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Korea Center for International Maritime Safety Cooperation

EKC 2021
Europe-Korea Conference on Science and Technology



IMO Strategy on GHG Emissions and Autonomous Ships

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Korea Center for International Maritime Safety Cooperation (KMC)

한국해사안전국제협력센터
Korea Center for International Maritime Safety Cooperation

24 October 2021

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Introduction to KMC



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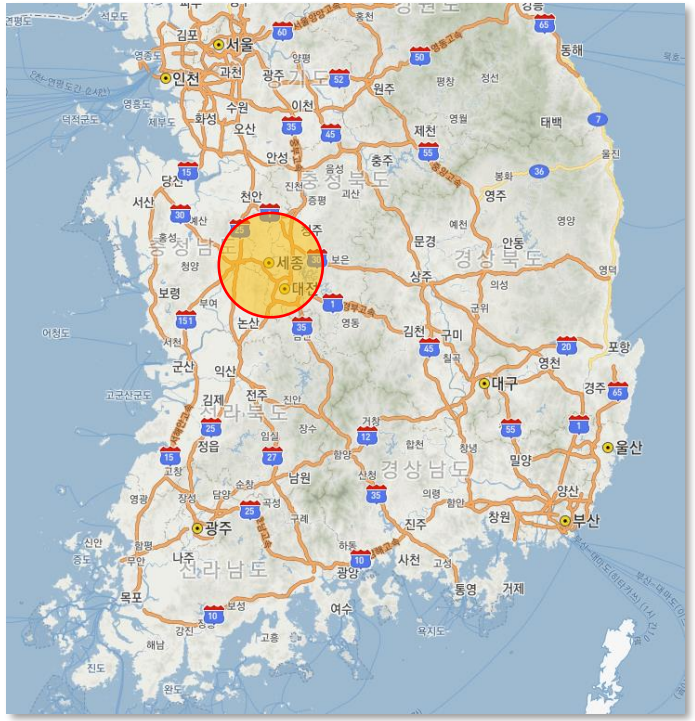
Korea Center for International Maritime Safety Cooperation

1. Introduction to KMC

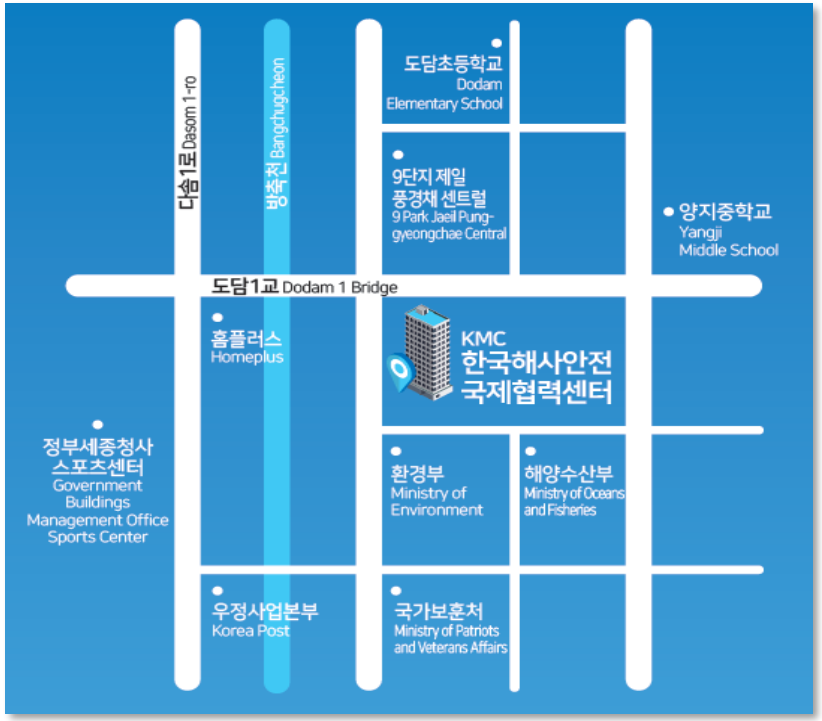
- **Name:** Korea Center for International Maritime Safety Cooperation (KMC)
- **President:** Booki Kim (also, President of KRISO)
- **Established:** January, 2014
- **Vision**
  Aiming at developing Korea's shipping & shipbuilding industries, and improving the efficiency of Korea's activities for maritime safety & marine environmental protection in maritime sector, especially IMO
- **Member Organization**
  (8 Regular Members) KRISO, KOMSA, KR, KSA, KOSHIPA, KOEM, KSA, KIMFT
  (2 Associate Members) KOMDI, KTR



