



## 2023 IMO GHG strategy Recommendations and Perspectives



### Revised GHG reduction strategy for global shipping adopted

International Maritime Organization (IMO) adopts revised strategy to reduce greenhouse gas emissions from international shipping.

Korea Maritime Institute

Director (Research Fellow)  
**Dr. Han-Seon PARK**

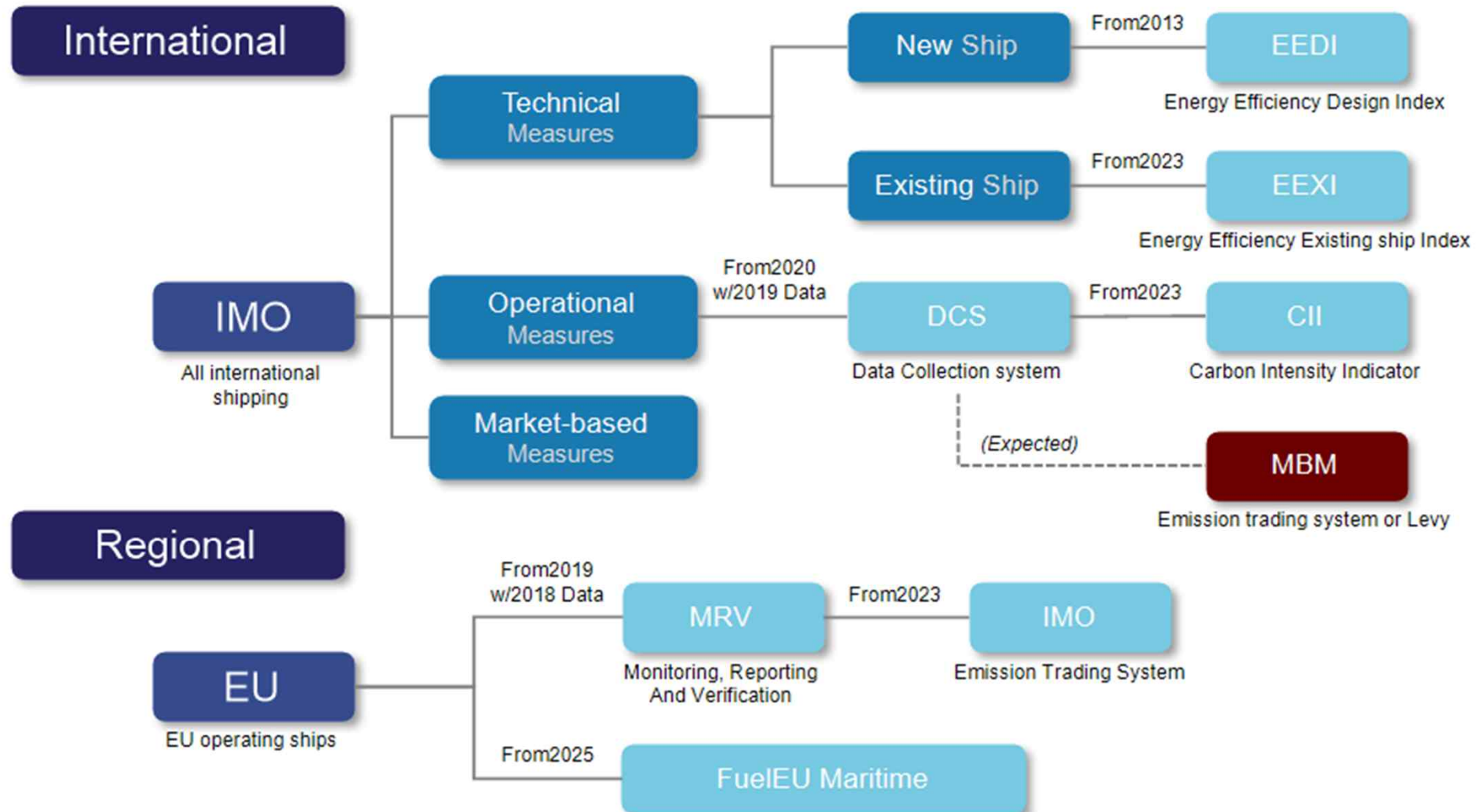
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## 2023 IMO GHG Reduction Strategy





# 1-2 2023 IMO GHG Reduction Strategy

## DRAFT RESOLUTION

Adopted on [7 July 2023]

### 2023 IMO STRATEGY ON REDUCTION OF GHG EMISSIONS FROM SHIPS

#### THE MARINE ENVIRONMENT PROTECTION COMMITTEE

RECALLING Article 38(e) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee (the Committee) to consider and take appropriate action with respect to any other matters falling within the scope of the Organization which would contribute to the prevention and control of marine pollution from ships,

