. The attained EEDI shall be verified, based on the EEDI technical file, either by the Administration or by any organization[3] duly authorized by it.

2 The attained EEDI shall be calculated taking into account guidelines[4] developed by the Organization.

[3] Refer to the Guidelines for the authorization of organizations acting on behalf of the Administration, adopted by the Organization by resolution A.739(18), as may be amended by the Organization, and the Specifications on the survey and certification functions of recognized organizations acting on behalf of the Administration, adopted by the Organization by resolution A.789(19), as may be amended by the Organization.

[4] Guidelines on the method of calculation of the Energy Efficiency Design Index for new ships.

Regulation 21

Required EEDI

1 For each:

.1 new ship;

.2 new ship which has undergone a major conversion; and

.3 new or existing ship which has undergone a major conversion that is so extensive that the ship is regarded by the Administration as a newly constructed ship

which falls into one of the categories defined in regulation 2.25 to 2.31 and to which this chapter is applicable, the attained EEDI shall be as follows:

Attained EEDI ≦ Required EEDI = (1-X/100) × Reference line value

where X is the reduction factor specified in Table 1 for the required EEDI compared to the EEDI Reference line.

2 For each new and existing ship that has undergone a major conversion which is so extensive that the ship is regarded by the Administration as a newly constructed ship, the attained EEDI shall be calculated and meet the requirement of paragraph 21.1 with the reduction factor applicable corresponding to the ship type and size of the converted ship at the date of the contract of the conversion, or in the absence of a contract, the commencement date of the conversion.

Table 1. Reduction factors (in percentage) for the EEDI relative to the EEDI Reference line

Ship Type	Size	Phase 0 1 Jan 2013 – 31 Dec 2014	Phase 1 1 Jan 2015 – 31 Dec 2019	Phase 2 1 Jan 2020 – 31 Dec 2024	Phase 3 1 Jan 2025 and onwards
Bulk carrier	20,000 DWT and above	0	10	20	30
	10,000 – 20,000 DWT	n/a	0-10*	0-20*	0-30*
Gas carrier	10,000 DWT and above	0	10	20	30
	2,000 – 10,000 DWT	n/a	0-10*	0-20*	0-30*
Tanker	20,000 DWT and above	0	10	20	30
	4,000 – 20,000 DWT	n/a	0-10*	0-20*	0-30*
Container ship	15,000 DWT and above	0	10	20	30
	10,000 – 15,000 DWT	n/a	0-10*	0-20*	0-30*

Ship Type	Size	Phase 0 1 Jan 2013 – 31 Dec 2014	Phase 1 1 Jan 2015 – 31 Dec 2019	Phase 2 1 Jan 2020 – 31 Dec 2024	Phase 3 1 Jan 2025 and onwards
General Cargo ships	15,000 DWT and above	0	10	15	30
	3,000 – 15,000 DWT	n/a	0-10*	0-15*	0-30*
Refrigerated cargo carrier	5,000 DWT and above	0	10	15	30
	3,000 – 5,000 DWT	n/a	0-10*	0-15*	0-30*
Combination carrier	20,000 DWT and above	0	10	20	30
	4,000 – 20,000 DWT	n/a	0-10*	0-20*	0-30*

* Reduction factor to be linearly interpolated between the two values dependent upon vessel size. The lower value of the reduction factor is to be applied to the smaller ship size.

n/a means that no required EEDI applies.

3 The Reference line values shall be calculated as follows:

Reference line value = $a \times b^{-c}$

where a, b and c are the parameters given in Table 2.

Table 2. Parameters for determination of reference values for the different ship types

Ship type defined in regulation 2	a	b	c
2.25 Bulk carrier	961.79	DWT of the ship	0.477
2.26 Gas carrier	1120.00	DWT of the ship	0.456
2.27 Tanker	1218.80	DWT of the ship	0.488
2.28 Container ship	174.22	DWT of the ship	0.201
2.29 General cargo ship	107.48	DWT of the ship	0.216
2.30 Refrigerated cargo carrier	227.01	DWT of the ship	0.244
2.31 Combination carrier	1219.00	DWT of the ship	0.488

4 If the design of a ship allows it to fall into more than one of the above ship type definitions, the required EEDI for the ship shall be the most stringent (the lowest) required EEDI.

5 For each ship to which this regulation applies, the installed propulsion power shall not be less than the propulsion power needed to maintain the manoeuvrability of the ship under adverse conditions as defined in the guidelines to be developed by the Organization.

6 At the beginning of Phase 1 and at the midpoint of Phase 2, the Organization shall review the status of technological developments and, if proven necessary, amend the time periods, the EEDI reference line parameters for relevant ship types and reduction rates set out in this regulation.

Regulation 22

Ship Energy Efficiency Management Plan (SEEMP)

1 Each ship shall keep on board a ship specific Ship Energy Efficiency Management Plan (SEEMP). This may form part of the ship's Safety Management System (SMS).

2 The SEEMP shall be developed taking into account guidelines adopted by the Organization.

Regulation 23

Promotion of technical co-operation and transfer of technology relating to the improvement of energy efficiency of ships

1 Administrations shall, in co-operation with the Organization and other international bodies, promote and provide, as appropriate, support directly or through the Organization to States, especially developing States, that request technical assistance.

2 The Administration of a Party shall co-operate actively with other Parties, subject to its national laws, regulations and policies, to promote the development and transfer of technology and exchange of information to States which request technical assistance, particularly developing States, in respect of the implementation of measures to fulfil the requirements of chapter 4 of this annex, in particular regulations 19.4 to 19.6."

23 A new appendix VIII is added at the end of the Annex as follows:

"APPENDIX VIII

Form of International Energy Efficiency (IEE) Certificate

INTERNATIONAL ENERGY EFFICIENCY CERTIFICATE

Issued under the provisions of the Protocol of 1997, as amended by resolution MEPC.203(62), to amend the International Convention for the Prevention of Pollution by Ships, 1973, as modified by the Protocol of 1978 related thereto (hereinafter referred to as "the Convention") under the authority of the Government of:

.....
(Full designation of the Party)

by .....
(Full designation of the competent person or organization
authorized under the provisions of the Convention)

Particulars of ship[5]

Name of ship .....

Distinctive number or letters .....

Port of registry .....

Gross tonnage .....

IMO Number[6] .....

THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with regulation 5.4 of Annex VI of the Convention; and

2 That the survey shows that the ship complies with the applicable requirements in regulation 20, regulation 21 and regulation 22.

Completion date of survey on which this Certificate is based: ..... (dd/mm/yyyy)

Issued at .....
(Place of issue of certificate)

(dd/mm/yyyy): ....
(Date of issue) (Signature of duly authorized official issuing the certificate)

(Seal or stamp of the authority, as appropriate)

5 Alternatively, the particulars of the ship may be placed horizontally in boxes.

6 In accordance with IMO ship identification number scheme, adopted by the Organization by resolution A.600(15).

Supplement to the International Energy Efficiency Certificate
(IEE Certificate)

RECORD OF CONSTRUCTION RELATING TO ENERGY EFFICIENCY

Notes:

1 This Record shall be permanently attached to the IEE Certificate. The IEE Certificate shall be available on board the ship at all times.

2 The Record shall be at least in English, French or Spanish. If an official language of the issuing Party is also used, this shall prevail in case of a dispute or discrepancy.

3 Entries in boxes shall be made by inserting either: a cross (x) for the answers "yes" and "applicable"; or a dash (-) for the answers "no" and "not applicable", as appropriate.

4 Unless otherwise stated, regulations mentioned in this Record refer to regulations in Annex VI of the Convention, and resolutions or circulars refer to those adopted by the International Maritime Organization.

1 Particulars of ship

1.1 Name of ship .....

1.2 IMO number .....

1.3 Date of building contract .....

1.4 Gross tonnage .....

1.5 Deadweight .....

1.6 Type of ship* .....

2 Propulsion system

2.1 Diesel propulsion ..... ☐

2.2 Diesel-electric propulsion ..... ☐

2.3 Turbine propulsion ..... ☐

2.4 Hybrid propulsion ..... ☐

2.5 Propulsion system other than any of the above ..... ☐

* Insert ship type in accordance with definitions specified in regulation 2. Ships falling into more than one of the ship types defined in regulation 2 should be considered as being the ship type with the most stringent (the lowest) required EEDI. If ship does not fall into the ship types defined in regulation 2, insert "Ship other than any of the ship type defined in regulation 2".

3 Attained Energy Efficiency Design Index (EEDI)

3.1 The Attained EEDI in accordance with regulation 20.1 is calculated based on the information contained in the EEDI technical file which also shows the process of calculating the Attained EEDI. …. .....☐

The Attained EEDI is: ..... grams-CO_2/tonne-mile

3.2 The Attained EEDI is not calculated as:

3.2.1 the ship is exempt under regulation 20.1 as it is not a new ship as defined in regulation 2.23 ..... ☐

3.2.2 the type of propulsion system is exempt in accordance with regulation 19.3 …. .....☐

3.2.3 the requirement of regulation 20 is waived by the ship's Administration in accordance with regulation 19.4 ..... ☐

3.2.4 the type of ship is exempt in accordance with regulation 20.1 ..... ☐

4 Required EEDI

4.1 Required EEDI is: ..... grams-CO_2/tonne-mile

4.2 The required EEDI is not applicable as:

4.2.1 the ship is exempt under regulation 21.1 as it is not a new ship as defined in regulation 2.23 ..... ☐

4.2.2 the type of propulsion system is exempt in accordance with regulation 19.3 …. ..... ☐

4.2.3 the requirement of regulation 21 is waived by the ship's Administration in accordance with regulation 19.4 ..... ☐

4.2.4 the type of ship is exempt in accordance with regulation 21.1 ..... ☐

4.2.5 the ship's capacity is below the minimum capacity threshold in Table 1 of regulation 21.2 …. ..... ☐

5 Ship Energy Efficiency Management Plan

5.1 The ship is provided with a Ship Energy Efficiency Management Plan (SEEMP) in compliance with regulation 22 ..... ☐

6 EEDI technical file

6.1 The IEE Certificate is accompanied by the EEDI technical file in compliance with regulation 20.1 ..... ☐

6.2 The EEDI technical file identification/verification number .....

6.3 The EEDI technical file verification date .....

THIS IS TO CERTIFY that this Record is correct in all respects.

Issued at .....
(Place of issue of the Record)

(dd/mm/yyyy): ....
(Date of issue) (Signature of duly authorized official issuing the Record)

(Seal or stamp of the authority, as appropriate)"

***

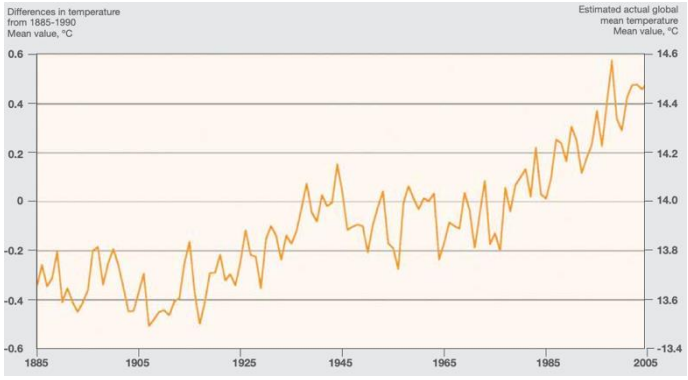
Appendix 2 - Discussion on Climate Change and Significance of Shipping

1. **Historical Background of Climate Change**

To understand the world's approach towards any problem and the policy decision taken to resolve such a problem, it is important to understand the genesis of the problem and how such a problem came into light for discussion. This step can be defined under the broader ambit of agenda setting. However, a comprehensive understanding of background and root cause can help us better understand actions of actors involved in the policy process. Scientists and researchers alike have been reporting changes in the climate as early as late 60s' and early 70s' (Treut et al., 2007). Figure 20 below is a graph which shows that the global temperature of the Earth's surface has been steadily rising from that same era.

Figure 20

Average Surface Temperature of Earth from 1885 to 2005

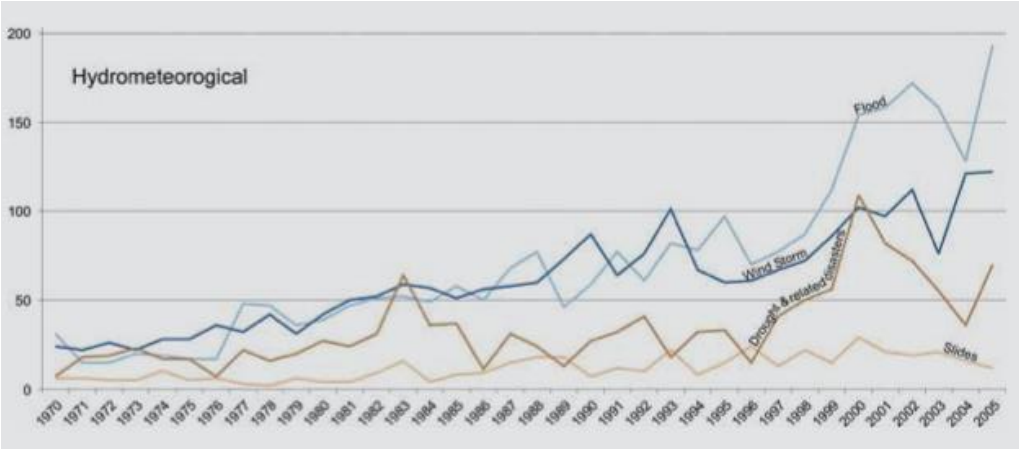


Note. From "*Youth & Climate Change*," UN, 2010 (https://www.un.org/esa/socdev/unyin/documents/wyr10/YouthReport-FINAL-web-single.pdf). Copyright 2010 by United Nations.

Also, during the same time, scientific modelling showed that climate change is directly linked to the increase of GHG gases in the atmosphere. Adverse impacts of climate change include rise in global temperature, loss of biodiversity, water and food insecurity, sea-level rise which threatens the existence of low-lying island nations, desertification, higher frequency of extreme climate events among many others (Rochaet et al., 2015). Figure 21 below shows the increased frequency of extreme climate events and how it relates to the global rise in temperature.

Figure 21

Increase Frequency in Extreme Climate Events



Note. from "*Youth & Climate Change*" UN, 2010 (https://www.un.org/esa/socdev/unyin/documents/wyr10/YouthReport-FINAL-web-single.pdf). Copyright 2010 by United Nations.

However, it was not until 1988 that international awareness prevailed and an Intergovernmental Panel on Climate Change (IPCC) was established under the auspices of World Meteorological Organisation (WMO) and United Nations Environment Programme (UNEP). IPCC submitted its first assessment report in 1990 which stated that global warming is a real threat and the world community needs to undertake some measures to control and prevent it (IMO, n.d. h). The assessment

report spurred the governments in action and in 1992 UNFCCC was developed and was adopted at Rio de Janeiro. IMO understands the significance and importance of shipping as a whole for maintaining sustainable global trade. Therefore, at the same time IMO also started to look into the possibility of reducing emissions from the shipping industry, which resulted in the adoption of protocols for amendment of the MARPOL Convention in 1997.

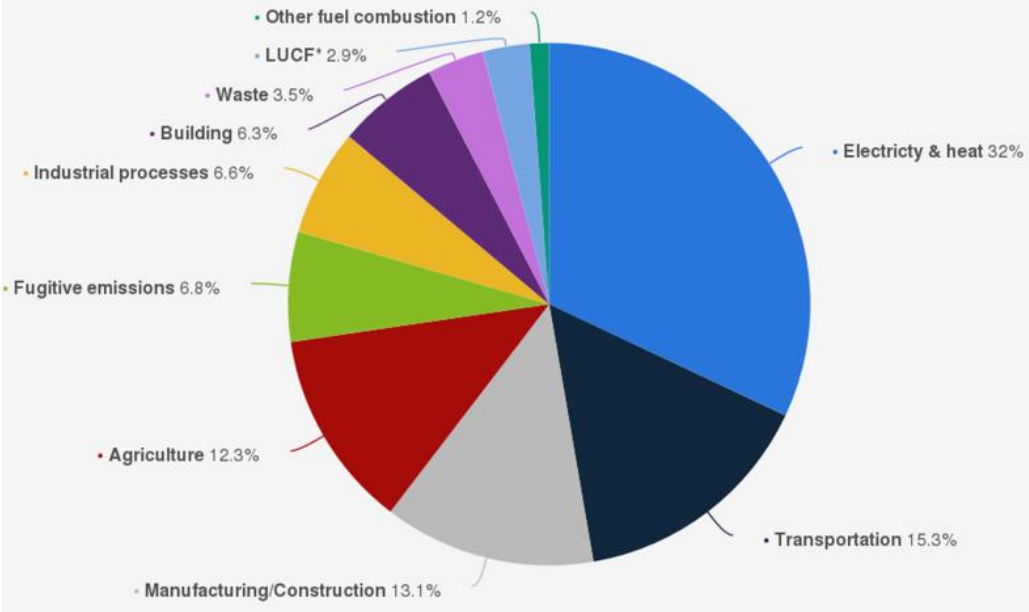
2. Significance of Shipping and its Share in GHG Emissions

Humanity has been progressing in each and every aspect of its existence. This progress is built on the foundation of trade and commerce, the demand for trade is likely to increase in the future with projection of 3.2% growth in trade volume in 2024 (World Trade Organisation [WTO], 2023) and with it the demand for efficient mode of transportation of goods across globe is also expected to increase. Transport by sea is one sector without which the global economy will collapse due to the sheer volume of cargo carried by the ships, be it bulk, dry, crude or containerized cargo. It is an undisputed fact that shipping is the most economical and energy efficient mode of transportation (Bodewig, 2022; European Environment Agency [EEA], 2021; Olçer, 2018, p. 1).