1. Location







- **Address** F5, 492, Hannuri-daero, Sejong, 30103, Republic of Korea
- **Homepage** http://www.imokorea.org

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1. History of KMC

(2007.11) Establishment of KMC (Korea Maritime Center) & KMC UK Office in London

(2014.01) Establishment of KMC (Korea Center for International Maritime Safety Cooperation)

(2018.03) Opening of Maritime Research Institute in KMC (Busan)

(2019.03) Relocation of KMC (Sejong)

'07 — '14 — '18 — '19

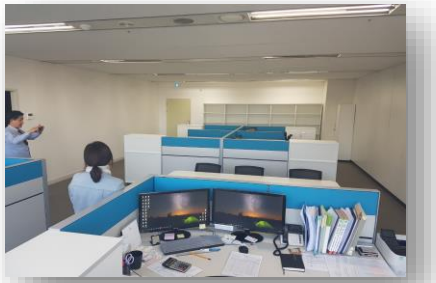


KMC Steering Committee (2013)



KMC Working Committee (2018)









Office & Meeting room (Sejong)

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1. Vision and Strategy

Vision

Improving the Efficiency of Korea's Activities at IMO for Maritime Safety & Marine Environmental Protection, and **Strengthening Competitiveness** as a Global Maritime Powerhouse through Comprehensive Response

Strategy

- **Analyzing & Identifying International Trends** on Maritime Safety and Marine Environmental Protection
- **Attending & Responding** to **IMO Meetings**
- Supporting **ITCP Activities** between Korea and IMO
- Disseminating **International Maritime Trends** & **Technical Information**
- Conducting & Supporting **Research on Maritime Policy** of the Government

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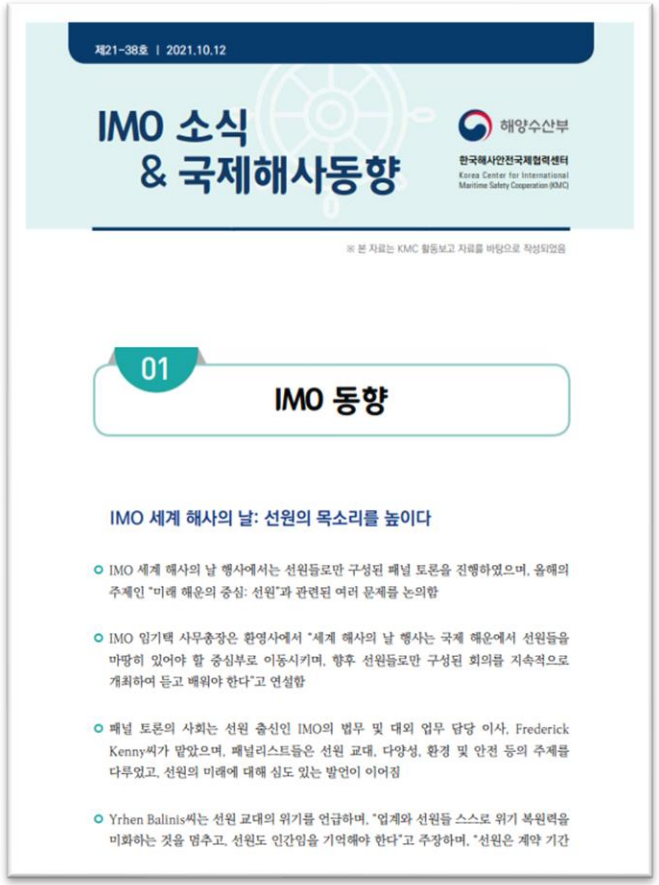
1. Major Activities

Comprehensive Response to IMO and other related Organizations & Relevant Policy Research

- **Responding to IMO and Conducting Relevant Research**
  (Development & review of IMO agenda, and proposal of Countermeasures)
- **Research on Maritime Policy on Maritime Safety and Marine Environmental Protection**
- **Supporting International Standardization of Korea's New Technologies**
  (Supporting Stakeholders in Korea according to Changes in International Standards)
- **Supporting Maritime Policy and International Cooperation of Korea Government**
- **Publication of Books and Newsletters regarding IMO and Maritime Issues**
  (IMO White Paper, International Maritime News, etc.)