ACKNOWLEDGING that work to address greenhouse gas (GHG) emissions from ships has been undertaken by the Organization continuously since the adoption of Conference Resolution 8 on CO<sub>2</sub> emissions from ships in September 1997, in particular, through the adoption of global mandatory technical and operational energy efficiency measures for ships under MARPOL Annex VI,

ACKNOWLEDGING ALSO the decisions of the Assembly at its thirtieth and thirty-second sessions in December 2017 and December 2021, that approved for the Organization a strategic direction to "Respond to climate change",

RECALLING that the Committee at its seventy-second session (MEPC 72) in April 2018 adopted, by resolution MEPC.304(72), the Initial IMO Strategy on Reduction of GHG Emissions from Ships (Initial IMO GHG Strategy),

NOTING that the Initial IMO GHG Strategy foresees that a revised IMO GHG Strategy should be adopted in 2023,

RECALLING the United Nations 2030 Agenda for Sustainable Development,

RECALLING ALSO the Paris Agreement adopted at the UN Climate Change Conference (COP 21), which identifies the long-term goal to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change, as was also reaffirmed in the Glasgow Climate Pact at COP 26 and in the Sharm el-Sheikh Implementation Plan at COP 27,

RECALLING FURTHER IMO Assembly resolution A.998(25) on the need to develop capacity-building for the development and implementation of new and amendments to existing instruments,

RECALLING FURTHER that the Maritime Safety Committee at its 107th session decided to initiate work on the "Development of a safety regulatory framework to support the reduction of GHG emissions from ships using new technologies and alternative fuels",

HAVING CONSIDERED, at its eightieth session, the draft 2023 IMO Strategy on Reduction of GHG emissions from ships,

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- 1 ADOPTS the 2023 IMO Strategy on Reduction of GHG emissions from Ships (2023 IMO GHG Strategy) as set out in the annex to the present resolution;
- 2 ACKNOWLEDGES the challenges that developing countries, in particular least developed countries (LDCs) and small island developing States (SIDS), may face in the implementation of the 2023 IMO GHG Strategy;
- 3 FURTHER ACKNOWLEDGES the importance of addressing the human element, including the impact on seafarers and other maritime professionals, in the safe implementation of the 2023 IMO GHG Strategy;
- 4 INVITES the Secretary-General to make adequate provisions in the Integrated Technical Cooperation Programme (ITCP), the IMO GHG TC-Trust Fund and any other means of support related to follow-up actions to the 2023 IMO GHG Strategy that may be further decided by the Committee and undertaken by developing countries, in particular LDCs and SIDS;
- 5 AGREES to keep the 2023 IMO GHG Strategy under review with a view to adoption of a revised IMO GHG Strategy in 2028;
- 6 ALSO AGREES that the 2023 IMO GHG Strategy revokes the 2018 Initial IMO GHG Strategy of 2018, as from this date.

Source : IMO & KMI

# 1-3 2023 IMO GHG Reduction Strategy

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## ANNEX

### 2023 IMO STRATEGY ON REDUCTION OF GHG EMISSIONS FROM SHIPS

#### Contents

- 1 INTRODUCTION
- 2 VISION
- 3 LEVELS OF AMBITION AND GUIDING PRINCIPLES
- 4 CANDIDATE SHORT-, MID- AND LONG-TERM GHG REDUCTION MEASURES WITH POSSIBLE TIMELINES AND THEIR IMPACTS ON STATES
- 5 BARRIERS AND SUPPORTIVE ACTIONS; CAPACITY-BUILDING AND TECHNICAL COOPERATION; R&D
- 6 FOLLOW-UP ACTIONS
- 7 PERIODIC REVIEW OF THE STRATEGY
- APPENDIX 1 OVERVIEW OF PREVIOUS WORK UNDERTAKEN BY THE ORGANIZATION TO ADDRESS GHG EMISSIONS FROM SHIPS
- APPENDIX 2 OVERVIEW OF RELEVANT INITIATIVES BY THE ORGANIZATION SUPPORTING THE REDUCTION OF GHG EMISSIONS FROM SHIPS

## Objectives of the 2023 IMO GHG Strategy

1.10 The 2023 IMO GHG Strategy is aimed at:

- .1 enhancing IMO's contribution to global efforts by addressing GHG emissions from international shipping. International efforts in addressing GHG emissions include the Paris Agreement and its goals and the United Nations 2030 Agenda for Sustainable Development and its SDG 13: "Take urgent action to combat climate change and its impacts";
- .2 identifying actions to be implemented by the international shipping sector, as appropriate, while addressing impacts on States and recognizing the critical role of international shipping in supporting the continued development of global trade and maritime transport services; and
- .3 identifying actions and measures, as appropriate, to help achieve the above objectives, including incentives for research and development and monitoring of GHG emissions from international shipping.