Figure 22 below highlights the distribution of GHG emission worldwide, the transportation sector is 15.3% as of 2020 of the entire anthropogenic emission, the numbers have changed since then and it is estimated that it ranges from 20-30% of total emission as on date (Ritchie, 2020).

Figure 22

Distribution of GHG Emission Worldwide 2020

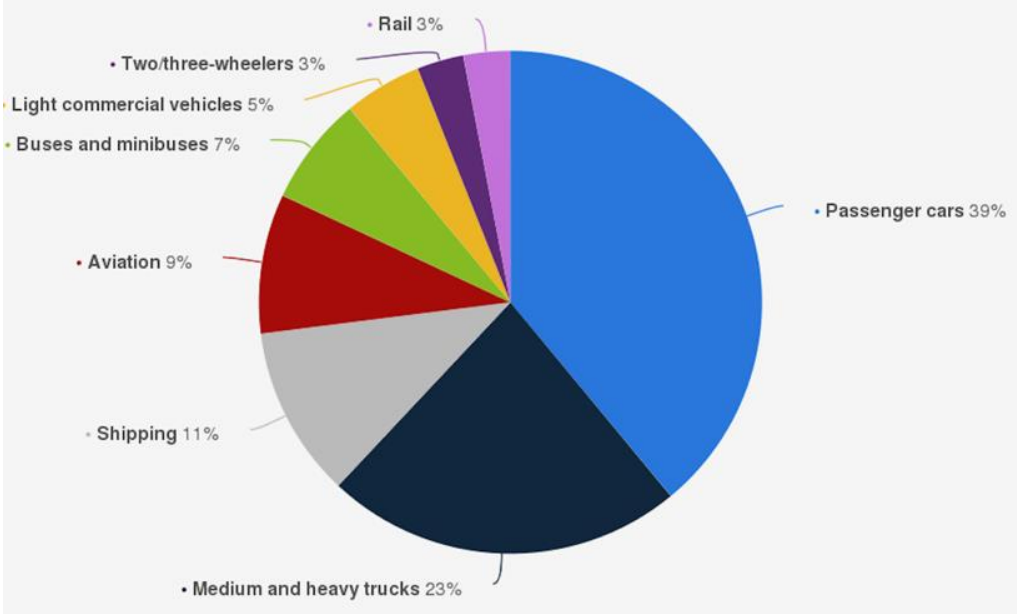


Note. From Distribution of greenhouse gas emissions worldwide in 2020, by sector, by Statista 2023 (https://www.statista.com/statistics/241756/proportion-of-energy-in-global-greenhouse-gas-emissions/). Copyright 2023 by Statista.

Figure 23 below shows the distribution of CO_2 emissions produced by the transportation sector worldwide in 2021. Despite transporting almost 80% of trade by volume, the shipping sector is responsible for only 11% of the total emission share from the transport sector.

Figure 23

Distribution of CO_2 Emission by Transport Sector 2021



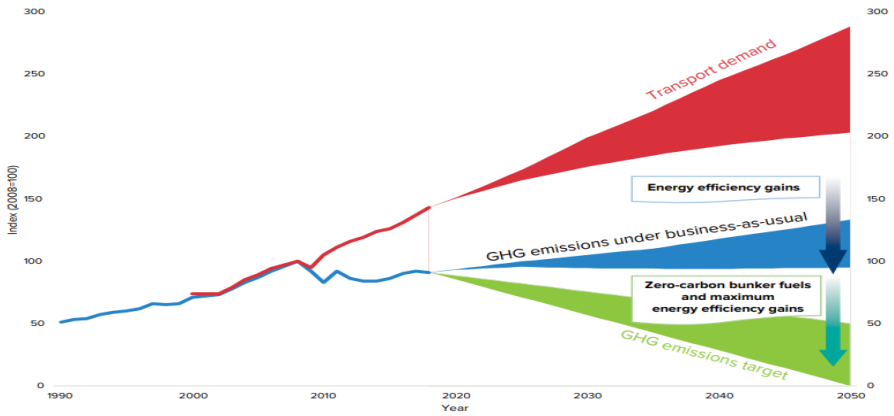
Note. From Distribution of carbon dioxide emissions produced by the transportation sector worldwide in 2021, by subsector, by Statista, 2022 (https://www.statista.com/statistics/1185535/transport-carbon-dioxide-emissions-breakdown/). Copyright 2023 by Statista.

As per the fourth GHG study, international shipping is responsible for only 2.89% of total anthropogenic emission as of 2018 (Bach & Hansen, 2023; IMO, 2021). Also, the study highlights the fact that in the Business-as-Usual scenario the total emission from shipping is likely to increase by 90-130% of 2008 emission by 2050 as against 50-250% reported by third GHG emission study (IMO, 2015). Although the emission has gone up from 977 million tonnes of GHG emission in 2012 to 1,076 million tonnes in 2018 (IMO, 2021), the trend shows a slowdown in the emission from the shipping industry. The measures implemented by IMO are sufficient enough or not is a question which is being debated at every major forum, but this discussion is not in

the scope of this research. The idea to present this data is to bring out a point which highlights the necessity of shipping, the total percentage share of emissions worldwide and slowing down of emission trends. Figure 24 below shows the gains made by implementation of various measures in the shipping industry in absence of a viable replacement for fossil fuels.

Figure 24

Transport Demand and GHG Emission from Shipping



Note. From Carbon revenue from shipping: A game changer for the energy transition, J. Brown, D. Englert, Y. Lee, & Salgmann, 2022 (https://blogs.worldbank.org/transport/carbon-revenues-shipping-game-changer-energy-transition). Copyright 2022 by World Bank.

The data presented above highlights that shipping at present is the most environmentally friendly mode of transportation of goods from the available options such as air freight (Siegle, 2014). Having said that, shipping is still amongst 10 largest polluters in the world releasing almost 1 bn tonnes of CO_2 annually (Collins, 2022). Therefore, efforts were and are still required from the shipping sector and IMO as a regulating body for reducing the GHG emission from the sector.

Appendix 3 – Ballast Water Management Convention

INTERNATIONAL MARITIME ORGANIZATION

IMO

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INTERNATIONAL CONFERENCE ON BALLAST WATER MANAGEMENT FOR SHIPS
Agenda item 8

BWM/CONF/36
16 February 2004
Original: ENGLISH

ADOPTION OF THE FINAL ACT AND ANY INSTRUMENTS, RECOMMENDATIONS AND RESOLUTIONS RESULTING FROM THE WORK OF THE CONFERENCE

INTERNATIONAL CONVENTION FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER AND SEDIMENTS, 2004

Text adopted by the Conference

1 As a result of its deliberations, as recorded in the Record of Decisions of the Plenary (BWM/CONF/RD/2/Rev.1) and the Final Act of the Conference (BWM/CONF/37), the Conference adopted the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004.

2 The above-mentioned Convention, as adopted by the Conference, is annexed hereto.

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ANNEX

INTERNATIONAL CONVENTION FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER AND SEDIMENTS, 2004

THE PARTIES TO THIS CONVENTION,

RECALLING Article 196(1) of the 1982 United Nations Convention on the Law of the Sea (UNCLOS), which provides that "States shall take all measures necessary to prevent, reduce and control pollution of the marine environment resulting from the use of technologies under their jurisdiction or control, or the intentional or accidental introduction of species, alien or new, to a particular part of the marine environment, which may cause significant and harmful changes thereto,"

NOTING the objectives of the 1992 Convention on Biological Diversity (CBD) and that the transfer and introduction of Harmful Aquatic Organisms and Pathogens via ships' ballast water threatens the conservation and sustainable use of biological diversity as well as decision IV/5 of the 1998 Conference of the Parties (COP 4) to the CBD concerning the conservation and sustainable use of marine and coastal ecosystems, as well as decision VI/23 of the 2002 Conference of the Parties (COP 6) to the CBD on alien species that threaten ecosystems, habitats or species, including guiding principles on invasive species,

NOTING FURTHER that the 1992 United Nations Conference on Environment and Development (UNCED) requested the International Maritime Organization (the Organization) to consider the adoption of appropriate rules on ballast water discharge,

MINDFUL of the precautionary approach set out in Principle 15 of the Rio Declaration on Environment and Development and referred to in resolution MEPC.67(37), adopted by the Organization's Marine Environment Protection Committee on 15 September 1995,

ALSO MINDFUL that the 2002 World Summit on Sustainable Development, in paragraph 34(b) of its Plan of Implementation, calls for action at all levels to accelerate the development of measures to address invasive alien species in ballast water,

CONSCIOUS that the uncontrolled discharge of Ballast Water and Sediments from ships has led to the transfer of Harmful Aquatic Organisms and Pathogens, causing injury or damage to the environment, human health, property and resources,

RECOGNIZING the importance placed on this issue by the Organization through Assembly resolutions A.774(18) in 1993 and A.868(20) in 1997, adopted for the purpose of addressing the transfer of Harmful Aquatic Organisms and Pathogens,

RECOGNIZING FURTHER that several States have taken individual action with a view to prevent, minimize and ultimately eliminate the risks of introduction of Harmful Aquatic Organisms and Pathogens through ships entering their ports, and also that this issue, being of worldwide concern, demands action based on globally applicable regulations together with guidelines for their effective implementation and uniform interpretation,

DESIRING to continue the development of safer and more effective Ballast Water Management options that will result in continued prevention, minimization and ultimate elimination of the transfer of Harmful Aquatic Organisms and Pathogens,

RESOLVED to prevent, minimize and ultimately eliminate the risks to the environment, human health, property and resources arising from the transfer of Harmful Aquatic Organisms and Pathogens through the control and management of ships' Ballast Water and Sediments, as well as to avoid unwanted side-effects from that control and to encourage developments in related knowledge and technology,

CONSIDERING that these objectives may best be achieved by the conclusion of an International Convention for the Control and Management of Ships' Ballast Water and Sediments,

HAVE AGREED as follows:

Article 1 *Definitions*

For the purpose of this Convention, unless expressly provided otherwise:

1 "Administration" means the Government of the State under whose authority the ship is operating. With respect to a ship entitled to fly a flag of any State, the Administration is the Government of that State. With respect to floating platforms engaged in exploration and exploitation of the sea-bed and subsoil thereof adjacent to the coast over which the coastal State exercises sovereign rights for the purposes of exploration and exploitation of its natural resources, including Floating Storage Units (FSUs) and Floating Production Storage and Offloading Units (FPSOs), the Administration is the Government of the coastal State concerned.

2 "Ballast Water" means water with its suspended matter taken on board a ship to control trim, list, draught, stability or stresses of the ship.

3 "Ballast Water Management" means mechanical, physical, chemical, and biological processes, either singularly or in combination, to remove, render harmless, or avoid the uptake or discharge of Harmful Aquatic Organisms and Pathogens within Ballast Water and Sediments.

4 "Certificate" means the International Ballast Water Management Certificate.

5 "Committee" means the Marine Environment Protection Committee of the Organization.

6 "Convention" means the International Convention for the Control and Management of Ships' Ballast Water and Sediments.

7 "Gross tonnage" means the gross tonnage calculated in accordance with the tonnage measurement regulations contained in Annex I to the International Convention on Tonnage Measurement of Ships, 1969 or any successor Convention.

8 "Harmful Aquatic Organisms and Pathogens" means aquatic organisms or pathogens which, if introduced into the sea including estuaries, or into fresh water courses, may create hazards to the environment, human health, property or resources, impair biological diversity or interfere with other legitimate uses of such areas.

9 "Organization" means the International Maritime Organization.

10 "Secretary-General" means the Secretary-General of the Organization.

11 "Sediments" means matter settled out of Ballast Water within a ship.

12 "Ship" means a vessel of any type whatsoever operating in the aquatic environment and includes submersibles, floating craft, floating platforms, FSUs and FPSOs.

Article 2 *General Obligations*

1 Parties undertake to give full and complete effect to the provisions of this Convention and the Annex thereto in order to prevent, minimize and ultimately eliminate the transfer of Harmful Aquatic Organisms and Pathogens through the control and management of ships' Ballast Water and Sediments.

2 The Annex forms an integral part of this Convention. Unless expressly provided otherwise, a reference to this Convention constitutes at the same time a reference to the Annex.

3 Nothing in this Convention shall be interpreted as preventing a Party from taking, individually or jointly with other Parties, more stringent measures with respect to the prevention, reduction or elimination of the transfer of Harmful Aquatic Organisms and Pathogens through the control and management of ships' Ballast Water and Sediments, consistent with international law.

4 Parties shall endeavour to co-operate for the purpose of effective implementation, compliance and enforcement of this Convention.

5 Parties undertake to encourage the continued development of Ballast Water Management and standards to prevent, minimize and ultimately eliminate the transfer of Harmful Aquatic Organisms and Pathogens through the control and management of ships' Ballast Water and Sediments.

6 Parties taking action pursuant to this Convention shall endeavour not to impair or damage their environment, human health, property or resources, or those of other States.

7 Parties should ensure that Ballast Water Management practices used to comply with this Convention do not cause greater harm than they prevent to their environment, human health, property or resources, or those of other States.

8 Parties shall encourage ships entitled to fly their flag, and to which this Convention applies, to avoid, as far as practicable, the uptake of Ballast Water with potentially Harmful Aquatic Organisms and Pathogens, as well as Sediments that may contain such organisms, including promoting the adequate implementation of recommendations developed by the Organization.

9 Parties shall endeavour to co-operate under the auspices of the Organization to address threats and risks to sensitive, vulnerable or threatened marine ecosystems and biodiversity in areas beyond the limits of national jurisdiction in relation to Ballast Water Management.

Article 3 *Application*

1 Except as expressly provided otherwise in this Convention, this Convention shall apply to:

(a) ships entitled to fly the flag of a Party; and

(b) ships not entitled to fly the flag of a Party but which operate under the authority of a Party.

2 This Convention shall not apply to:

(a) ships not designed or constructed to carry Ballast Water;

(b) ships of a Party which only operate in waters under the jurisdiction of that Party, unless the Party determines that the discharge of Ballast Water from such ships would impair or damage their environment, human health, property or resources, or those of adjacent or other States;

(c) ships of a Party which only operate in waters under the jurisdiction of another Party, subject to the authorization of the latter Party for such exclusion. No Party shall grant such authorization if doing so would impair or damage their environment, human health, property or resources, or those of adjacent or other States. Any Party not granting such authorization shall notify the Administration of the ship concerned that this Convention applies to such ship;

(d) ships which only operate in waters under the jurisdiction of one Party and on the high seas, except for ships not granted an authorization pursuant to sub-paragraph (c), unless such Party determines that the discharge of Ballast Water from such ships would impair or damage their environment, human health, property or resources, or those of adjacent of other States;

(e) any warship, naval auxiliary or other ship owned or operated by a State and used, for the time being, only on government non-commercial service. However, each Party shall ensure, by the adoption of appropriate measures not impairing operations or operational capabilities of such ships owned or operated by it, that such ships act in a manner consistent, so far as is reasonable and practicable, with this Convention; and

(f) permanent Ballast Water in sealed tanks on ships, that is not subject to discharge.

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

Article 4 *Control of the Transfer of Harmful Aquatic Organisms and Pathogens Through Ships' Ballast Water and Sediments*

1 Each Party shall require that ships to which this Convention applies and which are entitled to fly its flag or operating under its authority comply with the requirements set forth in this Convention, including the applicable standards and requirements in the Annex, and shall take effective measures to ensure that those ships comply with those requirements.

2 Each Party shall, with due regard to its particular conditions and capabilities, develop national policies, strategies or programmes for Ballast Water Management in its ports and waters under its jurisdiction that accord with, and promote the attainment of the objectives of this Convention.