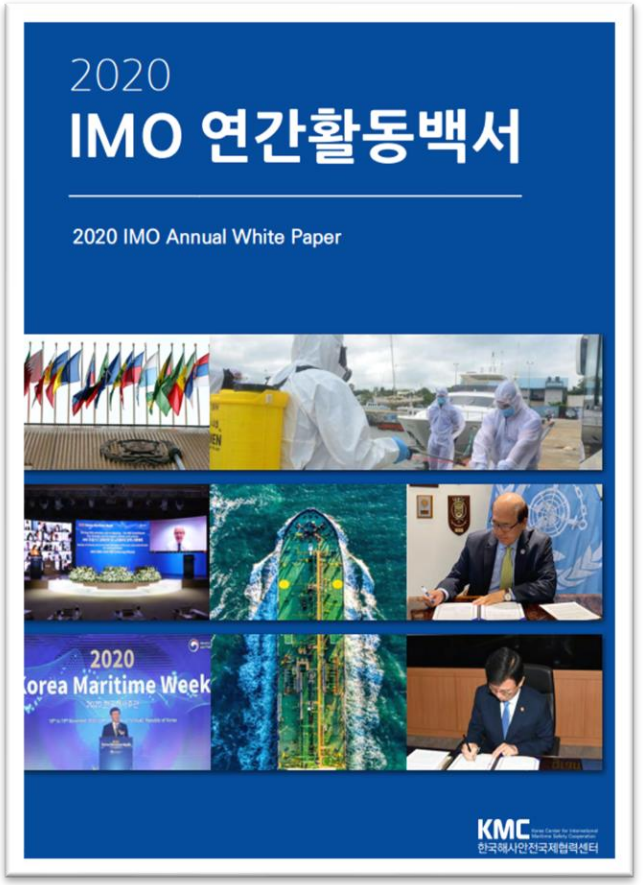
1. Major Activities



Weekly Newsletter on IMO and International Maritime Trends



Maritime Newsletter (quarterly basis)



IMO White Paper (annual basis)