## 2 VISION

IMO remains committed to reducing GHG emissions from international shipping and, as a matter of urgency, aims to phase them out as soon as possible, while promoting, in the context of this Strategy, a just and equitable transition.

Source : IMO & KMI



# 1-4 2023 IMO GHG Reduction Strategy

## 3 LEVELS OF AMBITION, INDICATIVE CHECKPOINTS, AND GUIDING PRINCIPLES

### Levels of ambition

3.1 Subject to amendment depending on reviews to be conducted by the Organization in accordance with section 7, the 2023 IMO GHG Strategy identifies levels of ambition for the international shipping sector noting that technological innovation and the global introduction and availability of zero or near-zero GHG emission technologies, fuels and/or energy sources for international shipping will be integral to achieving the overall level of ambition.

3.2 The levels of ambition and indicative checkpoints should take into account the well-to-wake GHG emissions of marine fuels as addressed in the *Guidelines on lifecycle GHG intensity of marine fuels (LCA guidelines)* developed by the Organization<sup>1</sup> with the overall objective of reducing GHG emissions within the boundaries of the energy system of international shipping and preventing a shift of emissions to other sectors.

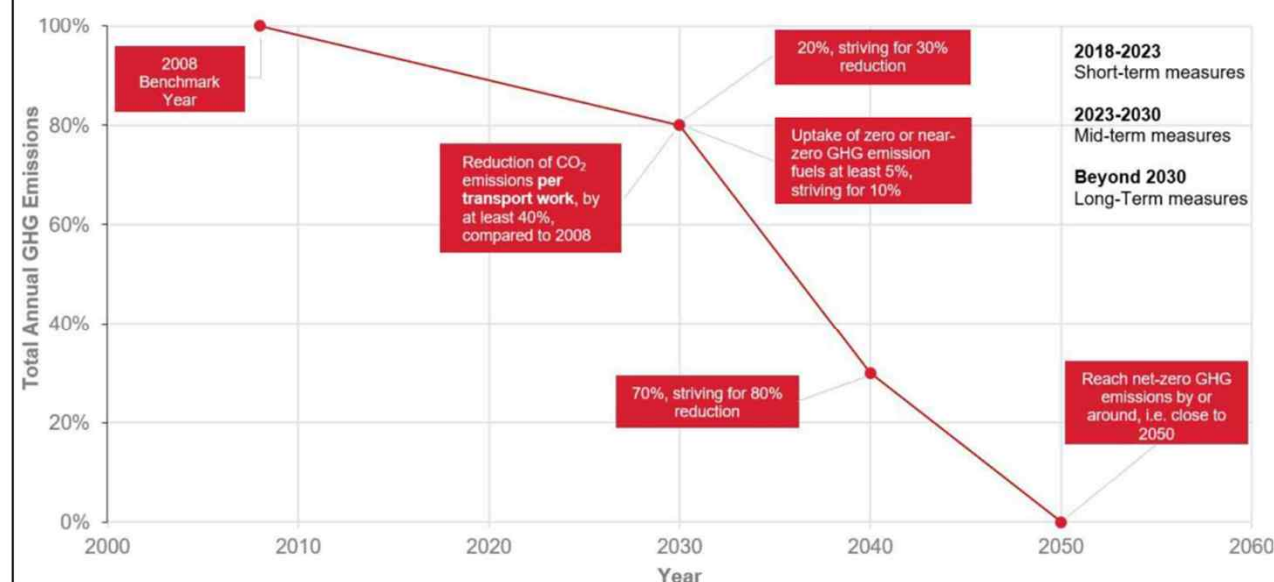
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3.3 Levels of ambition directing the 2023 IMO GHG Strategy are as follows:

- .1 **carbon intensity of the ship to decline through further improvement of the energy efficiency for new ships**  
to review with the aim of strengthening the energy efficiency design requirements for ships;
- .2 **carbon intensity of international shipping to decline**  
to reduce CO<sub>2</sub> emissions per transport work, as an average across international shipping, by at least 40% by 2030, compared to 2008;
- .3 **uptake of zero or near-zero GHG emission technologies, fuels and/or energy sources to increase**  
uptake of zero or near-zero GHG emission technologies, fuels and/or energy sources to represent at least 5%, striving for 10%, of the energy used by international shipping by 2030; and
- .4 **GHG emissions from international shipping to reach net zero**  
to peak GHG emissions from international shipping as soon as possible and to reach net-zero GHG emissions by or around, i.e., close to, 2050, taking into account different national circumstances, whilst pursuing efforts towards phasing them out as called for in the Vision consistent with the long-term temperature goal set out in Article 2 of the Paris Agreement.