Article 5 *Sediment Reception Facilities*

1 Each Party undertakes to ensure that, in ports and terminals designated by that Party where cleaning or repair of ballast tanks occurs, adequate facilities are provided for the reception of Sediments, taking into account the Guidelines developed by the Organization. Such reception facilities shall operate without causing undue delay to ships and shall provide for the safe disposal of such Sediments that does not impair or damage their environment, human health, property or resources or those of other States.

2 Each Party shall notify the Organization for transmission to the other Parties concerned of all cases where the facilities provided under paragraph 1 are alleged to be inadequate.

Article 6 *Scientific and Technical Research and Monitoring*

1 Parties shall endeavour, individually or jointly, to:

(a) promote and facilitate scientific and technical research on Ballast Water Management; and

(b) monitor the effects of Ballast Water Management in waters under their jurisdiction.

Such research and monitoring should include observation, measurement, sampling, evaluation and analysis of the effectiveness and adverse impacts of any technology or methodology as well as any adverse impacts caused by such organisms and pathogens that have been identified to have been transferred through ships' Ballast Water.

2 Each Party shall, to further the objectives of this Convention, promote the availability of relevant information to other Parties who request it on:

(a) scientific and technology programmes and technical measures undertaken with respect to Ballast Water Management; and

(b) the effectiveness of Ballast Water Management deduced from any monitoring and assessment programmes.

Article 7 *Survey and certification*

1 Each Party shall ensure that ships flying its flag or operating under its authority and subject to survey and certification are so surveyed and certified in accordance with the regulations in the Annex.

2 A Party implementing measures pursuant to Article 2.3 and Section C of the Annex shall not require additional survey and certification of a ship of another Party, nor shall the Administration of the ship be obligated to survey and certify additional measures imposed by another Party. Verification of such additional measures shall be the responsibility of the Party implementing such measures and shall not cause undue delay to the ship.

Article 8 *Violations*

1 Any violation of the requirements of this Convention shall be prohibited and sanctions shall be established under the law of the Administration of the ship concerned, wherever the violation occurs. If the Administration is informed of such a violation, it shall investigate the matter and may request the reporting Party to furnish additional evidence of the alleged violation. If the Administration is satisfied that sufficient evidence is available to enable proceedings to be brought in respect of the alleged violation, it shall cause such proceedings to be taken as soon as possible, in accordance with its law. The Administration shall promptly inform the Party that reported the alleged violation, as well as the Organization, of any action taken. If the Administration has not taken any action within 1 year after receiving the information, it shall so inform the Party which reported the alleged violation.

2 Any violation of the requirements of this Convention within the jurisdiction of any Party shall be prohibited and sanctions shall be established under the law of that Party. Whenever such a violation occurs, that Party shall either:

(a) cause proceedings to be taken in accordance with its law; or

(b) furnish to the Administration of the ship such information and evidence as may be in its possession that a violation has occurred.

3 The sanctions provided for by the laws of a Party pursuant to this Article shall be adequate in severity to discourage violations of this Convention wherever they occur.

Article 9 *Inspection of Ships*

1 A ship to which this Convention applies may, in any port or offshore terminal of another Party, be subject to inspection by officers duly authorized by that Party for the purpose of determining whether the ship is in compliance with this Convention. Except as provided in paragraph 2 of this Article, any such inspection is limited to:

(a) verifying that there is onboard a valid Certificate, which, if valid shall be accepted; and

(b) inspection of the Ballast Water record book, and/or

(c) a sampling of the ship's Ballast Water, carried out in accordance with the guidelines to be developed by the Organization. However, the time required to analyse the samples shall not be used as a basis for unduly delaying the operation, movement or departure of the ship.

2 Where a ship does not carry a valid Certificate or there are clear grounds for believing that:

(a) the condition of the ship or its equipment does not correspond substantially with the particulars of the Certificate; or

(b) the master or the crew are not familiar with essential shipboard procedures relating to Ballast Water Management, or have not implemented such procedures;

a detailed inspection may be carried out.

3 In the circumstances given in paragraph 2 of this Article, the Party carrying out the inspection shall take such steps as will ensure that the ship shall not discharge Ballast Water until it can do so without presenting a threat of harm to the environment, human health, property or resources.

Article 10 *Detection of Violations and Control of Ships*

1 Parties shall co-operate in the detection of violations and the enforcement of the provisions of this Convention.

2 If a ship is detected to have violated this Convention, the Party whose flag the ship is entitled to fly, and/or the Party in whose port or offshore terminal the ship is operating, may, in addition to any sanctions described in Article 8 or any action described in Article 9, take steps to warn, detain, or exclude the ship. The Party in whose port or offshore terminal the ship is operating, however, may grant such a ship permission to leave the port or offshore terminal for the purpose of discharging Ballast Water or proceeding to the nearest appropriate repair yard or reception facility available, provided doing so does not present a threat of harm to the environment, human health, property or resources.

3 If the sampling described in Article 9.1(c) leads to a result, or supports information received from another port or offshore terminal, indicating that the ship poses a threat to the environment, human health, property or resources, the Party in whose waters the ship is operating shall prohibit such ship from discharging Ballast Water until the threat is removed.

4 A Party may also inspect a ship when it enters the ports or offshore terminals under its jurisdiction, if a request for an investigation is received from any Party, together with sufficient evidence that a ship is operating or has operated in violation of a provision in this Convention. The report of such investigation shall be sent to the Party requesting it and to the competent authority of the Administration of the ship concerned so that appropriate action may be taken.

Article 11 *Notification of Control Actions*

1 If an inspection conducted pursuant to Article 9 or 10 indicates a violation of this Convention, the ship shall be notified. A report shall be forwarded to the Administration, including any evidence of the violation.

2 In the event that any action is taken pursuant to Article 9.3, 10.2 or 10.3, the officer carrying out such action shall forthwith inform, in writing, the Administration of the ship concerned, or if this is not possible, the consul or diplomatic representative of the ship concerned, of all the circumstances in which the action was deemed necessary. In addition, the recognized organization responsible for the issue of certificates shall be notified.

3 The port State authority concerned shall, in addition to parties mentioned in paragraph 2, notify the next port of call of all relevant information about the violation, if it is unable to take action as specified in Article 9.3, 10.2 or 10.3 or if the ship has been allowed to proceed to the next port of call.

Article 12 *Undue Delay to Ships*

1 All possible efforts shall be made to avoid a ship being unduly detained or delayed under Article 7.2, 8, 9 or 10.

2 When a ship is unduly detained or delayed under Article 7.2, 8, 9 or 10, it shall be entitled to compensation for any loss or damage suffered.

Article 13 *Technical Assistance, Co-operation and Regional Co-operation*

1 Parties undertake, directly or through the Organization and other international bodies, as appropriate, in respect of the control and management of ships' Ballast Water and Sediments, to provide support for those Parties which request technical assistance:

(a) to train personnel;

(b) to ensure the availability of relevant technology, equipment and facilities;

(c) to initiate joint research and development programmes; and

(d) to undertake other action aimed at the effective implementation of this Convention and of guidance developed by the Organization related thereto.

2 Parties undertake to co-operate actively, subject to their national laws, regulations and policies, in the transfer of technology in respect of the control and management of ships' Ballast Water and Sediments.

3 In order to further the objectives of this Convention, Parties with common interests to protect the environment, human health, property and resources in a given geographical area, in particular, those Parties bordering enclosed and semi-enclosed seas, shall endeavour, taking into account characteristic regional features, to enhance regional co-operation, including through the conclusion of regional agreements consistent with this Convention. Parties shall seek to co-operate with the Parties to regional agreements to develop harmonized procedures.

Article 14 *Communication of information*

1 Each Party shall report to the Organization and, where appropriate, make available to other Parties the following information:

(a) any requirements and procedures relating to Ballast Water Management, including its laws, regulations, and guidelines for implementation of this Convention;

(b) the availability and location of any reception facilities for the environmentally safe disposal of Ballast Water and Sediments; and

(c) any requirements for information from a ship which is unable to comply with the provisions of this Convention for reasons specified in regulations A-3 and B-4 of the Annex.

2 The Organization shall notify Parties of the receipt of any communications under the present Article and circulate to all Parties any information communicated to it under subparagraphs 1(b) and (c) of this Article.

Article 15 *Dispute Settlement*

Parties shall settle any dispute between them concerning the interpretation or application of this Convention by negotiation, enquiry, mediation, conciliation, arbitration, judicial settlement, resort to regional agencies or arrangements or other peaceful means of their own choice.

Article 16 *Relationship to International Law and Other Agreements*

Nothing in this Convention shall prejudice the rights and obligations of any State under customary international law as reflected in the United Nations Convention on the Law of the Sea.

Article 17 *Signature, Ratification, Acceptance, Approval and Accession*

1 This Convention shall be open for signature by any State at the Headquarters of the Organization from 1 June 2004 to 31 May 2005 and shall thereafter remain open for accession by any State.

2 States may become Parties to the Convention by:

(a) signature not subject to ratification, acceptance, or approval; or

(b) signature subject to ratification, acceptance, or approval, followed by ratification, acceptance or approval; or

(c) accession.

3 Ratification, acceptance, approval or accession shall be effected by the deposit of an instrument to that effect with the Secretary-General.

4 If a State comprises two or more territorial units in which different systems of law are applicable in relation to matters dealt with in this Convention, it may at the time of signature, ratification, acceptance, approval, or accession declare that this Convention shall extend to all its territorial units or only to one or more of them and may modify this declaration by submitting another declaration at any time.

5 Any such declaration shall be notified to the Depositary in writing and shall state expressly the territorial unit or units to which this Convention applies.

Article 18 *Entry into Force*

1 This Convention shall enter into force twelve months after the date on which not less than thirty States, the combined merchant fleets of which constitute not less than thirty-five percent of the gross tonnage of the world's merchant shipping, have either signed it without reservation as to ratification, acceptance or approval, or have deposited the requisite instrument of ratification, acceptance, approval or accession in accordance with Article 17.

2 For States which have deposited an instrument of ratification, acceptance, approval or accession in respect of this Convention after the requirements for entry into force thereof have been met, but prior to the date of entry in force, the ratification, acceptance, approval or accession shall take effect on the date of entry into force of this Convention or three months after the date of deposit of instrument, whichever is the later date.

3 Any instrument of ratification, acceptance, approval or accession deposited after the date on which this Convention enters into force shall take effect three months after the date of deposit.

4 After the date on which an amendment to this Convention is deemed to have been accepted under Article 19, any instrument of ratification, acceptance, approval or accession deposited shall apply to this Convention as amended.

Article 19 *Amendments*

1 This Convention may be amended by either of the procedures specified in the following paragraphs.

2 Amendments after consideration within the Organization:

(a) Any Party may propose an amendment to this Convention. A proposed amendment shall be submitted to the Secretary-General, who shall then circulate it to the Parties and Members of the Organization at least six months prior to its consideration.

(b) An amendment proposed and circulated as above shall be referred to the Committee for consideration. Parties, whether or not Members of the Organization, shall be entitled to participate in the proceedings of the Committee for consideration and adoption of the amendment.

(c) Amendments shall be adopted by a two-thirds majority of the Parties present and voting in the Committee, on condition that at least one-third of the Parties shall be present at the time of voting.

(d) Amendments adopted in accordance with subparagraph (c) shall be communicated by the Secretary-General to the Parties for acceptance.

(e) An amendment shall be deemed to have been accepted in the following circumstances:

(i) An amendment to an article of this Convention shall be deemed to have been accepted on the date on which two-thirds of the Parties have notified the Secretary-General of their acceptance of it.

(ii) An amendment to the Annex shall be deemed to have been accepted at the end of twelve months after the date of adoption or such other date as determined by the Committee. However, if by that date more than one-third of the Parties notify the Secretary-General that they object to the amendment, it shall be deemed not to have been accepted.

(f) An amendment shall enter into force under the following conditions:

(i) An amendment to an article of this Convention shall enter into force for those Parties that have declared that they have accepted it six months after the date on which it is deemed to have been accepted in accordance with subparagraph (e)(i).

(ii) An amendment to the Annex shall enter into force with respect to all Parties six months after the date on which it is deemed to have been accepted, except for any Party that has:

(1) notified its objection to the amendment in accordance with subparagraph (e)(ii) and that has not withdrawn such objection; or

(2) notified the Secretary-General, prior to the entry into force of such amendment, that the amendment shall enter into force for it only after a subsequent notification of its acceptance.

(g) (i) A Party that has notified an objection under subparagraph (f)(ii)(1) may subsequently notify the Secretary-General that it accepts the amendment. Such amendment shall enter into force for such Party six months after the date of its notification of acceptance, or the date on which the amendment enters into force, whichever is the later date.

(ii) If a Party that has made a notification referred to in subparagraph (f)(ii)(2) notifies the Secretary-General of its acceptance with respect to an amendment, such amendment shall enter into force for such Party six months after the date of its notification of acceptance, or the date on which the amendment enters into force, whichever is the later date.

3 Amendment by a Conference:

(a) Upon the request of a Party concurred in by at least one-third of the Parties, the Organization shall convene a Conference of Parties to consider amendments to this Convention.

(b) An amendment adopted by such a Conference by a two-thirds majority of the Parties present and voting shall be communicated by the Secretary-General to all Parties for acceptance.

(c) Unless the Conference decides otherwise, the amendment shall be deemed to have been accepted and shall enter into force in accordance with the procedures specified in paragraphs 2(e) and (f) respectively.

4 Any Party that has declined to accept an amendment to the Annex shall be treated as a non-Party only for the purpose of application of that amendment.

5 Any notification under this Article shall be made in writing to the Secretary-General.

6 The Secretary-General shall inform the Parties and Members of the Organization of:

(a) any amendment that enters into force and the date of its entry into force generally and for each Party; and

(b) any notification made under this Article.

Article 20 *Denunciation*

1 This Convention may be denounced by any Party at any time after the expiry of two years from the date on which this Convention enters into force for that Party.

2 Denunciation shall be effected by written notification to the Depositary, to take effect one year after receipt or such longer period as may be specified in that notification.

Article 21 *Depositary*

1 This Convention shall be deposited with the Secretary-General, who shall transmit certified copies of this Convention to all States which have signed this Convention or acceded thereto.

2 In addition to the functions specified elsewhere in this Convention, the Secretary-General shall:

(a) inform all States that have signed this Convention, or acceded thereto, of:

(i) each new signature or deposit of an instrument of ratification, acceptance, approval or accession, together with the date thereof;

(ii) the date of entry into force of this Convention; and

(iii) the deposit of any instrument of denunciation from the Convention, together with the date on which it was received and the date on which the denunciation takes effect; and

(b) as soon as this Convention enters into force, transmit the text thereof to the Secretariat of the United Nations for registration and publication in accordance with Article 102 of the Charter of the United Nations.

Article 22 *Languages*

This Convention is established in a single original in the Arabic, Chinese, English, French, Russian and Spanish languages, each text being equally authentic.

DONE AT LONDON this thirteenth day of February, two thousand and four.

IN WITNESS WHEREOF the undersigned, being duly authorised by their respective Governments for that purpose, have signed this Convention.

ANNEX

REGULATIONS FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER AND SEDIMENTS

SECTION A - GENERAL PROVISIONS

Regulation A-1 *Definitions*

For the purposes of this Annex:

1 "Anniversary date" means the day and the month of each year corresponding to the date of expiry of the Certificate.

2 "Ballast Water Capacity" means the total volumetric capacity of any tanks, spaces or compartments on a ship used for carrying, loading or discharging Ballast Water, including any multi-use tank, space or compartment designed to allow carriage of Ballast Water.

3 "Company" means the owner of the ship or any other organization or person such as the manager, or the bareboat charterer, who has assumed the responsibility for operation of the ship from the owner of the ship and who on assuming such responsibility has agreed to take over all the duties and responsibilities imposed by the International Safety Management Code[1].

4 "Constructed" in respect of a ship means a stage of construction where:

.1 the keel is laid; or

.2 construction identifiable with the specific ship begins;

.3 assembly of the ship has commenced comprising at least 50 tonnes or 1 percent of the estimated mass of all structural material, whichever is less; or

.4 the ship undergoes a major conversion.

5 "Major conversion" means a conversion of a ship:

.1 which changes its ballast water carrying capacity by 15 percent or greater, or

.2 which changes the ship type, or

.3 which, in the opinion of the Administration, is projected to prolong its life by ten years or more, or

.4 which results in modifications to its ballast water system other than component replacement-in-kind. Conversion of a ship to meet the provisions of regulation D-1 shall not be deemed to constitute a major conversion for the purpose of this Annex.

[1] Refer to the ISM Code adopted by the Organization by resolution A.741(18), as amended.