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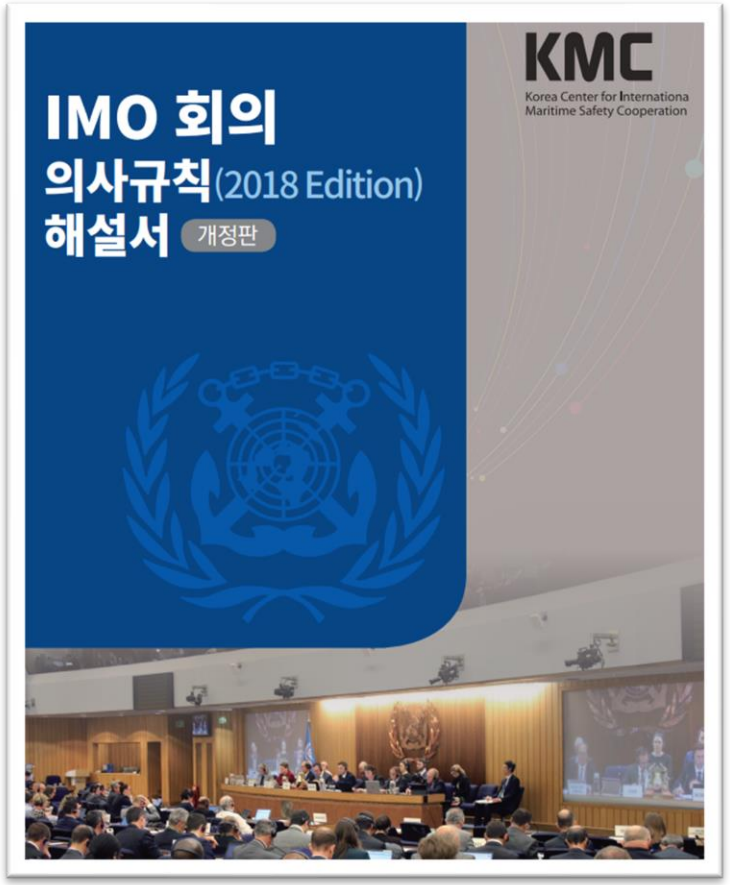
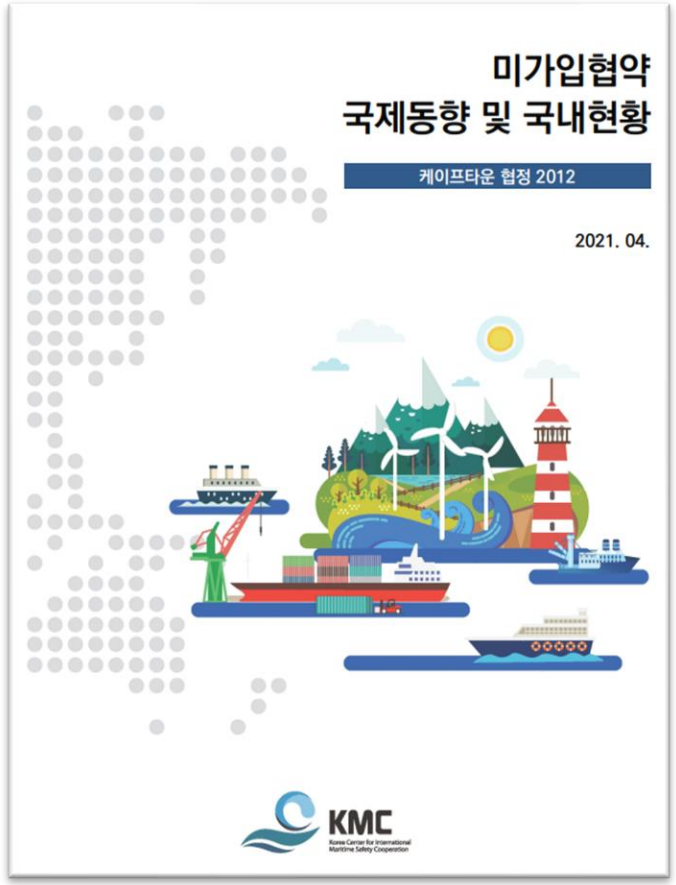
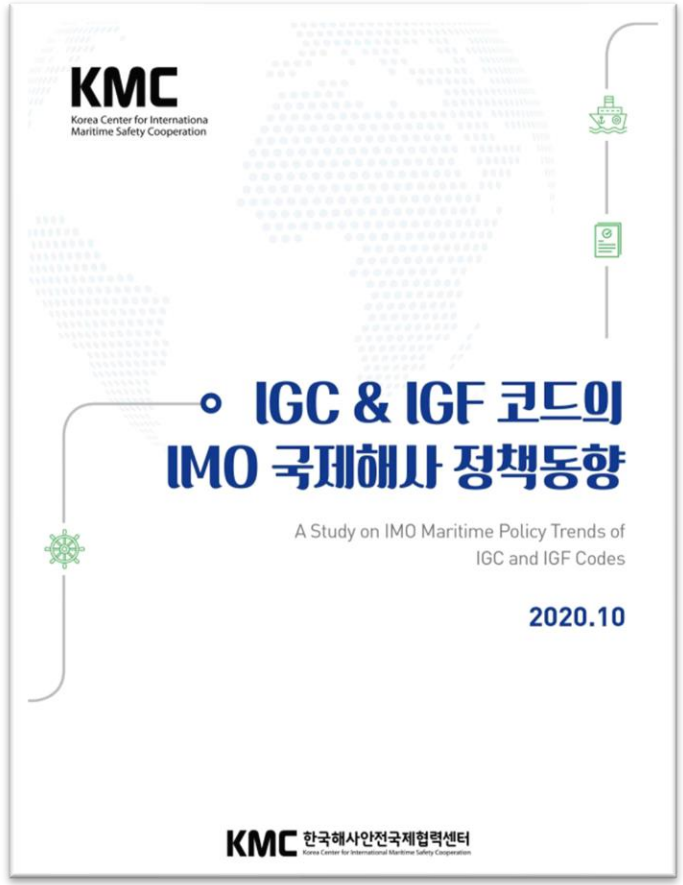
1. Major Activities