IMO GHG Reduction Targets



Timeline of candidate Short-, Mid- and Long-Term GHG Reduction Measures

Source : IMO & ABS & KMI

# 1-5 2023 IMO GHG Reduction Strategy

## Indicative checkpoints

- 3.4 Indicative checkpoints to reach net-zero GHG emissions from international shipping:
- .1 to reduce the total annual GHG emissions from international shipping by at least 20%, striving for 30%, by 2030, compared to 2008; and
  - .2 to reduce the total annual GHG emissions from international shipping by at least 70%, striving for 80%, by 2040, compared to 2008.

## Guiding principles

- 3.5 The principles guiding the 2023 IMO GHG Strategy include:
- .1 the need to be cognizant of the principles enshrined in instruments already developed, such as:
    - .1 the principle of non-discrimination and the principle of no more favourable treatment, enshrined in MARPOL and other IMO conventions; and
    - .2 the principle of common but differentiated responsibilities and respective capabilities, in the light of different national circumstances, enshrined in UNFCCC, its Kyoto Protocol and the Paris Agreement;



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Source : IMO & KMI



# 1-6 2023 IMO GHG Reduction Strategy

## 4 CANDIDATE SHORT-, MID- AND LONG-TERM GHG REDUCTION MEASURES WITH POSSIBLE TIMELINES AND THEIR IMPACTS ON STATES

### Timelines

4.1 Candidate measures set out in this 2023 IMO GHG Strategy should be consistent with the following timelines:

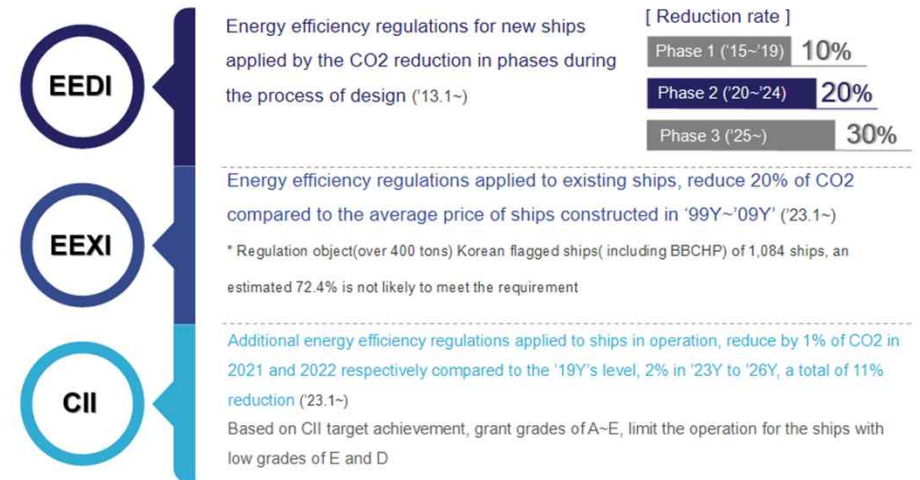
- .1 short-term GHG reduction measures are the measures finalized and agreed by the Committee between 2018 and 2023, as included in appendix 1;
- .2 the basket of mid-term GHG reduction measures should be finalized and agreed by the Committee by 2025. Dates of entry into force and when the measure(s) can effectively start to reduce GHG emissions could be defined for the basket or for each measure individually;
- .3 other candidate mid-term GHG reduction measures could be finalized and agreed by the Committee between 2023 and 2030. Dates of entry into force and when the measure can effectively start to reduce GHG emissions would be defined for each measure individually; and
- .4 possible long-term measures could be measures finalized and agreed by the Committee beyond 2030, to be developed as part of the 2028 review of the IMO GHG Strategy.

4.2 The list of candidate measures is non-exhaustive and is without prejudice to measures the Organization may further consider and adopt.

### Short-term GHG reduction measures

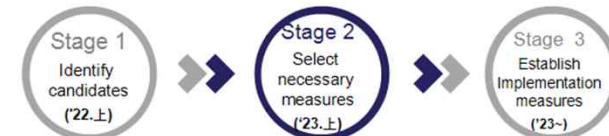
4.3 In accordance with regulations 25.3 and 28.11 of MARPOL Annex VI, a review of the mandatory goal-based technical and operational measures to reduce carbon intensity of international shipping (the "short-term GHG reduction measures") shall be completed by 1 January 2026.

## 02 Short-term measures



## 03 Mid-term measures

The IMO completed technical and operational short-term measures to reduce greenhouse gas emissions in international shipping, and began to discuss mid-term measures accompanied by market-based measures.