6 "From the nearest land" means from the baseline from which the territorial sea of the territory in question is established in accordance with international law except that, for the purposes of the Convention, "from the nearest land" off the north-eastern coast of Australia shall mean from a line drawn from a point on the coast of Australia in

latitude 11°00′ S, longitude 142°08′ E
to a point in latitude 10°35′ S, longitude 141°55′ E
thence to a point latitude 10°00′ S, longitude 142°00′ E
thence to a point latitude 9°10′ S, longitude 143°52′ E
thence to a point latitude 9°00′ S, longitude 144°30′ E
thence to a point latitude 10°41′ S, longitude 145°00′ E
thence to a point latitude 13°00′ S, longitude 145°00′ E
thence to a point latitude 15°00′ S, longitude 146°00′ E
thence to a point latitude 17°30′ S, longitude 147°00′ E
thence to a point latitude 21°00′ S, longitude 152°55′ E
thence to a point latitude 24°30′ S, longitude 154°00′ E
thence to a point on the coast of Australia
in latitude 24°42′ S, longitude 153°15′ E.

7 "Active Substance" means a substance or organism, including a virus or a fungus, that has a general or specific action on or against Harmful Aquatic Organisms and Pathogens.

Regulation A-2 *General Applicability*

Except where expressly provided otherwise, the discharge of Ballast Water shall only be conducted through Ballast Water Management in accordance with the provisions of this Annex.

Regulation A-3 *Exceptions*

The requirements of regulation B-3, or any measures adopted by a Party pursuant to Article 2.3 and Section C, shall not apply to:

1 the uptake or discharge of Ballast Water and Sediments necessary for the purpose of ensuring the safety of a ship in emergency situations or saving life at sea; or

2 the accidental discharge or ingress of Ballast Water and Sediments resulting from damage to a ship or its equipment:

.1 provided that all reasonable precautions have been taken before and after the occurrence of the damage or discovery of the damage or discharge for the purpose of preventing or minimizing the discharge; and

.2 unless the owner, Company or officer in charge wilfully or recklessly caused damage; or

3 the uptake and discharge of Ballast Water and Sediments when being used for the purpose of avoiding or minimizing pollution incidents from the ship; or

4 the uptake and subsequent discharge on the high seas of the same Ballast Water and Sediments; or

5 the discharge of Ballast Water and Sediments from a ship at the same location where the whole of that Ballast Water and those Sediments originated and provided that no mixing with unmanaged Ballast Water and Sediments from other areas has occurred. If mixing has occurred, the Ballast Water taken from other areas is subject to Ballast Water Management in accordance with this Annex.

Regulation A-4 *Exemptions*

1 A Party or Parties, in waters under their jurisdiction, may grant exemptions to any requirements to apply regulations B-3 or C-1, in addition to those exemptions contained elsewhere in this Convention, but only when they are:

.1 granted to a ship or ships on a voyage or voyages between specified ports or locations; or to a ship which operates exclusively between specified ports or locations;

.2 effective for a period of no more than five years subject to intermediate review;

.3 granted to ships that do not mix Ballast Water or Sediments other than between the ports or locations specified in paragraph 1.1; and

.4 granted based on the Guidelines on risk assessment developed by the Organization.

2 Exemptions granted pursuant to paragraph 1 shall not be effective until after communication to the Organization and circulation of relevant information to the Parties.

3 Any exemptions granted under this regulation shall not impair or damage the environment, human health, property or resources of adjacent or other States. Any State that the Party determines may be adversely affected shall be consulted, with a view to resolving any identified concerns.

4 Any exemptions granted under this regulation shall be recorded in the Ballast Water record book.

Regulation A-5 *Equivalent compliance*

Equivalent compliance with this Annex for pleasure craft used solely for recreation or competition or craft used primarily for search and rescue, less than 50 metres in length overall, and with a maximum Ballast Water capacity of 8 cubic metres, shall be determined by the Administration taking into account Guidelines developed by the Organization.

SECTION B – MANAGEMENT AND CONTROL REQUIREMENTS FOR SHIPS

Regulation B-1 *Ballast Water Management Plan*

Each ship shall have on board and implement a Ballast Water Management plan. Such a plan shall be approved by the Administration taking into account Guidelines developed by the Organization. The Ballast Water Management plan shall be specific to each ship and shall at least:

1 detail safety procedures for the ship and the crew associated with Ballast Water Management as required by this Convention;

2 provide a detailed description of the actions to be taken to implement the Ballast Water Management requirements and supplemental Ballast Water Management practices as set forth in this Convention;

3 detail the procedures for the disposal of Sediments:

.1 at sea; and

.2 to shore;

4 include the procedures for coordinating shipboard Ballast Water Management that involves discharge to the sea with the authorities of the State into whose waters such discharge will take place;

5 designate the officer on board in charge of ensuring that the plan is properly implemented;

6 contain the reporting requirements for ships provided for under this Convention; and

7 be written in the working language of the ship. If the language used is not English, French or Spanish, a translation into one of these languages shall be included.

Regulation B-2 *Ballast Water Record Book*

1 Each ship shall have on board a Ballast Water record book that may be an electronic record system, or that may be integrated into another record book or system and, which shall at least contain the information specified in Appendix II.

2 Ballast Water record book entries shall be maintained on board the ship for a minimum period of two years after the last entry has been made and thereafter in the Company's control for a minimum period of three years.

3 In the event of the discharge of Ballast Water pursuant to regulations A-3, A-4 or B-3.6 or in the event of other accidental or exceptional discharge of Ballast Water not otherwise exempted by this Convention, an entry shall be made in the Ballast Water record book describing the circumstances of, and the reason for, the discharge.

4 The Ballast Water record book shall be kept readily available for inspection at all reasonable times and, in the case of an unmanned ship under tow, may be kept on the towing ship.

5 Each operation concerning Ballast Water shall be fully recorded without delay in the Ballast Water record book. Each entry shall be signed by the officer in charge of the operation concerned and each completed page shall be signed by the master. The entries in the Ballast Water record book shall be in a working language of the ship. If that language is not English, French or Spanish the entries shall contain a translation into one of those languages. When entries in an official national language of the State whose flag the ship is entitled to fly are also used, these shall prevail in case of a dispute or discrepancy.

6 Officers duly authorized by a Party may inspect the Ballast Water record book on board any ship to which this regulation applies while the ship is in its port or offshore terminal, and may make a copy of any entry, and require the master to certify that the copy is a true copy. Any copy so certified shall be admissible in any judicial proceeding as evidence of the facts stated in the entry. The inspection of a Ballast Water record book and the taking of a certified copy shall be performed as expeditiously as possible without causing the ship to be unduly delayed.

Regulation B-3 *Ballast Water Management for Ships*

1 A ship constructed before 2009:

.1 with a Ballast Water Capacity of between 1,500 and 5,000 cubic metres, inclusive, shall conduct Ballast Water Management that at least meets the standard described in regulation D-1 or regulation D-2 until 2014, after which time it shall at least meet the standard described in regulation D-2;

.2 with a Ballast Water Capacity of less than 1,500 or greater than 5,000 cubic metres shall conduct Ballast Water Management that at least meets the standard described in regulation D-1 or regulation D-2 until 2016, after which time it shall at least meet the standard described in regulation D-2.

2 A ship to which paragraph 1 applies shall comply with paragraph 1 not later than the first intermediate or renewal survey, whichever occurs first, after the anniversary date of delivery of the ship in the year of compliance with the standard applicable to the ship.

3 A ship constructed in or after 2009 with a Ballast Water Capacity of less than 5,000 cubic metres shall conduct Ballast Water Management that at least meets the standard described in regulation D-2.

4 A ship constructed in or after 2009, but before 2012, with a Ballast Water Capacity of 5,000 cubic metres or more shall conduct Ballast Water Management in accordance with paragraph 1.2.

5 A ship constructed in or after 2012 with a Ballast Water Capacity of 5000 cubic metres or more shall conduct Ballast Water Management that at least meets the standard described in regulation D-2.

6 The requirements of this regulation do not apply to ships that discharge Ballast Water to a reception facility designed taking into account the Guidelines developed by the Organization for such facilities.

7 Other methods of Ballast Water Management may also be accepted as alternatives to the requirements described in paragraphs 1 to 5, provided that such methods ensure at least the same level of protection to the environment, human health, property or resources, and are approved in principle by the Committee.

Regulation B-4 *Ballast Water Exchange*

1 A ship conducting Ballast Water exchange to meet the standard in regulation D-1 shall:

.1 whenever possible, conduct such Ballast Water exchange at least 200 nautical miles from the nearest land and in water at least 200 metres in depth, taking into account the Guidelines developed by the Organization;

.2 in cases where the ship is unable to conduct Ballast Water exchange in accordance with paragraph 1.1, such Ballast Water exchange shall be conducted taking into account the Guidelines described in paragraph 1.1 and as far from the nearest land as possible, and in all cases at least 50 nautical miles from the nearest land and in water at least 200 metres in depth.

2 In sea areas where the distance from the nearest land or the depth does not meet the parameters described in paragraph 1.1 or 1.2, the port State may designate areas, in consultation with adjacent or other States, as appropriate, where a ship may conduct Ballast Water exchange, taking into account the Guidelines described in paragraph 1.1.

3 A ship shall not be required to deviate from its intended voyage, or delay the voyage, in order to comply with any particular requirement of paragraph 1.

4 A ship conducting Ballast Water exchange shall not be required to comply with paragraphs 1 or 2, as appropriate, if the master reasonably decides that such exchange would threaten the safety or stability of the ship, its crew, or its passengers because of adverse weather, ship design or stress, equipment failure, or any other extraordinary condition.

5 When a ship is required to conduct Ballast Water exchange and does not do so in accordance with this regulation, the reasons shall be entered in the Ballast Water record book.

Regulation B-5 *Sediment Management for Ships*

1 All ships shall remove and dispose of Sediments from spaces designated to carry Ballast Water in accordance with the provisions of the ship's Ballast Water Management plan.

2 Ships described in regulation B-3.3 to B-3.5 should, without compromising safety or operational efficiency, be designed and constructed with a view to minimize the uptake and undesirable entrapment of Sediments, facilitate removal of Sediments, and provide safe access to allow for Sediment removal and sampling, taking into account guidelines developed by the Organization. Ships described in regulation B-3.1 should, to the extent practicable, comply with this paragraph.

Regulation B-6 *Duties of Officers and Crew*

Officers and crew shall be familiar with their duties in the implementation of Ballast Water Management particular to the ship on which they serve and shall, appropriate to their duties, be familiar with the ship's Ballast Water Management plan.

SECTION C – SPECIAL REQUIREMENTS IN CERTAIN AREAS

Regulation C-1 *Additional Measures*

1 If a Party, individually or jointly with other Parties, determines that measures in addition to those in Section B are necessary to prevent, reduce, or eliminate the transfer of Harmful Aquatic Organisms and Pathogens through ships' Ballast Water and Sediments, such Party or Parties may, consistent with international law, require ships to meet a specified standard or requirement.

2 Prior to establishing standards or requirements under paragraph 1, a Party or Parties should consult with adjacent or other States that may be affected by such standards or requirements.

3 A Party or Parties intending to introduce additional measures in accordance with paragraph 1 shall:

.1 take into account the Guidelines developed by the Organization.

.2 communicate their intention to establish additional measure(s) to the Organization at least 6 months, except in emergency or epidemic situations, prior to the projected date of implementation of the measure(s). Such communication shall include:

.1 the precise co-ordinates where additional measure(s) is/are applicable;

.2 the need and reasoning for the application of the additional measure(s), including, whenever possible, benefits;

.3 a description of the additional measure(s); and

.4 any arrangements that may be provided to facilitate ships' compliance with the additional measure(s).

. 3 to the extent required by customary international law as reflected in the United Nations Convention on the Law of the Sea, as appropriate, obtain the approval of the Organization.

4 A Party or Parties, in introducing such additional measures, shall endeavour to make available all appropriate services, which may include but are not limited to notification to mariners of areas, available and alternative routes or ports, as far as practicable, in order to ease the burden on the ship.

5 Any additional measures adopted by a Party or Parties shall not compromise the safety and security of the ship and in any circumstances not conflict with any other convention with which the ship must comply.

6 A Party or Parties introducing additional measures may waive these measures for a period of time or in specific circumstances as they deem fit.

Regulation C-2 *Warnings Concerning Ballast Water Uptake in Certain Areas and Related Flag State Measures*

1 A Party shall endeavour to notify mariners of areas under their jurisdiction where ships should not uptake Ballast Water due to known conditions. The Party shall include in such notices the precise coordinates of the area or areas, and, where possible, the location of any alternative area or areas for the uptake of Ballast Water. Warnings may be issued for areas:

.1 known to contain outbreaks, infestations, or populations of Harmful Aquatic Organisms and Pathogens (e.g., toxic algal blooms) which are likely to be of relevance to Ballast Water uptake or discharge;

.2 near sewage outfalls; or

.3 where tidal flushing is poor or times during which a tidal stream is known to be more turbid.

2 In addition to notifying mariners of areas in accordance with the provisions of paragraph 1, a Party shall notify the Organization and any potentially affected coastal States of any areas identified in paragraph 1 and the time period such warning is likely to be in effect. The notice to the Organization and any potentially affected coastal States shall include the precise coordinates of the area or areas, and, where possible, the location of any alternative area or areas for the uptake of Ballast Water. The notice shall include advice to ships needing to uptake Ballast Water in the area, describing arrangements made for alternative supplies. The Party shall also notify mariners, the Organization, and any potentially affected coastal States when a given warning is no longer applicable.

Regulation C-3 *Communication of Information*

The Organization shall make available, through any appropriate means, information communicated to it under regulations C-1 and C-2.

SECTION D - STANDARDS FOR BALLAST WATER MANAGEMENT

Regulation D-1 *Ballast Water Exchange Standard*

1 Ships performing Ballast Water exchange in accordance with this regulation shall do so with an efficiency of at least 95 percent volumetric exchange of Ballast Water.

2 For ships exchanging Ballast Water by the pumping-through method, pumping through three times the volume of each Ballast Water tank shall be considered to meet the standard described in paragraph 1. Pumping through less than three times the volume may be accepted provided the ship can demonstrate that at least 95 percent volumetric exchange is met.

Regulation D-2 *Ballast Water Performance Standard*

1 Ships conducting Ballast Water Management in accordance with this regulation shall discharge less than 10 viable organisms per cubic metre greater than or equal to 50 micrometres in minimum dimension and less than 10 viable organisms per millilitre less than 50 micrometres in minimum dimension and greater than or equal to 10 micrometres in minimum dimension; and discharge of the indicator microbes shall not exceed the specified concentrations described in paragraph 2.

2 Indicator microbes, as a human health standard, shall include:

.1 Toxicogenic *Vibrio cholerae* (O1 and O139) with less than 1 colony forming unit (cfu) per 100 millilitres or less than 1 cfu per 1 gram (wet weight) zooplankton samples ;

.2 *Escherichia coli* less than 250 cfu per 100 millilitres;

.3 Intestinal Enterococci less than 100 cfu per 100 milliliters.

Regulation D-3 *Approval requirements for Ballast Water Management systems*

1 Except as specified in paragraph 2, Ballast Water Management systems used to comply with this Convention must be approved by the Administration taking into account Guidelines developed by the Organization.

2 Ballast Water Management systems which make use of Active Substances or preparations containing one or more Active Substances to comply with this Convention shall be approved by the Organization, based on a procedure developed by the Organization. This procedure shall describe the approval and withdrawal of approval of Active Substances and their proposed manner of application. At withdrawal of approval, the use of the relevant Active Substance or Substances shall be prohibited within 1 year after the date of such withdrawal.

3 Ballast Water Management systems used to comply with this Convention must be safe in terms of the ship, its equipment and the crew.

Regulation D-4 Prototype Ballast Water Treatment Technologies

1 For any ship that, prior to the date that the standard in regulation D-2 would otherwise become effective for it, participates in a programme approved by the Administration to test and evaluate promising Ballast Water treatment technologies, the standard in regulation D-2 shall not apply to that ship until five years from the date on which the ship would otherwise be required to comply with such standard.

2 For any ship that, after the date on which the standard in regulation D-2 has become effective for it, participates in a programme approved by the Administration, taking into account Guidelines developed by the Organization, to test and evaluate promising Ballast Water technologies with the potential to result in treatment technologies achieving a standard higher than that in regulation D-2, the standard in regulation D-2 shall cease to apply to that ship for five years from the date of installation of such technology.

3 In establishing and carrying out any programme to test and evaluate promising Ballast Water technologies, Parties shall:

.1 take into account Guidelines developed by the Organization, and

.2 allow participation only by the minimum number of ships necessary to effectively test such technologies.