Guidebook of IMO Rules of Procedure

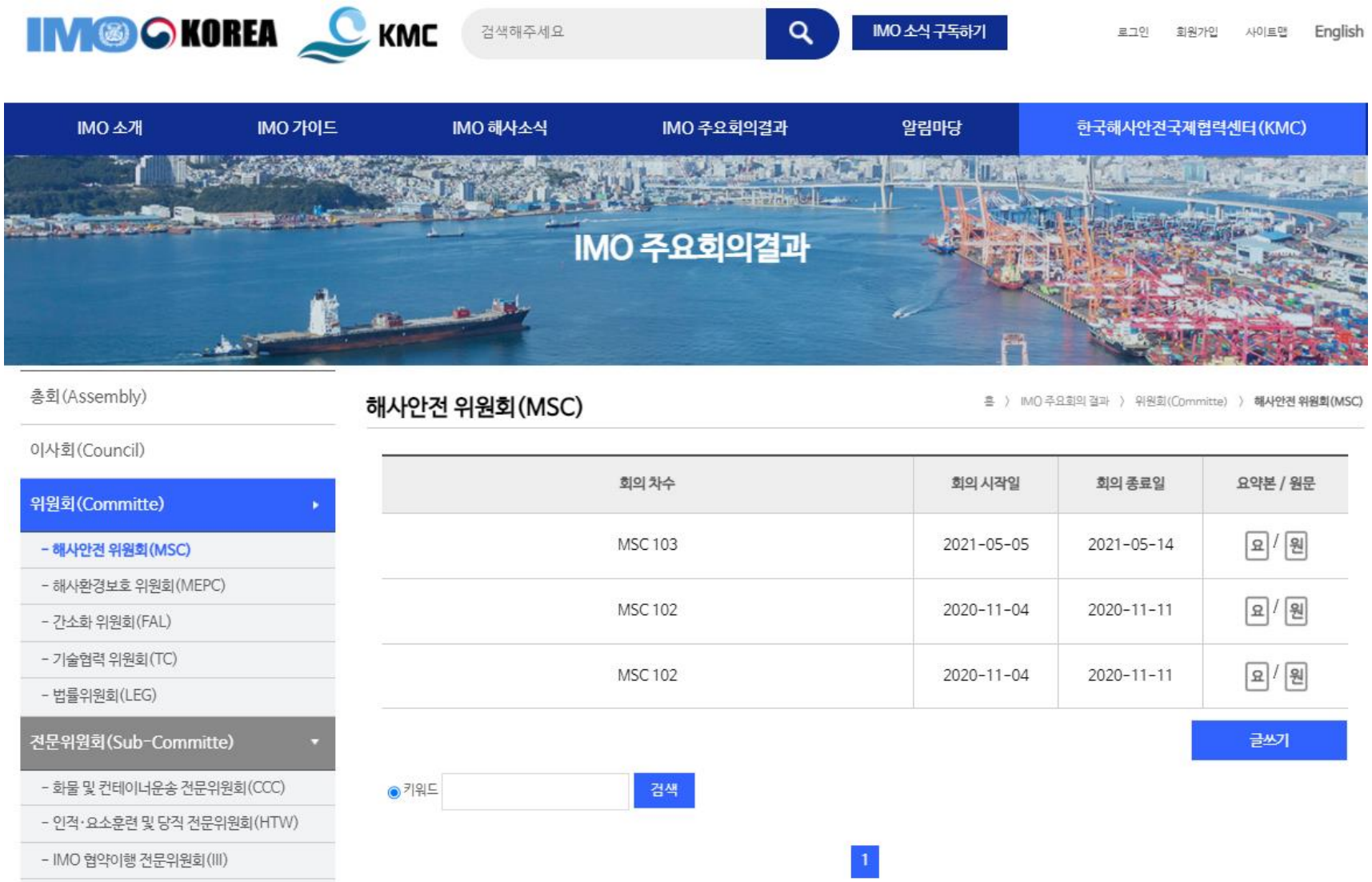


Research on IMO Instruments



Research on Maritime Policy

1. Major Activities



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1. Major Activities









Supporting Events & Meetings for International Cooperation
in Maritime Sector

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IMO Strategy for Reducing GHG Emissions from Ships



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2. Evolution of Fuels for Ships

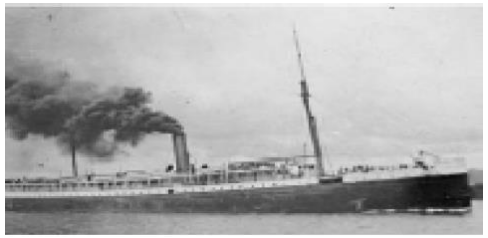
Key Driving Forces

- Technology
- Price competitiveness
- Safety, Effectiveness and Efficiency
- Eco-friendly