### Mid-term candidate measures for GHG reduction (MEPC 78)

- ❖ Technical measure : ①GHG Fuel Standard, ②IMSF&R
- ❖ Market-based measure : ③Emission Cap and Trade System, ④GHG Levy  
⑤Zero Emission Vessel, ⑥ IMRB
- ❖ Combined measure : ⑦GFS+GHG Levy ⑧GFS+ECTS



# 1-7 2023 IMO GHG Reduction Strategy

## Basket of candidate mid-term GHG reduction measures

4.5 In accordance with the timelines set out in this Strategy and the Work Plan, a basket of candidate measure(s), delivering on the reduction targets, should be developed and finalized comprised of both:

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- .1 a technical element, namely a goal-based marine fuel standard regulating the phased reduction of the marine fuel's GHG intensity; and
- .2 an economic element, on the basis of a maritime GHG emissions pricing mechanism.

The candidate economic elements will be assessed observing specific criteria to be considered in the comprehensive impact assessment, with a view to facilitating the finalization of the basket of measures.

The mid-term GHG reduction measures should effectively promote the energy transition of shipping and provide the world fleet a needed incentive while contributing to a level playing field and a just and equitable transition.

4.6 In accordance with Phase III of the Work Plan, the measure(s) in the basket should be developed and adopted, along with the assessments of impacts on States.

4.7 The development of the basket of candidate mid-term GHG reduction measures should take into account the well-to-wake GHG emissions of marine fuels as addressed in the LCA guidelines developed by the Organization with the overall objective of reducing GHG emissions within the boundaries of the energy system of international shipping and preventing a shift of emissions to other sectors.

## Candidate mid-term GHG reduction measures

The basket of candidate mid-term GHG reduction measures shall be developed and finalized of both:

- A technical measure, a goal-based marine fuel standard regulating the reduction of the marine fuel's GHG intensity. There is broad support for the Greenhouse Gas Fuel Standard (GFS) as proposed initially by Austria et al.
- An economic measure, on the basis of a maritime GHG emissions pricing mechanism. On the contrary to universal support of GFS, there are divergent views on the economic elements, where the following seem to stand out:
  1. IMO Maritime Sustainability Fund and Reward (F&R) by International Chamber of Shipping (ICS);
  2. Zero-Emission Shipping Incentive Scheme (ZESIS) by Japan;
  3. International Maritime Sustainability Funding and Reward (IMSF&R) by Argentina et al;
  4. International Maritime Sustainable Fuels and Fund (IMSF&F) by China;
  5. GHG Levy (GHGL) by Marshall and Solomon Islands.

Both technical and economic measures should consider the WtW GHG emissions of marine fuels as addressed in the Guidelines on lifecycle GHG intensity of marine fuels (LCA Guidelines). Furthermore, the Committee will consider any possible synergies of mid-term measures with existing measures such as the Carbon Intensity Indicator (CII), regarding incentives for energy efficiency.



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## Synergies with existing measures

4.8 In addition, the potential synergies with other existing measures such as the Carbon Intensity Indicator (CII) will be considered, in particular regarding incentives for energy efficiency and for the adoption of better operational practices in the shipping value chain or other technologies to reduce emissions from ships.

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## Other candidate mid-term GHG reduction measures

4.9 In addition to the basket of candidate mid-term GHG reduction measures, the Organization should continue to develop other mid-term GHG reduction measures to reduce GHG emissions from ships. All the following candidate mid-term measures represent possible mid-term further action of the Organization on matters related to the reduction of GHG emissions from ships:

### Informed policymaking:

- .1 the Secretariat to undertake annual IMO GHG emission and carbon intensity estimates using the available data from the IMO DCS and other relevant sources; and other studies to inform policy decisions;
- .2 development of a feedback mechanism to enable lessons learned on implementation of measures to be collated and shared through a possible information exchange on best practice;

### Supporting global availability and uptake of zero or near-zero GHG emission technologies, fuels and/or energy sources:

- .3 further development of the LCA guidelines;

- .4 undertake a regulatory assessment of safety aspects associated with reducing GHG emissions in accordance with this Strategy and to develop a road map to support the safe delivery of the Strategy;
- .5 consider and analyse measures to address emissions of methane and nitrous oxide and further enhance measures to address emissions of volatile organic compounds;
- .6 incentives for first movers to develop and take up new technologies; and
- .7 consider and analyse measures to encourage port developments and activities globally to facilitate reduction of GHG emissions from shipping, including provision of ship and shoreside/onshore power supply from renewable sources, infrastructure to support supply of zero or near-zero GHG emission fuels and/or energy sources, and to further optimize the logistic chain and its planning, including ports.