4 Throughout the test and evaluation period, the treatment system must be operated consistently and as designed.

Regulation D-5 *Review of Standards by the Organization*

1 At a meeting of the Committee held no later than three years before the earliest effective date of the standard set forth in regulation D-2, the Committee shall undertake a review which includes a determination of whether appropriate technologies are available to achieve the standard, an assessment of the criteria in paragraph 2, and an assessment of the socio-economic effect(s) specifically in relation to the developmental needs of developing countries, particularly small island developing States. The Committee shall also undertake periodic reviews, as appropriate, to examine the applicable requirements for ships described in regulation B-3.1 as well as any other aspect of Ballast Water Management addressed in this Annex, including any Guidelines developed by the Organization.

2 Such reviews of appropriate technologies shall also take into account:

.1 safety considerations relating to the ship and the crew;

.2 environmental acceptability, i.e., not causing more or greater environmental impacts than they solve;

.3 practicability, i.e., compatibility with ship design and operations;

.4 cost effectiveness, i.e., economics; and

.5 biological effectiveness in terms of removing, or otherwise rendering not viable, Harmful Aquatic Organisms and Pathogens in Ballast Water.

3 The Committee may form a group or groups to conduct the review(s) described in paragraph 1. The Committee shall determine the composition, terms of reference and specific issues to be addressed by any such group formed. Such groups may develop and recommend proposals for amendment of this Annex for consideration by the Parties. Only Parties may participate in the formulation of recommendations and amendment decisions taken by the Committee.

4 If, based on the reviews described in this regulation, the Parties decide to adopt amendments to this Annex, such amendments shall be adopted and enter into force in accordance with the procedures contained in Article 19 of this Convention.

SECTION E - SURVEY AND CERTIFICATION REQUIREMENTS FOR BALLAST WATER MANAGEMENT

Regulation E-1 *Surveys*

1 Ships of 400 gross tonnage and above to which this Convention applies, excluding floating platforms, FSUs and FPSOs, shall be subject to surveys specified below:

.1 An initial survey before the ship is put in service or before the Certificate required under regulation E-2 or E-3 is issued for the first time. This survey shall verify that the Ballast Water Management plan required by regulation B-1 and any associated structure, equipment, systems, fitting, arrangements and material or processes comply fully with the requirements of this Convention.

.2 A renewal survey at intervals specified by the Administration, but not exceeding five years, except where regulation E-5.2, E-5.5, E-5.6, or E-5.7 is applicable. This survey shall verify that the Ballast Water Management plan required by regulation B-1 and any associated structure, equipment, systems, fitting, arrangements and material or processes comply fully with the applicable requirements of this Convention.

.3 An intermediate survey within three months before or after the second Anniversary date or within three months before or after the third Anniversary date of the Certificate, which shall take the place of one of the annual surveys specified in paragraph 1.4. The intermediate surveys shall ensure that the equipment, associated systems and processes for Ballast Water Management fully comply with the applicable requirements of this Annex and are in good working order. Such intermediate surveys shall be endorsed on the Certificate issued under regulation E-2 or E-3.

.4 An annual survey within three months before or after each Anniversary date, including a general inspection of the structure, any equipment, systems, fittings, arrangements and material or processes associated with the Ballast Water Management plan required by regulation B-1 to ensure that they have been maintained in accordance with paragraph 9 and remain satisfactory for the service

for which the ship is intended. Such annual surveys shall be endorsed on the Certificate issued under regulation E-2 or E-3.

.5 An additional survey either general or partial, according to the circumstances, shall be made after a change, replacement, or significant repair of the structure, equipment, systems, fittings, arrangements and material necessary to achieve full compliance with this Convention. The survey shall be such as to ensure that any such change, replacement, or significant repair has been effectively made, so that the ship complies with the requirements of this Convention. Such surveys shall be endorsed on the Certificate issued under regulation E-2 or E-3.

2 The Administration shall establish appropriate measures for ships that are not subject to the provisions of paragraph 1 in order to ensure that the applicable provisions of this Convention are complied with.

3 Surveys of ships for the purpose of enforcement of the provisions of this Convention shall be carried out by officers of the Administration. The Administration may, however, entrust the surveys either to surveyors nominated for the purpose or to organizations recognized by it.

4 An Administration nominating surveyors or recognizing organizations to conduct surveys, as described in paragraph 3 shall, as a minimum, empower such nominated surveyors or recognized organizations[2] to:

.1 require a ship that they survey to comply with the provisions of this Convention; and

.2 carry out surveys and inspections if requested by the appropriate authorities of a port State that is a Party.

5 The Administration shall notify the Organization of the specific responsibilities and conditions of the authority delegated to the nominated surveyors or recognized organizations, for circulation to Parties for the information of their officers.

6 When the Administration, a nominated surveyor, or a recognized organization determines that the ship's Ballast Water Management does not conform to the particulars of the Certificate required under regulation E-2 or E-3 or is such that the ship is not fit to proceed to sea without presenting a threat of harm to the environment, human health, property or resources such surveyor or organization shall immediately ensure that corrective action is taken to bring the ship into compliance. A surveyor or organization shall be notified immediately, and it shall ensure that the Certificate is not issued or is withdrawn as appropriate. If the ship is in the port of another Party, the appropriate authorities of the port State shall be notified immediately. When an officer of the Administration, a nominated surveyor, or a recognized organization has notified the appropriate authorities of the port State, the Government of the port State concerned shall give such officer, surveyor or organization any necessary assistance to carry out their obligations under this regulation, including any action described in Article 9.

[2] Refer to the guidelines adopted by the Organization by resolution A.739(18), as may be amended by the Organization, and the specifications adopted by the Organization by resolution A.789(19), as may be amended by the Organization.

7 Whenever an accident occurs to a ship or a defect is discovered which substantially affects the ability of the ship to conduct Ballast Water Management in accordance with this Convention, the owner, operator or other person in charge of the ship shall report at the earliest opportunity to the Administration, the recognized organization or the nominated surveyor responsible for issuing the relevant Certificate, who shall cause investigations to be initiated to determine whether a survey as required by paragraph 1 is necessary. If the ship is in a port of another Party, the owner, operator or other person in charge shall also report immediately to the appropriate authorities of the port State and the nominated surveyor or recognized organization shall ascertain that such report has been made.

8 In every case, the Administration concerned shall fully guarantee the completeness and efficiency of the survey and shall undertake to ensure the necessary arrangements to satisfy this obligation.

9 The condition of the ship and its equipment, systems and processes shall be maintained to conform with the provisions of this Convention to ensure that the ship in all respects will remain fit to proceed to sea without presenting a threat of harm to the environment, human health, property or resources.

10 After any survey of the ship under paragraph 1 has been completed, no change shall be made in the structure, any equipment, fittings, arrangements or material associated with the Ballast Water Management plan required by regulation B-1 and covered by the survey without the sanction of the Administration, except the direct replacement of such equipment or fittings.

Regulation E-2 *Issuance or Endorsement of a Certificate*

1 The Administration shall ensure that a ship to which regulation E-1 applies is issued a Certificate after successful completion of a survey conducted in accordance with regulation E-1. A Certificate issued under the authority of a Party shall be accepted by the other Parties and regarded for all purposes covered by this Convention as having the same validity as a Certificate issued by them.

2 Certificates shall be issued or endorsed either by the Administration or by any person or organization duly authorized by it. In every case, the Administration assumes full responsibility for the Certificate.

Regulation E-3 *Issuance or Endorsement of a Certificate by Another Party*

1 At the request of the Administration, another Party may cause a ship to be surveyed and, if satisfied that the provisions of this Convention are complied with, shall issue or authorize the issuance of a Certificate to the ship, and where appropriate, endorse or authorize the endorsement of that Certificate on the ship, in accordance with this Annex.

2 A copy of the Certificate and a copy of the survey report shall be transmitted as soon as possible to the requesting Administration.

3 A Certificate so issued shall contain a statement to the effect that it has been issued at the request of the Administration and it shall have the same force and receive the same recognition as a Certificate issued by the Administration.

4 No Certificate shall be issued to a ship entitled to fly the flag of a State which is not a Party.

Regulation E-4 *Form of the Certificate*

The Certificate shall be drawn up in the official language of the issuing Party, in the form set forth in Appendix I. If the language used is neither English, French nor Spanish, the text shall include a translation into one of these languages.

Regulation E-5 *Duration and Validity of the Certificate*

1 A Certificate shall be issued for a period specified by the Administration that shall not exceed five years.

2 For renewal surveys:

.1 Notwithstanding the requirements of paragraph 1, when the renewal survey is completed within three months before the expiry date of the existing Certificate, the new Certificate shall be valid from the date of completion of the renewal survey to a date not exceeding five years from the date of expiry of the existing Certificate.

.2 When the renewal survey is completed after the expiry date of the existing Certificate, the new Certificate shall be valid from the date of completion of the renewal survey to a date not exceeding five years from the date of expiry of the existing Certificate.

.3 When the renewal survey is completed more than three months before the expiry date of the existing Certificate, the new Certificate shall be valid from the date of completion of the renewal survey to a date not exceeding five years from the date of completion of the renewal survey.

3 If a Certificate is issued for a period of less than five years, the Administration may extend the validity of the Certificate beyond the expiry date to the maximum period specified in paragraph 1, provided that the surveys referred to in regulation E-1.1.3 applicable when a Certificate is issued for a period of five years are carried out as appropriate.

4 If a renewal survey has been completed and a new Certificate cannot be issued or placed on board the ship before the expiry date of the existing Certificate, the person or organization authorized by the Administration may endorse the existing Certificate and such a Certificate shall be accepted as valid for a further period which shall not exceed five months from the expiry date.

5 If a ship at the time when the Certificate expires is not in a port in which it is to be surveyed, the Administration may extend the period of validity of the Certificate but this extension shall be granted only for the purpose of allowing the ship to complete its voyage to the port in which it is to be surveyed, and then only in cases where it appears proper and reasonable to do so. No Certificate shall be extended for a period longer than three months, and a ship to which such extension is granted shall not, on its arrival in the port in which it is to be surveyed, be entitled by virtue of such extension to leave that port without having a new Certificate. When

the renewal survey is completed, the new Certificate shall be valid to a date not exceeding five years from the date of expiry of the existing Certificate before the extension was granted.

6 A Certificate issued to a ship engaged on short voyages which has not been extended under the foregoing provisions of this regulation may be extended by the Administration for a period of grace of up to one month from the date of expiry stated on it. When the renewal survey is completed, the new Certificate shall be valid to a date not exceeding five years from the date of expiry of the existing Certificate before the extension was granted.

7 In special circumstances, as determined by the Administration, a new Certificate need not be dated from the date of expiry of the existing Certificate as required by paragraph 2.2, 5 or 6 of this regulation. In these special circumstances, the new Certificate shall be valid to a date not exceeding five years from the date of completion of the renewal survey.

8 If an annual survey is completed before the period specified in regulation E-1, then:

.1 the Anniversary date shown on the Certificate shall be amended by endorsement to a date which shall not be more than three months later than the date on which the survey was completed;

.2 the subsequent annual or intermediate survey required by regulation E-1 shall be completed at the intervals prescribed by that regulation using the new Anniversary date;

.3 the expiry date may remain unchanged provided one or more annual surveys, as appropriate, are carried out so that the maximum intervals between the surveys prescribed by regulation E-1 are not exceeded.

9 A Certificate issued under regulation E-2 or E-3 shall cease to be valid in any of the following cases:

.1 if the structure, equipment, systems, fittings, arrangements and material necessary to comply fully with this Convention is changed, replaced or significantly repaired and the Certificate is not endorsed in accordance with this Annex;

.2 upon transfer of the ship to the flag of another State. A new Certificate shall only be issued when the Party issuing the new Certificate is fully satisfied that the ship is in compliance with the requirements of regulation E-1. In the case of a transfer between Parties, if requested within three months after the transfer has taken place, the Party whose flag the ship was formerly entitled to fly shall, as soon as possible, transmit to the Administration copies of the Certificates carried by the ship before the transfer and, if available, copies of the relevant survey reports;

.3 if the relevant surveys are not completed within the periods specified under regulation E-1.1; or

.4 if the Certificate is not endorsed in accordance with regulation E-1.1.

The principal Ballast Water Management method(s) employed on this ship is/are:

☐ in accordance with regulation D-1

☐ in accordance with regulation D-2
(describe) .....

☐ the ship is subject to regulation D-4

THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with regulation E-1 of the Annex to the Convention; and

2 That the survey shows that Ballast Water Management on the ship complies with the Annex to the Convention.

This certificate is valid until …… subject to surveys in accordance with regulation E-1 of the Annex to the Convention.

Completion date of the survey on which this certificate is based: dd/mm/yyyy

Issued at .....
(Place of issue of certificate)

....
(*Date of issue*) *Signature of authorized official issuing the certificate)*

(Seal or stamp of the authority, as appropriate)

ENDORSEMENT FOR ANNUAL AND INTERMEDIATE SURVEY(S)

THIS IS TO CERTIFY that a survey required by regulation E-1 of the Annex to the Convention the ship was found to comply with the relevant provisions of the Convention:

Annual survey: Signed .....
(Signature of duly authorized official)

Place .....

Date.....…

(Seal or stamp of the authority, as appropriate)

Annual*/Intermediate survey*: Signed .....
(Signature of duly authorized official)

Place .....

Date.....…

(Seal or stamp of the authority, as appropriate)

Annual*/Intermediate survey*: Signed .....
(Signature of duly authorized official)

Place .....

Date.....…

(Seal or stamp of the authority, as appropriate)

Annual survey: Signed .....
(Signature of duly authorized official)

Place .....

Date.....…

(Seal or stamp of the authority, as appropriate)

---

* Delete as appropriate.

**ANNUAL/INTERMEDIATE SURVEY
IN ACCORDANCE WITH REGULATION E-5.8.3**

THIS IS TO CERTIFY that, at an annual/intermediate* survey in accordance with regulation E-5.8.3 of the Annex to the Convention, the ship was found to comply with the relevant provisions of the Convention:

Signed .....
(Signature of authorized official)

Place .....

Date.....

(Seal or stamp of the authority, as appropriate)

**ENDORSEMENT TO EXTEND THE CERTIFICATE IF VALID
FOR LESS THAN 5 YEARS WHERE REGULATION E-5.3 APPLIES**

The ship complies with the relevant provisions of the Convention, and this Certificate shall, in accordance with regulation E-5.3 of the Annex to the Convention, be accepted as valid until……

Signed .....
(Signature of authorized official)

Place .....

Date.....

(Seal or stamp of the authority, as appropriate)

**ENDORSEMENT WHERE THE RENEWAL SURVEY HAS BEEN
COMPLETED AND REGULATION E-5.4 APPLIES**

The ship complies with the relevant provisions of the Convention and this Certificate shall, in accordance with regulation E-5.4 of the Annex to the Convention, be accepted as valid until ……

Signed .....
(Signature of authorized official)

Place .....

Date.....

(Seal or stamp of the authority, as appropriate)

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* Delete as appropriate

ENDORSEMENT TO EXTEND THE VALIDITY OF THE CERTIFICATE UNTIL REACHING THE PORT OF SURVEY OR FOR A PERIOD OF GRACE WHERE REGULATION E-5.5 OR E-5.6 APPLIES

This Certificate shall, in accordance with regulation E-5.5 or E-5.6* of the Annex to the Convention, be accepted as valid until ……..

Signed .....
(Signature of authorized official)

Place .....

Date.....…

(Seal or stamp of the authority, as appropriate)

ENDORSEMENT FOR ADVANCEMENT OF ANNIVERSARY DATE WHERE REGULATION E-5.8 APPLIES

In accordance with regulation E-5.8 of the Annex to the Convention the new Anniversary date is …….

Signed .....
(Signature of authorized official)

Place .....

Date.....…

(Seal or stamp of the authority, as appropriate)

In accordance with regulation E-5.8 of the Annex to the Convention the new Anniversary date is …….

Signed .....
(Signature of duly authorized official)

Place .....

Date.....…

(Seal or stamp of the authority, as appropriate)

* Delete as appropriate

APPENDIX II

FORM OF BALLAST WATER RECORD BOOK

INTERNATIONAL CONVENTION FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER AND SEDIMENTS

Period From: …..…… To: ……..

Name of Ship ……..……...

IMO number ……..……..……..….

Gross tonnage ……

Flag ……

Total Ballast Water capacity (in cubic metres) ……..…..

The ship is provided with a Ballast Water Management plan ☐

Diagram of ship indicating ballast tanks:

1 Introduction

In accordance with regulation B-2 of the Annex to the International Convention for the Control and Management of Ships' Ballast Water and Sediments, a record is to be kept of each Ballast Water operation. This includes discharges at sea and to reception facilities.