Great Smog of London,
and Clean Air Act(1956)





World first steam turbine ship
: Turbina (1894)



World first diesel engine ship
: M/S Selandia (1912)



World first LNG-Fuelled Container Ship
: Isla Bella (TOTE Maritime) (2015)

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2. Adoption and Progress of the Conventions on Climate Change



1st World Climate Conference (WCC)



Adoption of Kyoto Protocol



Doha Climate Gateway (2013-2020)

1979 — **1992** — **1997** — **Kyoto Regime** — 2005 — 2012 — **2015** — **2021** — **Post-2020 Climate Regime**

Adoption of UNFCCC

Kyoto Protocol entered into force

Paris Agreement



Note:
- ✓ UNFCCC: United Nations Framework Convention on Climate Change
- ✓ Limitations of the Kyoto Protocol: refusal to participate in some advanced countries, absence of obligations for developing countries, etc.
- ✓ Goal of Paris Agreement is to limit global warming to well below 2, preferably to 1.5℃, compared to pre-industrial (1850-1900) levels

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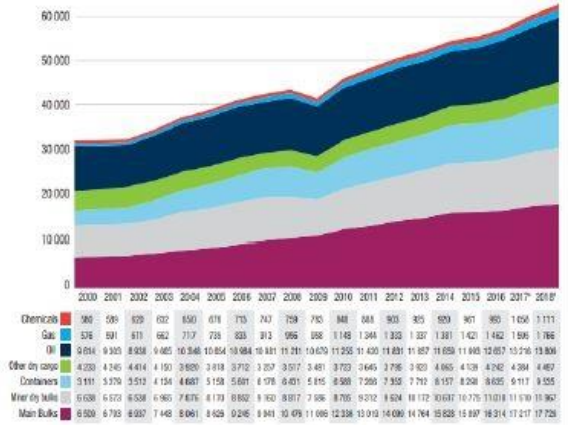
2. Statistics on GHG Emissions in Shipping

1

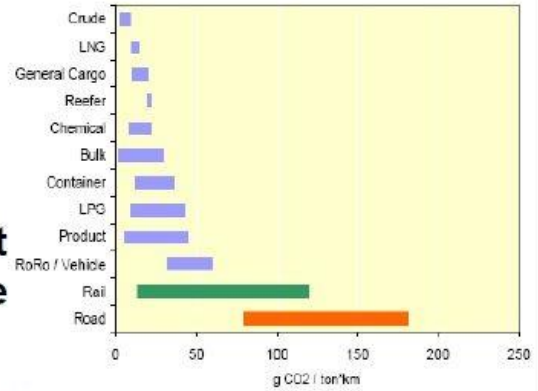
80% of
World Trade by volume



Source: Review of Maritime Transport 2018

2

No.1
Energy efficient Transport mode



Source: Second IMO GHG Study 2009

3

2.6% of
Global CO_2 emissions

(million tonnes)

Year	Global anthropogenic CO_2 emissions	Total shipping CO_2	Total shipping as a percentage of global	International shipping CO_2	Percentage of global
2012	34,793	961	2.76%	701	2.01%
2013	34,959	956	2.74%	683	1.96%
2014	35,224	963	2.74%	681	1.93%
2015	35,238	990	2.81%	699	1.99%
2016	35,379	1,026	2.9%	726	2.05%
2017	35,810	1,063	2.97%	745	2.08%
2018	36,572	1,056	2.89%	739	2.02%

Source: Fourth IMO GHG Study 2020

4

No.6 **Emitting country**



755million ton(6th) 701million ton 593million ton(7th)

Source:
- Emissions of Country: IEA
- Emissions of Int'l shipping: Fourth IMO GHG Study 2020