# 1-9 2023 IMO GHG Reduction Strategy

## MEASURES MATRIX

				Economic measure / element [on the basis of maritime GHG pricing mechanism]										
				a	b	c	d	e	f	g	h	i	j	k
				SRUs*	Sustainable Shipping Fund through RUs* for in-sector purposes	GHG pricing on all GHG emissions / Levy								Feebate
Disbursement of any revenues				No revenues generated, but addresses/ reduces price gap and incentivise first movers	Capacity building and negative impact mitigation	RD&D	Admin	RD&D	Reward for eligible fuels	General GHG mitigation and adaptation	Address DNI as appropriate	Equitable transition	Admin	Reward for eligible fuel
Technical measure / element	I	Goal-based fuel Standard	Sustainability [criteria] framework											
	II	Goal-based fuel standard	FCUs and GRUs*											
	III	Goal-based fuel standard												
		[placeholder for another option]												

\* Some consider the flexibility element of the goal-based fuel standard to be a part of the technical element, others consider it an economic element

### List of abbreviations:

DNI: Disproportionately Negative Impacts.  
 FCUs: Flexible Compliance Units.  
 GRUs: GHG Remedial Unit.  
 RD&D: Research Development and Deployment.  
 RUs: Remedial Units.  
 SRUs: Surplus Reward Units.

Source : IMO & KMI

# 2-10 2023 IMO GHG Reduction Strategy

## 6 FOLLOW-UP ACTIONS

6.1 A programme of follow-up actions of the 2023 IMO GHG Strategy should be developed.

6.2 The key stages towards the adoption of a 2028 IMO GHG Strategy are as follows:

Target dates	Milestones		
	Comprehensive impact assessment of the basket of candidate mid-term measures	Development of candidate mid-term measures	Other milestones
MEPC 80 (Summer 2023)	Initiation of CIA	Initiate Phase III of the Work Plan on the development of mid-term measures	
MEPC 81 (Spring 2024)	Interim report	Finalization of basket of measures	
MEPC 82 (Autumn 2024)	Finalized report		
MEPC 83 (Spring 2025)		Approval of measures	Review of the short-term measure to be completed by 1 January 2026
Extraordinary one or two-day MEPC (six months after MEPC 83 in Autumn 2025)		Adoption of measures	

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Target dates	Milestones		
	Comprehensive impact assessment of the basket of candidate mid-term measures	Development of candidate mid-term measures	Other milestones
MEPC 84 (Spring 2026)			
MEPC 85 (Autumn 2026)			
16 months after adoption (2027)		Entry into force of measures	
MEPC 86 (Summer 2027)			Initiate the review of the 2023 IMO GHG Strategy
MEPC 87 (Spring 2028)			
MEPC 88 (Autumn 2028)			Finalization of the review of the 2023 IMO GHG Strategy with a view to adoption of the 2028 IMO GHG Strategy

6.3 The Marginal Abatement Cost Curve (MACC) for each measure, as appropriate, should be ascertained and updated, and then evaluated on a regular basis.

## 7 PERIODIC REVIEW OF THE STRATEGY

7.1 The IMO GHG Strategy should be subject to a five-yearly review with the first review due in 2028.



# 1-11 2023 IMO GHG Reduction Strategy

## Impacts on States

4.10 The impacts on States of a measure/combination of measures should be assessed and taken into account as appropriate before adoption of the measure(s) in accordance with the *Revised procedure for assessing impacts on States of candidate measures*.<sup>2</sup> Particular attention should be paid to the needs of developing countries, in particular LDCs and SIDS.

4.11 The Committee should consider the comprehensive impact assessment in order to inform further consideration of the proposed measure(s), and take action as appropriate.

4.12 When assessing impacts on States, the impact of (a) measure(s) should be considered, as appropriate, inter alia, in the following terms:

- .1 geographic remoteness of and connectivity to main markets;
- .2 cargo value and type;
- .3 transport dependency;
- .4 transport costs;
- .5 food security;
- .6 disaster response;
- .7 cost-effectiveness; and
- .8 socio-economic progress and development.

4.13 Once the comprehensive impact assessment is completed, and disproportionately negative impacts assessed and addressed, as appropriate, the measure(s) may be considered for adoption.

## 2-1 Recommendations and International Cooperation

Consultative body in responding to decarbonization between the private, public, industry and academia

### Composition

Expert consultative body to implement Korea's response strategy and promote environment-friendly shipping in the fast transition to decarbonization in international shipping

\* Our ministry, Shipping companies, shipbuilding-equipment companies, Research institutions(KRISO, KMI, KOMERI), ship inspection companies, [Korea Ocean Business Corporation](#), Korea Institute of Energy Research, Korea Shipowners' Association, Korea Offshore & Shipbuilding Association etc.,.