2 Ballast Water and Ballast Water Management

"Ballast Water" means water with its suspended matter taken on board a ship to control trim, list, draught, stability, or stresses of a ship. Management of Ballast Water shall be in accordance with an approved Ballast Water Management plan and taking into account Guidelines[3] developed by the Organization.

3 Entries in the Ballast Water Record Book

Entries in the Ballast Water record book shall be made on each of the following occasions:

3.1 When Ballast Water is taken on board:

[3] Refer to the Guidelines for the control and management of ships' ballast water to minimize the transfer of harmful aquatic organisms and pathogens adopted by the Organization by resolution A.868(20).

.1 Date, time and location port or facility of uptake (port or lat/long), depth if outside port

.2 Estimated volume of uptake in cubic metres

.3 Signature of the officer in charge of the operation.

3.2 Whenever Ballast Water is circulated or treated for Ballast Water Management purposes:

.1 Date and time of operation

.2 Estimated volume circulated or treated (in cubic metres)

.3 Whether conducted in accordance with the Ballast Water Management plan

.4 Signature of the officer in charge of the operation

3.3 When Ballast Water is discharged into the sea:

.1 Date, time and location port or facility of discharge (port or lat/long)

.2 Estimated volume discharged in cubic metres plus remaining volume in cubic metres

.3 Whether approved Ballast Water Management plan had been implemented prior to discharge

.4 Signature of the officer in charge of the operation.

3.4 When Ballast Water is discharged to a reception facility:

.1 Date, time, and location of uptake

.2 Date, time, and location of discharge

.3 Port or facility

.4 Estimated volume discharged or taken up, in cubic metres

.5 Whether approved Ballast Water Management plan had been implemented prior to discharge

.6 Signature of officer in charge of the operation

3.5 Accidental or other exceptional uptake or discharges of Ballast Water:

.1 Date and time of occurrence

.2 Port or position of the ship at time of occurrence

.3 Estimated volume of Ballast Water discharged

.4 Circumstances of uptake, discharge, escape or loss, the reason therefore and general remarks.

.5 Whether approved Ballast Water Management plan had been implemented prior to discharge

.6 Signature of officer in charge of the operation

3.6 Additional operational procedure and general remarks

4 Volume of Ballast Water

The volume of Ballast Water onboard should be estimated in cubic metres. The Ballast Water record book contains many references to estimated volume of Ballast Water. It is recognized that the accuracy of estimating volumes of ballast is left to interpretation.

RECORD OF BALLAST WATER OPERATIONS

SAMPLE BALLAST WATER RECORD BOOK PAGE

Name of Ship: ……

Distinctive number or letters ……..

Date	Item (number)	Record of operations/signature of officers in charge

Signature of master ……..

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Appendix 4 - Submitted Documents to MEPC Towards Ballast Water Management from MEPC 43 to 49

Country	Document Number	Title of the Document	MEPC Meeting
Australia	MEPC 43/INF.12	Australia's Ballast Water Maritime Awareness Campaign	43
Australia	MEPC 43/INF.13	Development of Australia's ballast water decision support system	43
Australia	MEPC 43/4/9	Suggestions for amendments to draft articles and regulations	43
Brazil	MEPC 43/4/5	The dilution method as an alternative method of ballast water exchange to be included in the BWM Code	43
BWWG	MEPC 43/4	Report of the Working Group on Ballast Water convened during MEPC 42	43
Greece	MEPC 43/4/2	possibility of convening a Conference for the purpose of adopting a legal instrument on Ballast Water Management.	43
Japan	MEPC 43/4/3	Ballast Water Management and Control Procedures	43
Norway	MEPC 43/INF.23	Ballast Water Transfer Atlas, Hazard Assessment and Decision Support	43
Norway	MEPC 43/4/7	Comments and proposals related to the concept of "International Ballast Water Management Areas"	43
Norway	MEPC 43/4/8	Comments and proposals on "ballast water management techniques" to include in the draft new provisions on the handling of ballast water	43
Secretariat	MEPC 43/4/1	Draft texts of the legal instruments and outline of provisions in regulations	43
Secretariat	MEPC 43/4/1/Corr.1	Draft texts of the legal instruments and outline of provisions in regulations-Corrigendum	43
Secretariat	MEPC 43/4/6	Compilation of responses to the Questionnaire on Ballast Water Management. (MEPC/Circ.342)	43
United States	MEPC 43/4/4	Comments on the Report of the Working Group on Ballast Water convened during MEPC 42 (MEPC 43/4)	43
Argentina	MEPC/44/4/2	Preventing pollution by harmful organisms in the ballast water of ships bound for Argentine ports in the River Plate Estuary	44
Australia	MEPC 44/INF.19	Australia's ballast water management arrangements	44

Australia	MEPC 44/INF.20	Australia's Ballast Water Exchange Verification Method	44
Brazil	MEPC 44/4/4	Proposals to improve the work regarding the adoption of the Regulations and the enforcement of these measures	44
BWWG	MEPC 44/4	Report of the Working Group on Ballast Water convened during MEPC 43	44
Greece	MEPC 44/4/5	This paper proposes the development of performance Standards for the approval of BWM techniques	44
Japan	MEPC 44/INF. 4	Mixer pipe method as an alternative ballast water management technique	44
Japan	MEPC 44/4/3	Ballast Water Management and Control Procedures	44
Norway	MEPC 44/4/5	Alternative principles for regulating ballast water management	44
Secretariat	MEPC 44/INF.23	GEF/UNDP/IMO Project on Ballast Water Management (GLO/99/G31/A/1G/19)	44
United States	MEPC 44/4/1	Comments on the draft international convention for the control and management of ship's ballast water and sediments	44
Australia	MEPC 45/2/11	Ballast Water Uptake and Discharge Contingency Zones	45
Australia	MEPC 45/2/12	Development of standards for ballast water management and control options and their assessment and approval	45
Australia	MEPC 45/2/13	Marine Target Species List	45
Australia	MEPC 45/2/14	Role of co-regulation in minimising the risks posed by harmful aquatic organisms and pathogens carried in ships' ballast water	45
Brazil	MEPC 45/2/16	Comments and proposals on the Report of the Ballast Water Working Group	45
BWWG	MEPC 45/2	Report of the Working Group on Ballast Water convened during MEPC 44	45
Canada	MEPC 45/INF.26	Evaluation of safety aspects in relation to ballast water exchange	45
Canada	MEPC 45/2/10	Evaluation of Safety Aspects in relation to Ballast Water Exchange	45
France	MEPC 45/INF.4	DOCUMENT AVAILABLE IN FRENCH ONLY	45
France	MEPC 45/2/2	Evaluation of the risk of introducing undesirable species to French coasts via ships' ballast water	45

Germany	MEPC 45/2/7	Germany co-ordinated a research project, which included the application of all ballast water sampling methods and equipment that have been used world-wide for sampling ballast water.	45
Germany	MEPC 45/2/8	Proposal for a standardized assessment method of ballast water treatment options that remove organisms from the ballast water	45
IACS	MEPC 45/2/1	IACS Hazard Identification (HAZID) of Ballast Water Exchange at Sea - Bulk Carriers	45
INTERTANKO	MEPC 45/INF.21	The continuous Plankton Recorder Survey: plankton biodiversity and water exchange	45
Israel	MEPC 45/2/15	Research on the effects of open ocean exchange and freshwater flushing on marine heterotrophic protists - possible implications for ballast water management	45
Secretariat	MEPC 45/INF.13	Outcome of the fifth meeting of the Conference of the Parties to the Convention on Biological Diversity (COP5)	45
Spain	MEPC 45/2/3	Comments on port facilities for the management of ships' ballast water and sediments and the supervisory function of ports	45
Spain	MEPC 45/2/4	Influence of the operating conditions on board ship on the change of ballast during sailing	45
Spain	MEPC 45/2/5	Impact of ballast water exchange at sea on the structural conditions and structural safety of ships	45
Spain	MEPC 45/2/6	Installations for the reception and treatment of ballast water in harbours	45
United States	MEPC 45/2/9	In its report to MEPC 44, the Ballast Water Working Group asked that delegations give serious intersessional consideration to a “two-tier” approach to ballast water management	45
Australia	MEPC 46/INF.22	Suggested Designs to Facilitate Improved Management and Treatment of Ballast Water on New and Existing Ships	46
Australia	MEPC 46/INF.23	Research and Development to improve Ballast Water Management in Australia - Including the use of International Shipping Levy Funds	46
Australia	MEPC 46/3/5	New Ballast Water Management Arrangements for International Shipping visiting Australia	46
Brazil	MEPC 46/INF.30	Information regarding the first Country Project Task Force Meeting in Brazil for the development of the National Workplan for the GloBallast Programme and the First Brazilian Seminar on Ballast Water	46

Brazil	MEPC 46/3/14	Standards for the management and control of ballast water	46
BWWG	MEPC 46/3	Report of the Ballast Water Working Group convened during MEPC 45	46
FOEI	MEPC 46/INF.24	Marine Forum "Alien Species from Ballast Water, How does it affect the North Sea Region?"	46
FOEI	MEPC 46/3/10	Outline environmental criteria for the establishment of ballast water management areas and for prior and adequate notification	46
Germany	MEPC 46/3/6	Proposal for a Standardized Assessment Method of Chemical Ballast Water Treatment Options	46
Greece	MEPC 46/3/1	Comments on the draft Convention	46
India	MECP 46/INF.13	Development of ballast water management programme	46
India	MEPC 46/3/15	Comments on the draft Convention - Ballast water management for existing ships	46
Japan	MEPC 46/INF.19	Alternative ballast water treatment method	46
Japan	MEPC 46/3/7	Comments and proposals on the report of the Ballast Water Working Group and draft text of the Convention for the Control and Management of Ships' Ballast Water and Sediments	46
Japan	MEPC 46/3/11	Technical standards for the treatment of ballast water	46
Japan	MEPC 46/3/11/Rev.1	Technical standards for the treatment of ballast water	46
Japan	MEPC 46/3/12	Harmful aquatic organisms and pathogens from the viewpoint of aquatic biology	46
Japan	MEPC 46/3/13	Comparison of treatment techniques of ballast water and sediments	46
Netherlands	MEPC 46/INF.34	Report: "Standards for Ballast Water Treatment"	46
Norway	MEPC 46/3/8	Proposal for a methodical approach for setting ballast water standards	46
Norway	MEPC 46/3/9	"Tier 2" requirements for ballast water management	46
Secretariat	MEPC 46/INF.27	International Ballast Water Treatment R&D Symposium (26 to 27 March 2001) and Standards Workshop (28 to 30 March 2001)	46
Secretariat	MEPC 46/INF.28	GloBallast Programme: Progress Report to MEPC	46

Secretariat	MEPC 46/3/4	Advice concerning legal aspects of the draft International Convention for the Control and Management of Ships' Ballast Water and Sediments	46
United Kingdom	MEPC 46/INF.17	Recent and current UK research into the transport of non-indigenous species by ballast water	46
United States	MEPC 46/3/2	Draft Consolidated Text of an International Convention for the Control and Management of Ships' Ballast Water and Sediments	46
United States	MEPC 46/3/3	Standards and continued technological development	46
Brazil	MEPC 47/INF.12	Report of the Informal Contact Group on the Research on Pathogens in Ballast Water	47
Brazil	MEPC 47/INF.13	Evaluation of the survival of organisms in ballast water treated with chlorine	47
Brazil	MEPC 47/INF.14	GloBallast Programme Activities in Brazil	47
Brazil	MEPC 47/2/9	Proposal for the establishment of concepts and of a logical sequence to set out acceptance criteria for shipborne ballast water management systems	47
Brazil	MEPC 47/2/10	Brazil's comments on the proposal to phase-out ballast water exchange at sea	47
Brazil	MEPC 47/2/11	Investigation carried out in selected ports in Brazil to identify and characterize pathogens in ballast water	47
Brazil	MEPC 47/2/17	Comments and views on the Report of the Ballast Water Working Group and the Draft Convention for the Control and Management of Ships' Ballast Water and Sediments	47
BWWG	MEPC 47/2	Report of the Ballast Water Working Group convened during MEPC 46	47
BWWG, Chairman	MEPC 47/2/14	Comments on the Report of the Ballast Water Standards Correspondence Group	47
BWWG, Chairman	MECP 47.2.15	Comments on the Report of the Working Group at MEPC 46	47
ICS	MEPC 47/2/21	Comments on the draft Convention	47
INTERTANKO	MEPC 47/2/18	Ballast water exchange – sediment removal: Comments on submission MEPC 47/2/1 by the United Kingdom	47
Iran	MEPC 47/20	Comments and proposals on the draft text of the Convention for the Control and Management of Ships' Ballast Water and Sediments	47
Israel	MEPC 47/2/6	Biological effectiveness of a multi-treatment process - a pilot test	47
Japan	MEPC 47/INF.18	Outcome of a study on Mechanical Treatment System	47

Japan	MEPC 47/2/2	Safety of Ballast Water Exchange at Sea	47
Japan	MEPC 47/2/12	Proposal for the Draft Text of an International Convention for the Control and Management of Ships' Ballast Water and Sediments	47
Korea	MEPC 47/16	Effectively expelling-ballast tank sediments and the potentially harmful aquatic organisms contained therein	47
Norway	MEPC 47/INF.11	Description of the proposed model groups defined under Tier 1	47
Norway	MEPC 47/2/8	Proposal for elements to be included in the two-tier approach	47
Norway	MEPC 47/2/13	Proposal for performance criteria of the ballast water treatment standard	47
OCIMF	MEPC 47/2/19	Comments on the submission by the Ballast Water Standards Correspondence Group and suggested action to accelerate use of Ballast Water Management systems	47
Secretariat	MEPC 47/INF.10	The Legislative Review Project and the 1st International Workshop on Legal Aspects of Ballast Water Management and Control, World Maritime University, Malmö, Sweden 15-16 November 2001	47
Secretariat	MECP 47/2/5	Baltic Regional Workshop on Ballast Water Management Tallinn, Estonia, 22-24 October 2001	47
South Africa	MEPC 47/2/7	Status report of GloBallast - South Africa	47
Ukraine	MEPC 47/2/4	1 st Black Sea Conference on Ballast Water Management and Control Odessa, Ukraine, 10-12 October 2001	47
United Kingdom	MEPC 47/2/1	Ballast water exchange – sediment removal	47
United States	MEPC 47/INF.5	Addendum to the Report of the Ballast Water Standards Correspondence Group - Questions Posed and Input Received	47
United States	MEPC 47/2/3	Report of the Ballast Water Standards Correspondence Group	47
Australia	MEPC 48/INF.3	APEC Marine Resource Conservation Working Group (MRCWG) Workshop on Introduced Marine Pests	48
Australia	MEPC 48/INF.3/Corr.1	APEC Marine Resource Conservation Working Group (MRCWG) Workshop on Introduced Marine Pests Corrigendum	48
Australia and United Kingdom	MEPC 48/2/2	Design and Construction Standards for Ballast Water Exchange (BWE)	48

Brazil	MEPC 48/2/3	Proposed amendments to the draft International Convention for the Control and Management of Ship.s Ballast Water and Sediments, with a focus on the precautionary and conceptual approaches	48
Brazil	MEPC 48/2/10	Application of the Multi-criteria Decision-making Methodology (MCDM) for outranking the ballast water management options Œ Example and proposal for application	48
Brazil	MEPC 48/2/11	Investigation carried out in selected ports in Brazil to identify and characterize pathogens in ballast water	48
Brazil	MEPC 48/2/18	Comments on document MEPC 48/INF.6: Treatment and Management of Ship's Ballast Water to Control Introductions of Non-Indigenous Species: Advice by GESAMP	48
BWWG	MEPC 48/2	Report of the Ballast Water Working Group convened during MEPC 47	48
Germany	MEPC 48/INF.19	New ballast water project including full-scale testing of treatment techniques	48
IACS	MEPC 48/2/7	Issues associated with ballast water exchange at sea	48
ICS	MEPC 48/2/12	Outline draft for guidelines on sediment control	48
ICS	MECP 48/2/13	Comments on the draft Convention	48
India	MEPC 48/INF.15	GloBallast Programme Activities in India	48
India	MEPC 48/2/17	Comments on the Draft International Convention for the Control and Management of Ship™s Ballast Water and Sediments	48
Japan	MEPC 48/2/15	Comments on IMO's work towards a Diplomatic Conference	48
Japan	MEPC 48/2/16	Comments and proposal for the survey and certification requirements for ships under the draft Convention	48
Japan	MEPC 48/2/21	Comments on regulations E-1 and C-1 of the Convention	48
Netherlands	MEPC 48/2/4	Comments on the draft Convention	48
Netherlands and Germany	MEPC 48/2/5	Comments on determining a ballast water treatment standard	48
Norway	MEPC 48/2/20	Proposal to develop further guidance on where to perform ballast water exchange and consideration of some operation limitations of the method	48
OCIMF	MEPC 48/2/19	Comments on issues from the Ballast Water Working Group	48