* Emissions in 2012

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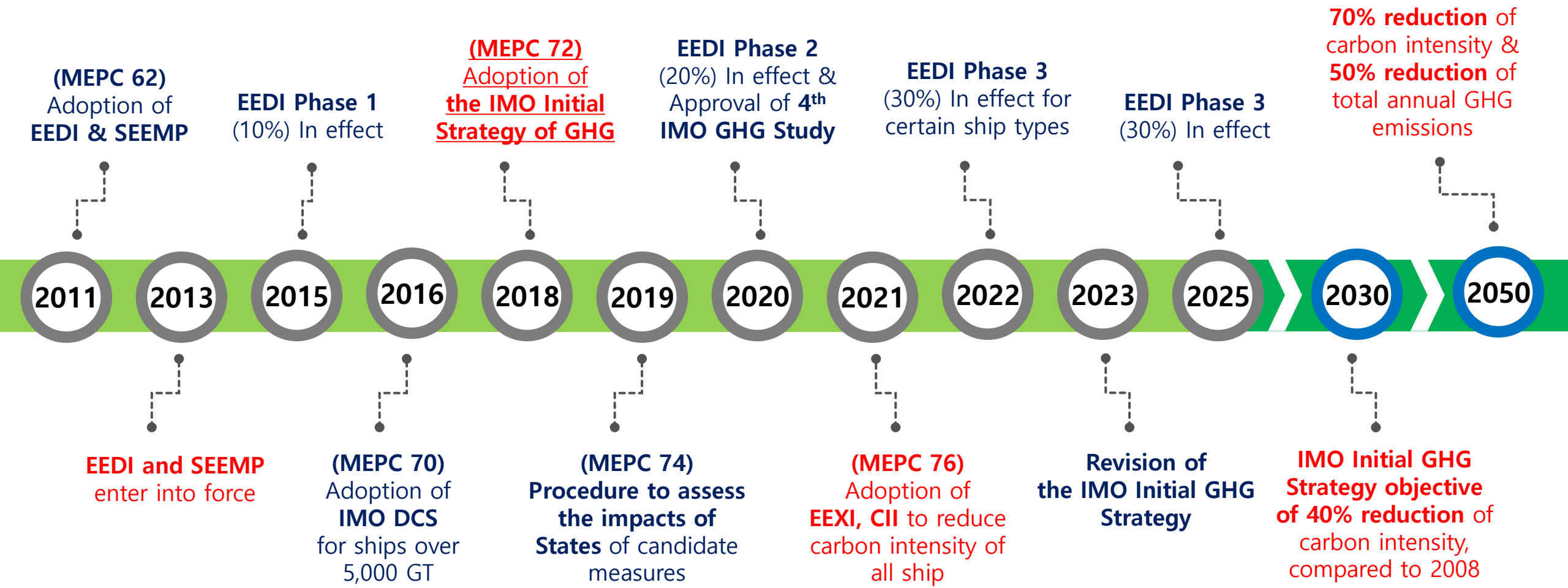
2. IMO Roadmap for Reducing GHG Emissions from Ships



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2. IMO Strategy for Reducing GHG Emissions from Ships

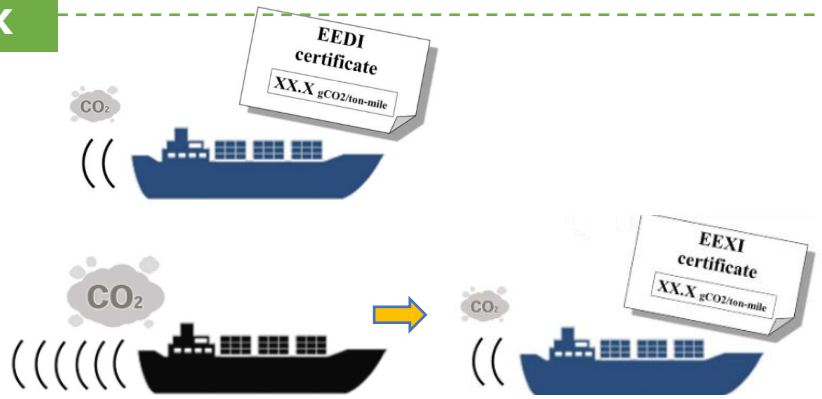
IMO GHG Strategy

IMO Energy Efficiency Framework

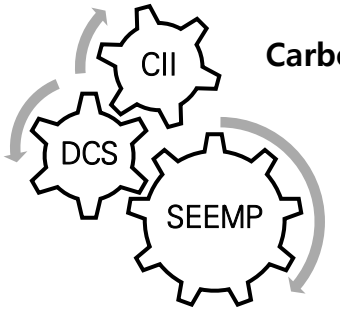
Technical Measures

NEW SHIP — **EEDI:** Energy Efficiency Design Index

EXISTING SHIP — **EEXI:** Energy Efficiency Existing Ship Index



Operational Measures

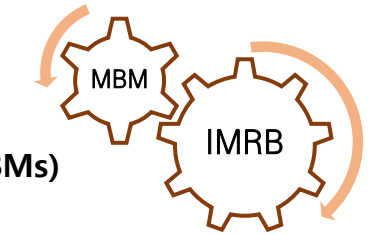


Carbon Intensity Indicator (CII)

Data Collection System (DCS)

Ship Management Plan to Improve Energy Efficiency (SEEMP)

Market Based Measures



International Maritime Research and Development Board (IMRB)

Market Based Measures (MBMs) ?