Responsibilities	Classification	Responsibility
	Government	Development of strategies and policies for decarbonization of international shipping and promotion of cooperation between countries
	Company·Corporation	Analysis of the impact on the industry, seeking ways to strengthen regulatory activities and competitiveness
	Research and Inspection institution	Analysis of international trends and transitions, and the search for competitiveness and advancement of domestic technologies

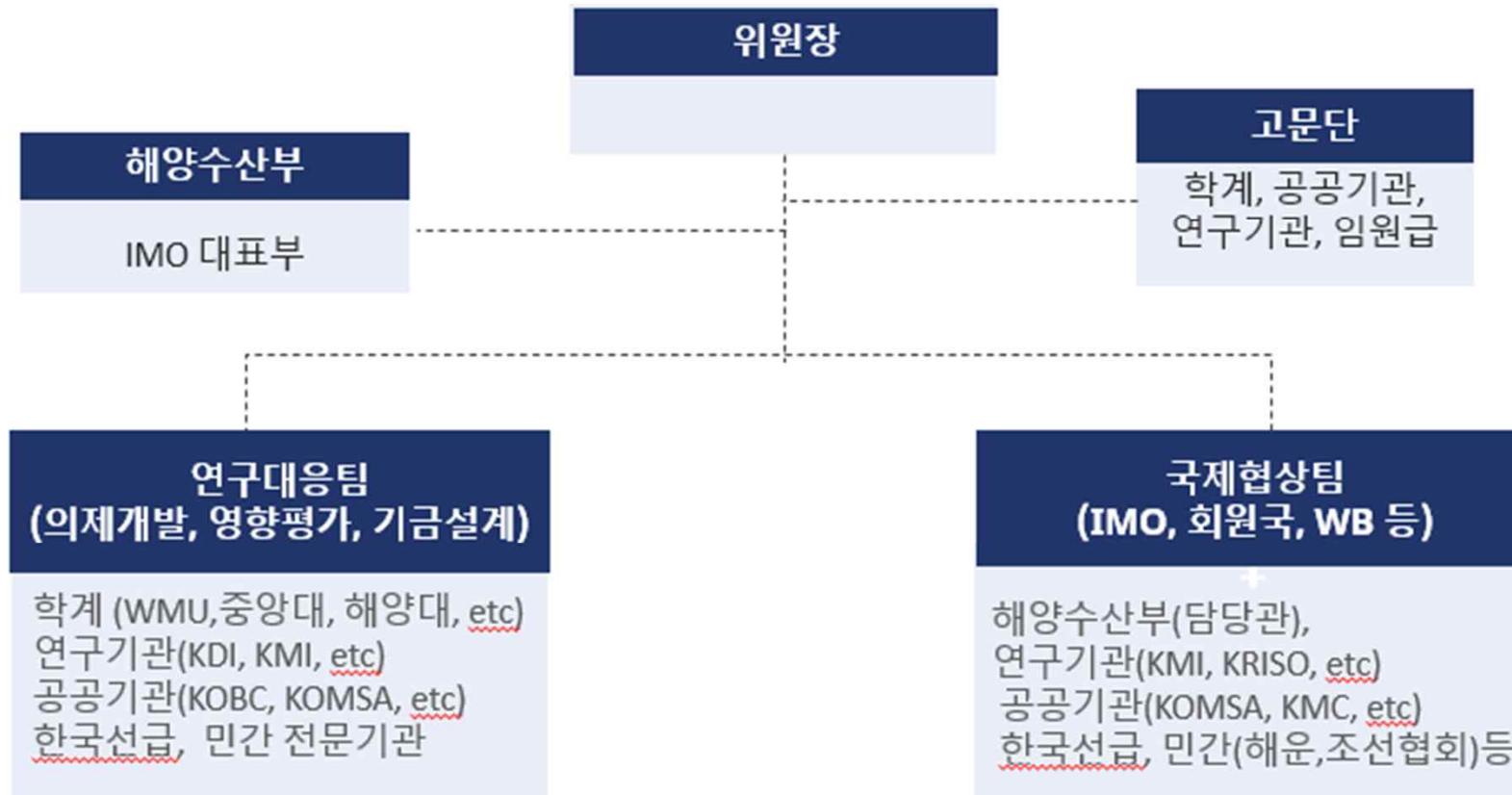
### management

Holding meetings of industrial CEO-Minister-Vice Minister to promote quarterly and semi-annual operations and main policy decision-making by categorizing the cases as working-level or executive-level



## 2-2 Recommendations and International Cooperation

### 중기조치 종합대응 TF 구성(안)



Source : KMI (2023.7)

## 2-3 Recommendations and International Cooperation

<최종보고서>

### 국제해운 탈탄소화 추진전략 연구

A Study on the Strategy for Promoting Decarbonization of International Shipping

박한선·김보람·정민지·김지호·윤재웅·황대중·이정윤·김진형·안준연·이성엽

2023.02



연구진	박한선, 김보람, 정민지, 김지호, 윤재웅, 황대중, 이정윤, 김진형, 안준연, 이성엽
보고서 발행 내역	
연구책임자	연구책임자: 박한선, 연구위원: 김보람, 정민지, 김지호, 윤재웅, 황대중, 이정윤, 김진형, 안준연, 이성엽
연구진	연구위원: 김보람, 정민지, 김지호, 윤재웅, 황대중, 이정윤, 김진형, 안준연, 이성엽
연구위원	연구위원: 김보람, 정민지, 김지호, 윤재웅, 황대중, 이정윤, 김진형, 안준연, 이성엽