Secretariat	MEPC 48/INF.6	Treatment and Management of Ships' Ballast Water to Control Introductions of Non-indigenous Species: Advice by GESAMP	48
SGBOSV, Chairman	MEPC 48/2/9	Approval testing of ballast water treatment techniques	48
United States	MEPC 48/INF.16	Size distribution of organisms in ballast water	48
United States	MEPC 48/2/1	Report of the Ballast Water Standards Correspondence Group	48
United States	MEPC 48/2/6	Ballast Water Standards and Technology	48
United States	MEPC 48/2/8	Proposed Redraft of Regulations in Section C	48
United States	MEPC 48/2/14	Additional outstanding issues	48
Argentina and Others	MEPC 49/2/1	Draft International Convention for the Control and Management of Ships™ Ballast Water and Sediments	49
Brazil	MECP 49/INF.26	Remarks on Ballast Water Management by Ships	49
Brazil	MEPC 49/2	Consideration of GESAMP™s advice on ballast water matters	49
Brazil	MEPC 49/2/2	Proposed amendments to the Regulations of the draft International Convention for the Control and Management of Ships™ Ballast Water and Sediments	49
Brazil	MEPC 49/2/4	Assessment of the efficacy of ballast water exchange through the analysis of physical, chemical, biological and microbiological variables	49
Brazil	MEPC 49/2/9	Proposal for the standardization of indicators for assessment of the microbiological quality of ballast water	49
Brazil	MEPC 49/2/17	Proposals for the improvement of the draft Convention for the Control and Management of Ships' Ballast Water and Sediments	49
BWWG	MEPC 49/2/3	Report of the Second Intersessional Meeting of the MEPC Ballast Water Working Group	49
EC	MECP 49/INF.16	Mitigation measures for ballast water management: Results and recommendations from the EU co-funded project SEAM	49
EC	MECP 49/INF.17	Treatment and management of ballast water to control introduction of non-indigenous species (on-board treatment of ballast water): Results and recommendations from the EU co-funded project MARTOB	49

FOEI and Others	MEPC 49/2/13	Ballast Water Treatment comments to MEPC-IBWWG 2/3 (CEFIC)	49
Germany	MECP 49/INF.9	R&D project to develop ballast water treatment techniques on board vessels	49
Germany	MEPC 49/INF.29	Results of a R&D project on the development of a ballast water treatment plant	49
IACS	MEPC 49/2/11	Standards for Ballast Water Exchange (BWE)	49
ICES	MEPC 49/2/21	Comments on draft Regulation E-2 Concentrations of organisms delivered in ships' ballast water in the absence of any treatment: Establishing a baseline for consideration of treatment efficacy	49
ICS	MEPC 49/2/22	Comments on the draft Convention	49
ICS	MEPC 49/2/23	Draft Guidelines for Development of Ballast Water Management Plans	49
India	MECP 49/INF.27	GloBallast Programme Activities in India	49
India	MEPC 49/2/12	Input for development of Guidelines on Ballast Water Sampling	49
ISAF	MEPC 49/2/7	Draft International Convention for the Control and Management of Ships Ballast Water and Sediments	49
Israel	MEPC 49/2/30	Equivalent compliance for recreational vessels	49
Israel	MEPC 49/2/31	Ships unable to conduct ballast water exchange due to time/route constraints	49
Italy	MEPC 49/2/10	Comments on the draft text of the International Convention for the Control and Management of Ships' Ballast Water and Sediments	49
Japan	MEPC 49/2/25	Ballast Water Performance Standard	49
Japan	MEPC 49/2/26	Comments on the draft Convention	49
Japan	MEPC 49/2/27	Guidelines for Type Approval of Ballast Water Treatment System	49
Japan	MEPC 49/2/28	Ballast Water Exchange (BWE)	49
Japan	MEPC 49/2/29	Proposal for sampling of ships. ballast water	49
Netherlands	MEPC 49/2/15	Type approval procedure for ballast water treatment systems	49
Netherlands	MECP 49/2/16	The use of chemical or biocidal treatment options	49
Netherlands and Singapore	MEPC 49/2/14	Draft International Convention for the Control and Management of Ships' Ballast Water and Sediments - Principles of the Convention	49

Norway	MEPC 49/2/19	Proposal for modification of Regulation E-2 Ballast Water Performance Standard	49
Norway	MEPC 49/2/20	Proposal for modification of Regulation A-4 and development of Guidelines on Assessment of Risk Related to Discharge of Unmanaged Ballast Water	49
Norway	MEPC 49/2/24	Proposal for draft Guidelines for Type Approval of Ballast Water Treatment Systems	49
Secretariat	MECP 49/INF.6	Draft International Convention for the Control and Management of Ships' Ballast Water and Sediments: Text in instrike-outlŸW version	49
Secretariat	MEPC 49/INF.35	Development of International Guidelines and Standards for Ballast Water Sampling	49
Secretariat	MEPC 49/INF.36	Development of International Guidelines and Standards for Surveys and Monitoring of Invasive Aquatic Species in port Areas	49
Secretariat	MEPC 49/2/6	Concept of the Continuation of the IMO/UNDP/GEF Project "Ballast Water Management" (GloBallast)	49
Secretariat	MEPC 49/2/32	Draft Conference resolution on promotion of technical co-operation	49
Ukraine	MEPC 49/INF.32	Status report on GloBallast Programme Activities - Ukraine	49
UNESCO	MEPC 49/INF.28	Ballast Water Background Paper by the Intergovernmental Panel on Harmful Algal Blooms, May 2003 edited by Dr. Gustaaf Hallegraeff	49
United Kingdom	MEPC 49/2/8	Guidelines for Ballast Water Exchange	49
United States	MEPC 49/INF.31	Summary of an International Workshop on Ballast Water Discharge Standards	49
United States	MEPC 49/2/5	Phased in Implementation of Ballast Water Standards	49
United States	MEPC 49/2/18	Additional outstanding issues	49
Secretariat	MEPC 51/2	Outcome of the International Conference on Ballast Water Management for Ships and follow-up action	51

Appendix 5 - Submitted Documents to MEPC Towards Air Pollution from Ships from MEPC 45 to 62

Country	Document Number	Title of the Document	MEPC Meeting
Japan	MEPC 45/INF.27	A point of view toward GHG emission reduction:1 Preliminary study on estimation and future trend of GHG emissions from all marine vessels	45
Secretariat	MEPC 45/8	Report on the outcome of the IMO Study on Greenhouse Gas Emissions from Ships	45
Secretariat	MEPC 45/8/1	Draft MEPC resolution on Interim Guidelines for the Application of regulation 16(2)(a) of Annex VI to MARPOL 73/78	45
Secretariat	MEPC 45/8/2	Progress report on follow-up activities	45
Secretariat	MEPC 45/8/3	Consideration of an IMO strategy for greenhouse gases reduction	45
FOEI	MEPC 46/INF.29	IMO policy on ozone-depleting substances and greenhouse gases	46
Japan	MEPC 46/INF.33	Preliminary Study on estimation of GHG emissions other than CO2 from ocean-going vessels	46
Norway	MEPC 46/INF. 9	Information on some mechanisms to curb greenhouse gas emissions from international shipping	46
Norway	MEPC 46/10/1	Proposal for elements to be included in an IMO strategy on greenhouse gases	46
Secretariat	MEPC 46/10	Progress report on follow-up activities	46
FOEI	MEPC 47/4/3	Greenhouse gas emissions	47
FOEI	MEPC 47/4/4	SOx Emissions	47
Japan	MEPC 47/4/5	Study on estimation and reduction of GHG emissions from ocean-going vessels	47
Norway	MEPC 47/4/1	Elements to be considered in a possible development of a GHG emission standard for ships	47
Secretariat	MEPC 47/4	Progress report on follow-up activities	47
United Kingdom	MEPC 47/4/2	Elements to be considered in a possible development of a GHG emission standard for ships	47
Greece	MEPC 48/INF.8	Results concerning the effects of Heavy Fuel Oil Additive on engine performance and emissions	48
Netherlands	MEPC 48/INF.4	Sulphur monitoring 2001	48

Norway	MECP 48/4/1	Report of the Correspondence Group on Greenhouse Gas Emissions from Ships	48
Secretariat	MEPC 48/4	Progress report on follow-up activities	48
Germany	MEPC 49/INF.19	Proposal for a CO2-indexing method for ship machinery combining design operation parameters and The proposed methodology and statistical data	49
Germany	MEPC 49/4/3	Proposal for a CO2-indexing method for ship machinery combining design parameters and operation	49
Japan	MEPC 49/INF.10	On-board NOx measurement and monitoring	49
Netherlands	MEPC 49/4/1	Sulphur monitoring 2002	49
Norway	MEPC 49/4	Report of the Correspondence Group on Greenhouse Gas Emissions from Ships	49
Norway	MEPC 49/4/5	Proposal for elements to be included in an IMO strategy on greenhouse gases	49
Norway	MEPC 49/4/6	Commitments under the Convention on Climate Change and the Kyoto Protocol	49
Secretariat	MEPC 49/4/2	Report of the IMO/UNFCCC Meeting	49
Singapore	MEPC 49/INF.18	Guidelines for the Sampling of Fuel Oil for Determination of Compliance with Annex VI of MARPOL 73/78	49
United Kingdom	MEPC 49/4/4	Comments on the development of draft Assembly resolution for IMO policies and practices related to reduction of greenhouse gas emissions from ships	49
Germany	MECP 51/INF.2	Statistical investigation of containership design with regard to emission indexing	51
Norway	MECP 51/4	Report of the Correspondence Group on Greenhouse Gas Emissions from Ships	51
Norway	MEPC 51/4/2	Views on the further work on Greenhouse Gas Emissions from international shipping	51
Secretariat	MEPC 51/4/1	Progress report on follow-up activities	51
Working Group	MEPC 51/WP.6	Report of the Working Group	51
FOEI	MEPC 52/4/4	Comments on Annex VI	52
FOEI	MEPC 52/4/5	Greenhouse Gas Emissions	52
Germany, Norway and UK	MEPC 52/4/2	Input to the further work on Greenhouse Gas Emissions from international shipping	52
IACS	MEPC 52/4/6	Clarification on Regulations 9 and 13 of MARPOL Annex VI	52

IACS	MEPC 52/4/7	Unified Interpretations to MARPOL Annex VI	52
India	MEPC 52/4/9	Greenhouse gas emissions from ships	52
INTERTANKO	MEPC 52/4/11	Unified Interpretations to MARPOL Annex VI	52
Iran	MEPC 52/4/12	Comments on regulation 14 of MARPOL Annex VI	52
Netherlands	MEPC 52/4/8	Sulphur monitoring 2003	52
Norway	MEPC 52/4/1	Principles of the IMO Work on Reduction of GHG Emissions from Ships	52
Secretariat	MEPC 52/4	Report of the Informal Meeting between the Secretariats of IMO and UNFCCC	52
Secretariat	MEPC 52/4/3	Progress report on follow-up activities	52
United Kingdom	MEPC 52/4/10	Survey Guidelines for MARPOL Annex VI	52
Working Group	MEPC 52/WP.9	Report of the Working Group	52
China	MEPC 53/4/6	Comments on the Draft Guidelines for On-Board Exhaust Gas SOx Cleaning Systems	53
EUROMOT	MEPC 53/4/5	Proposals to amend MARPOL Annex VI and the Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines	53
EUROMOT	MEPC 53/4/13	Proposals to amend the NOx Technical Code	53
Finland and Others	MEPC 53/4/4	MARPOL Annex VI - Proposal to initiate a revision process	53
FOEI	MEPC 53/4/1	Reducing Shipping Emissions of Air Pollution . Feasible and Cost-effective Options	53
FOEI	MEPC 53/4/8	Air Pollution from Shipping Emissions - Environmental Justice: Public Health and Community Impacts Supplement to Background Paper Submitted on Reducing Shipping Emissions of Air Pollution - Feasible and Cost-effective Options	53
Germany	MEPC 53/INF.5	Investigation of different ship types with regard to emission indexing based on statistical and operational data	53
Germany	MEPC 53/4/18	Comments on the draft Guidelines for port State control for MARPOL Annex VI	53
IADC	MEPC 53/4/7	Difficulties associated with implementation of MARPOL Annex VI on mobile offshore drilling units	53
India	MEPC 53/4/9	Draft Guidelines for CO2 Emission Indexing - trials based on operational data	53

India	MEPC 53/4/17	Comments on the outcome of FSI 13 on MARPOL Annex VI-related matters – on-board verification survey for demonstrating compliance with NOx emission limits	53
India	MEPC 53/4/19	Comments on the outcome of DE 48 on matters related to MARPOL Annex VI	53
INTERTANKO	MEPC 53/4/16	Outcome of FSI 13 on MARPOL Annex VI - related matters Draft guidelines for MARPOL Annex VI	53
Japan	MEPC 53/4/15	Comments on the outcome of DE 48 on matters related to MARPOL Annex VI	53
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Appendix 6 - Submitted Documents to MEPC Towards Energy Efficiency Design Index from MEPC 59 to 62

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CLIA	MEPC 59/4/29	Consideration of the Energy Efficiency Design Index for New Ships Refinements to the "draft guidelines on the method of calculation of the energy efficiency design index for new ships" for non-conventional passenger ships	59
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IACS	MEPC 59/4/27	Comments on verification of the proposed Energy Efficiency Design Index (EEDI)	59
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China	GHG WG2/2/10	Comments on the draft Interim Guidelines on the Method of Calculation of the Energy Efficiency Design Index for New Ships	
China	GHG WG2/2/9	Comments on the EEDI baseline formula	
CILA	GHG WG2/2/21	Attained Index definition for passengers ships only	
Denmark	GHG WG2/2/6	Capacity for ro-ro passenger ships	
Denmark	GHG WG2/2/3	Definition of Ship types – Energy efficiency design index	
Denmark	GHG WG2/2/4	Proposal for a verification procedure for Waste Heat Recovery Contribution	
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Denmark and Japan	EE WG1/3/3	Guidelines for calculation of baselines for use with the Energy Efficiency Design Index	

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Japan	GHG WG2/2/15	Technical consideration of baselines for Energy Efficiency Design Index (EEDI)	
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Appendix 7 - Submitted Documents to STW Towards Comprehensive Revision of STCW Convention and STCW Code from STW 38 to 41

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EC	STW 38/12/4	Comprehensive Review of the STCW Convention and the STCW Code	38
Estonia and Others	STW 38/12/9	Comprehensive Review of the STCW Convention and the STCW Code	38
ICCL	STW 38/12/13	Comprehensive Review of the STCW Convention and the STCW Code	38
ICFTU	STW 38/12/3	This document identifies areas of the STCW Convention that may need additions of amendments	38
IFSMA	STW 38/12/5	Proposal for amendments to Chapters II and III of the STCW-Code	38
IFSMA	STW 38/12/6	Proposal for amendments to Chapter VIII of the STCW Code	38
IFSMA	STW 38/12/7	Comprehensive Review of the STCW Convention and the STCW Code	38
India	STW 38/12/1	STCW Convention and the STCW Code that needs to be reviewed to take into account the existing inconsistencies and inclusion of new technological advances	38
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Bulgaria and Others	STW 39/7/18	Mandatory alcohol limit and to enhance international exchange of information on alcohol-related incidents on board seagoing ships	39
Bulgaria, France, Poland and United Kingdom	STW 39/7/12	Definition and mandatory requirements for certification of electro-technical officer and senior electro-technical officer and a special training for engineering personnel managing the operation of electrical power plant above 1000 Volts	39
Canada	STW 39/7/43	Specification of the minimum standard of competence in survival craft and rescue boats other than fast rescue boats	39
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IFSMA	STW 39/7/34	Review of regulation I/12 of the STCW Convention	39
IFSMA	STW 39/7/36	Review of regulation II/1 of the STCW Convention Integrated Bridge System Training	39
IMCA	STW 39/7/50	Review of chapter V of the STCW Convention and the STCW Code	39
IMHA	STW 39/7/8	Development of international standards of fitness for all seafarers and a standard format medical fitness certificate (Regulation I/9)	39
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India	STW 39/7/21	Review of STCW regulation I/3	39
India	STW 39/7/42	Review of chapter III of the STCW Convention and the STCW Code	39
India	STW 39/7/45	Review of regulation V/1 of the STCW Convention and STCW Code related to personnel serving on board liquefied natural gas tankers	39

India	STW 39/7/46	Review of chapter VI of the STCW Convention and the STCW Code	39
India	STW 39/7/47	Review of regulation V/1 of the STCW Convention and the STCW Code related to personnel serving onboard liquefied natural gas tankers	39
India	STW 39/7/48	Review of regulation V/1 of the STCW Convention and STCW Code related to personnel serving on board oil and chemical tankers	39
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ISF	STW 39/7/51	Review of chapter VIII of the STCW Convention and the STCW Code	39
ITF	STW 39/7/35	Review of chapter I of the STCW Convention and the STCW Code	39
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Norway	STW 40/7/25	Chapter V of the STCW Convention and Code Training requirements for ships operating in ice-covered waters	40
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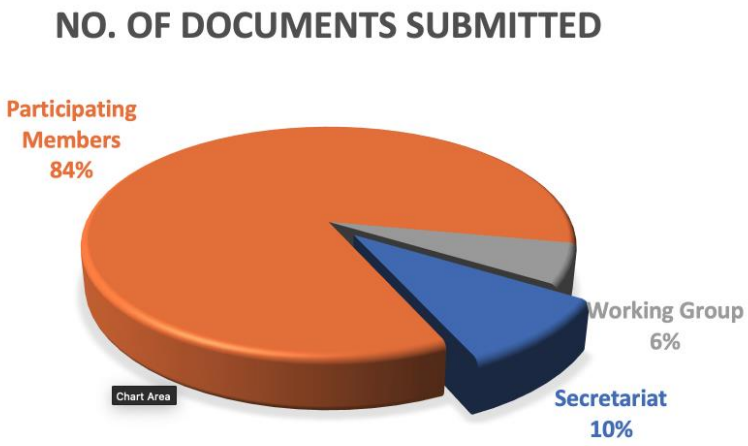
Working Group	STW 41/WP.2/Add.3/Rev.1	Chapter I	41
Working Group	STW 41/WP.4	Chapter II and Conference resolutions	41
Working Group	STW 41/WP.4/Add.1	Chapter II and Conference resolutions	41
Working Group	STW 41/WP.5	--	41
Working Group	STW 41/WP.5/Add.1	Chapters IV, VII and VIII	41

Appendix 8 - Results of the Analysis Presented in the Form of Graphs for Distribution between Secretariat/Working Vs Participating Members

1. The graphs presented in figures 25 to 28 represents the percentage share of documents submitted by the Secretariat and Working Groups against the participating members (Member States and IGOs/NGOs).