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2. IMO Measures for Reducing GHG Emissions from Ships

EEDI	Energy Efficiency Design Index	→ **MARPOL Annex VI, Chapter IV** **Reg. 20 (Attained EEDI) / Reg. 21 (Required EEDI)**
SEEMP	Ship Energy Efficiency Management Plan	→ **MARPOL Annex VI, Chapter IV** **Reg. 22 (SEEMP) – Part I for CII / Part II for DCS**
DCS	Data Collection System	→ **MARPOL Annex VI, Chapter IV** **Reg. 22A** (Collection and reporting of ship fuel oil consumption data)
EEXI	Energy Efficiency Existing Ship Index	→ **MARPOL Annex VI, Chapter IV** **Reg. 20A (Attained EEXI) / Reg. 21A (Required EEXI)**
CII	Carbon Intensity Indicator	→ **MARPOL Annex VI, Chapter IV** **Reg. 22 (SEEMP) – Attained CII / Required CII**
MBM	Market-based Mechanism	→ 8 MBM proposals, *suspended discussions from MEPC 65
Initial IMO Strategy		→ **Resolution MEPC.304(72)** adopted at MEPC 72

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IMO Strategy on Autonomous Ships





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3. Expected Effects of Introduction of Autonomous Ships

Items	Expected Effects
Reduction of Marine Accidents	• Reduction of human errors and marine accidents due to accident prevention and response system • Improvement of safety by predicting, diagnosing and servicing engines and systems in advance
Resolving the Shortage of Seafarers	• Resolving the shortage of seafarers, and improving the working environment • Growing demand for professionals on shore
Reduction of Ship Operating and Managing Costs	• Reducing fuel and labor costs • Reduction of operating costs due to reduction of maintenance and downtime
Reduction of GHG Emissions from Ships	• Reduction of GHG through optimization of flight and ship operation • Increase of operational efficiency and reduction of GHG by reducing waiting time in ports
Etc.	• Industrialization of shipbuilding and shipping with smart technology • creation of new industries and expansion of existing ones.

3. Decisions on Development of IMO Instruments on MASS

IMO Meetings	Date	Decisions
MSC 98	**July 2017**	Agreed to include the Regulatory Scoping Exercise (RSE) for the use of MASS in the post-biennial agenda of MSC
MSC 100	**Dec. 2018**	Approved the framework and methodology for RSE for MASS, including preliminary definitions of MASS and degrees of autonomy
MSC 103	**May 2021**	Completed the RSE for MASS, and agreed that proposals for new outputs would be needed to address the various gaps in IMO instruments identified in the RSE.
MSC 104	**Oct. 2021**	Agreed to develop a goal-based instrument for MASS, and included a new output on "Development of a goal-based instrument for MASS", with a target completion year of 2025

Note:

- ✓ RSE 1st Step: identify current provisions in an agreed list of IMO instruments and assess how they may or may not be applicable to ships with varying degrees of autonomy and/or whether they may preclude MASS operations.
- ✓ RSE 2nd Step: determine the most appropriate way of addressing MASS operations, taking into account, inter alia, the human element, technology and operational factors.

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3. Preliminary Definition of Degrees of Autonomy

MASS Degree 1	MASS Degree 2	MASS Degree 3	MASS Degree 4
Ship with automated process and decision support	**Remotely controlled ship with seafarers on board**	**Remotely controlled ship without seafarers on board**	**Fully autonomous ship**
• Seafarers on board • Some operations automated and at times unsupervised with seafarers ready to control	• Controlled and operated from another location • Seafarers available on board to take control and operate	• Controlled and operated from another location • No seafarers on board	• The operating system of MASS is able to make decisions and determine actions by itself

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Thank You for Your Attention

Q & A