Figure 25

BWM – Percentage Share of Document Submission – Secretariat V/s Participating Members



Note. Created by the Author.

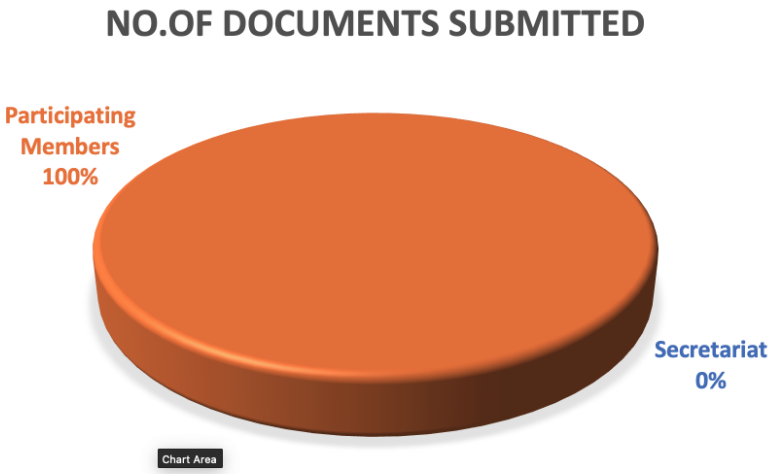
Figure 26

Air Pollution from Ships –Document Submission - Secretariat V/s Participating Members

Note. Created by the Author.

Figure 27

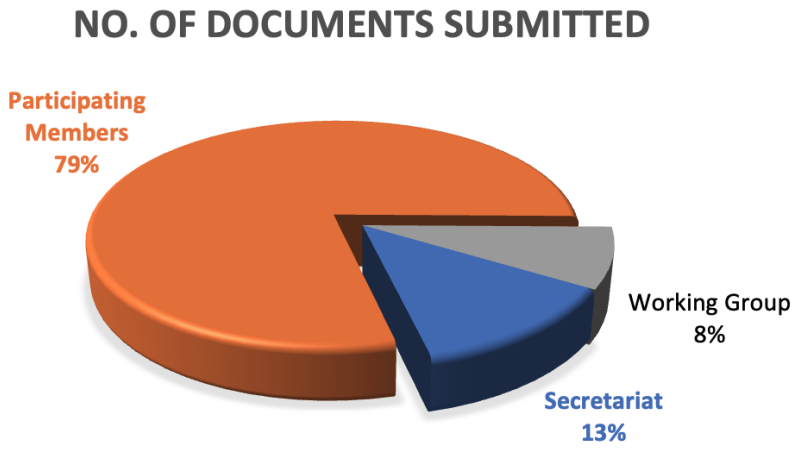
EEDI –Document Submission - Secretariat V/s Participating Members



Note. Created by the Author.

Figure 28

STCW –Document Submission - Secretariat V/s Participating Members



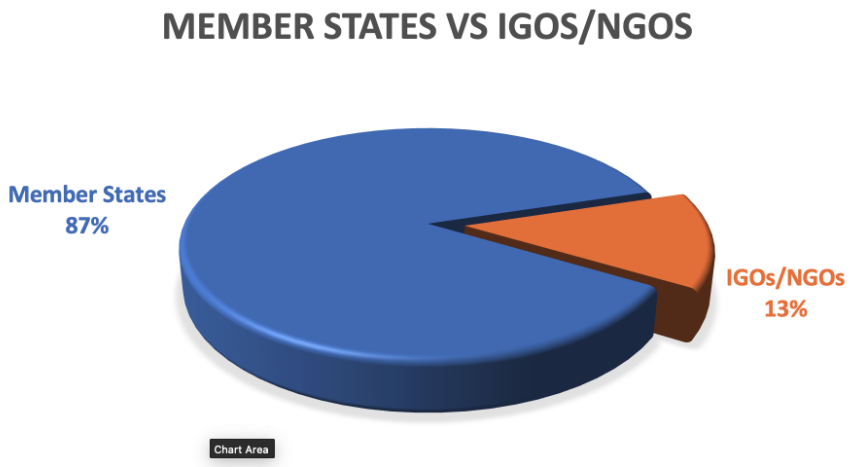
Note. Created by the Author.

Appendix 9 - Results of the Analysis Presented in the Form of Graphs for Distribution between Member States Vs IGOs/NGOs

1. The graphs presented in figures 29 to 32 represents the percentage share of documents submitted by the Member States against IGOs/NGOs post exclusion of submission by the Secretariat.

Figure 29

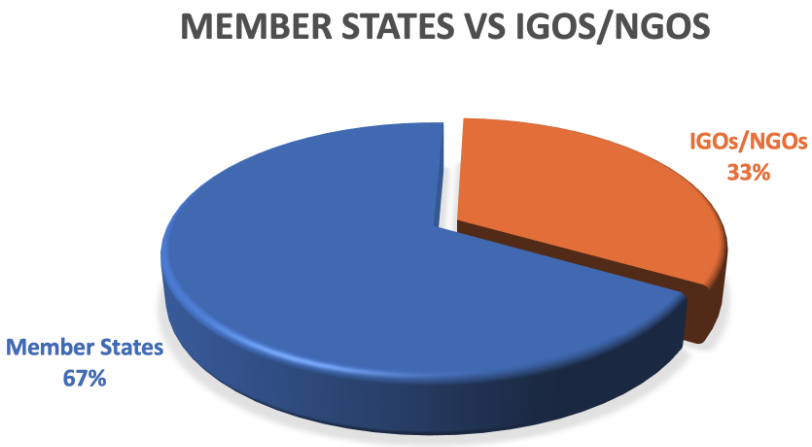
BWM –Document Submission – Member States V/s IGOs/NGOs



Note. Created by the Author.

Figure 30

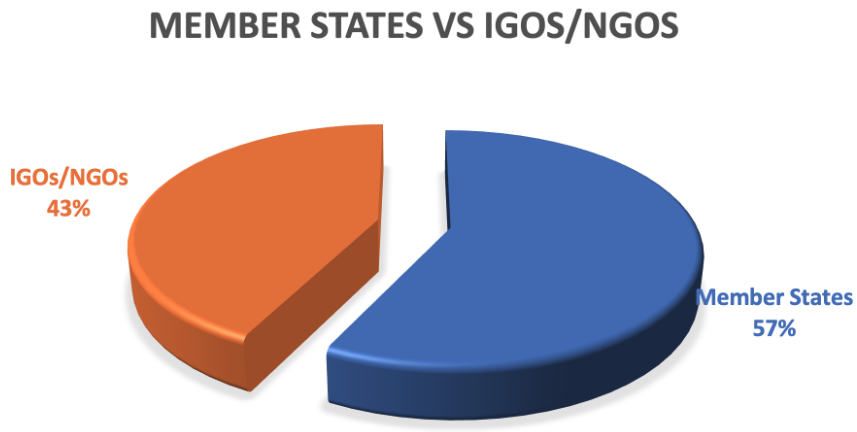
Air Pollution from Ships – Document Submission – Member States V/s IGOs/NGOs



Note. Created by the Author.

Figure 31

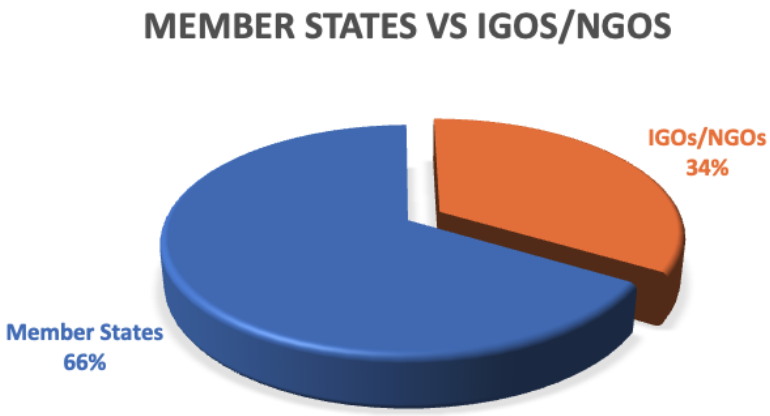
EEDI - Document Submission – Member States V/s IGOs/NGOs



Note. Created by the Author.

Figure 32

STCW –Document Submission – Member States V/s IGOs/NGOs



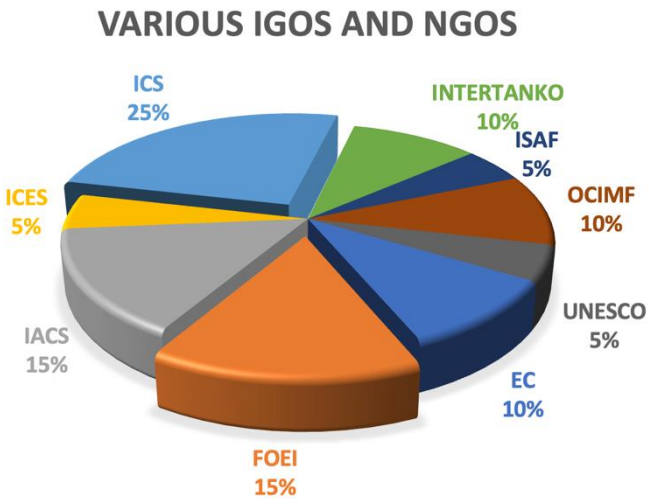
Note. Created by the Author.

Appendix 10 - Results of the Analysis Presented in the Form of Graphs for Distribution between Various IGOs/NGOs

1. The graphs presented in figures 33 to 36 highlights the number of documents submitted by various IGOs/NGOs on particular issue. Although, analysis of the same is not part of the research the data is presented here as it brings out some interesting facts about the role which NGOs play in the larger scheme of things.

Figure 33

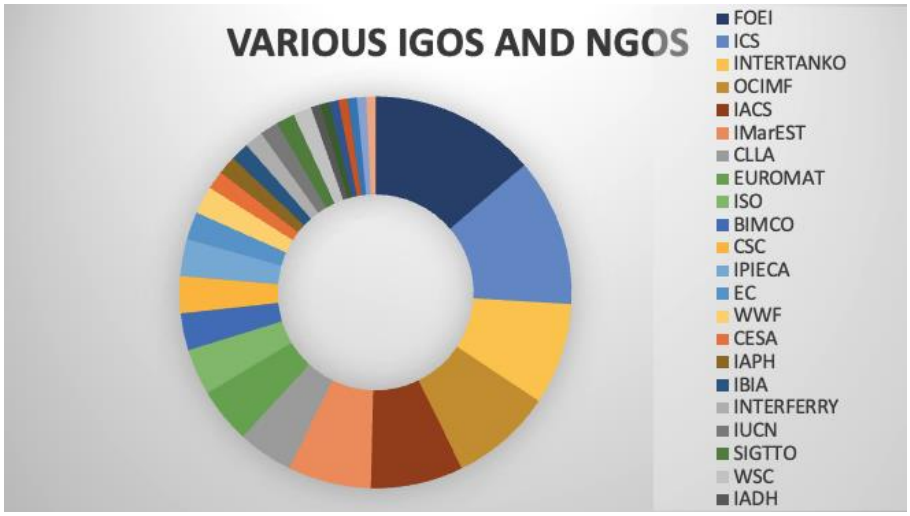
BWM – Submission by IGOs/NGOs



Note. Created by the Author.

Figure 34

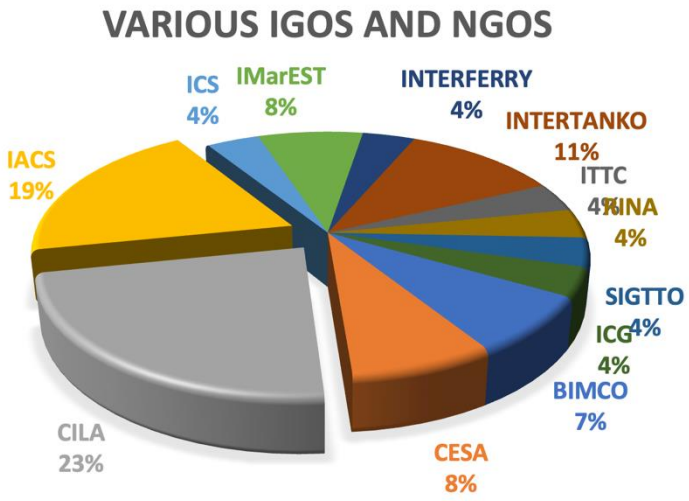
Air Pollution from Ships – Submission by IGOs/NGOs



Note. Created by the Author.

Figure 35

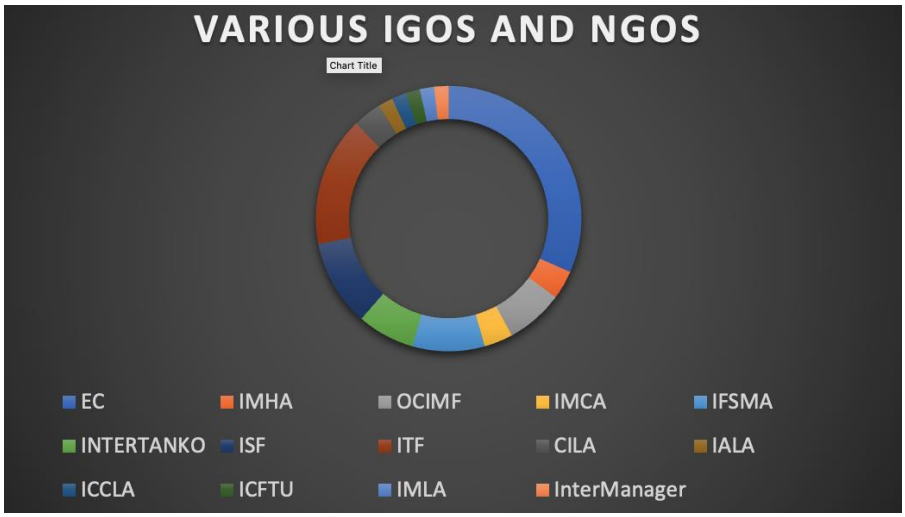
EEDI – Submission by IGOs/NGOs



Note. Created by the Author.

Figure 36

STCW – Submission by IGOs/NGOs



Note. Created by the Author.