### 한 눈에 보는 국제해운 탈탄소화 추진전략 (비전과 목표)

비전 | 2050 국제해운 탄소중립을 이끄는 기후모범국가

#### 01 친환경 해운 전환 1위 국가 목표



#### 02 2050 국제해운 분야 탈탄소중립 실현



#### 03 국가 경쟁력 강화 및 경제적 부가치 창출

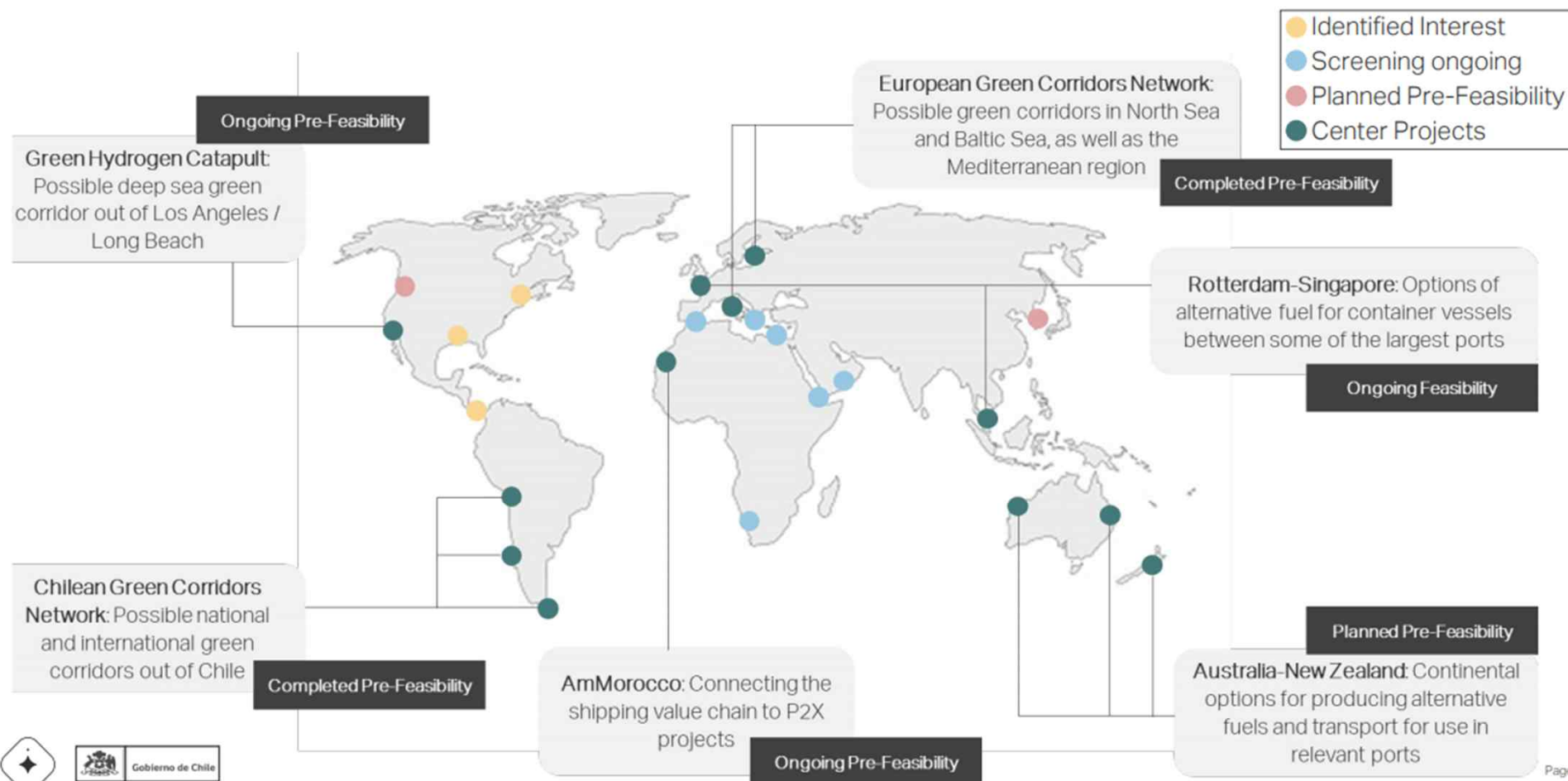


Source : MOF & KMI (2023.2)

## 2-4 Recommendations and International Cooperation

The Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping - Activity

### Green corridors activity: location and phases

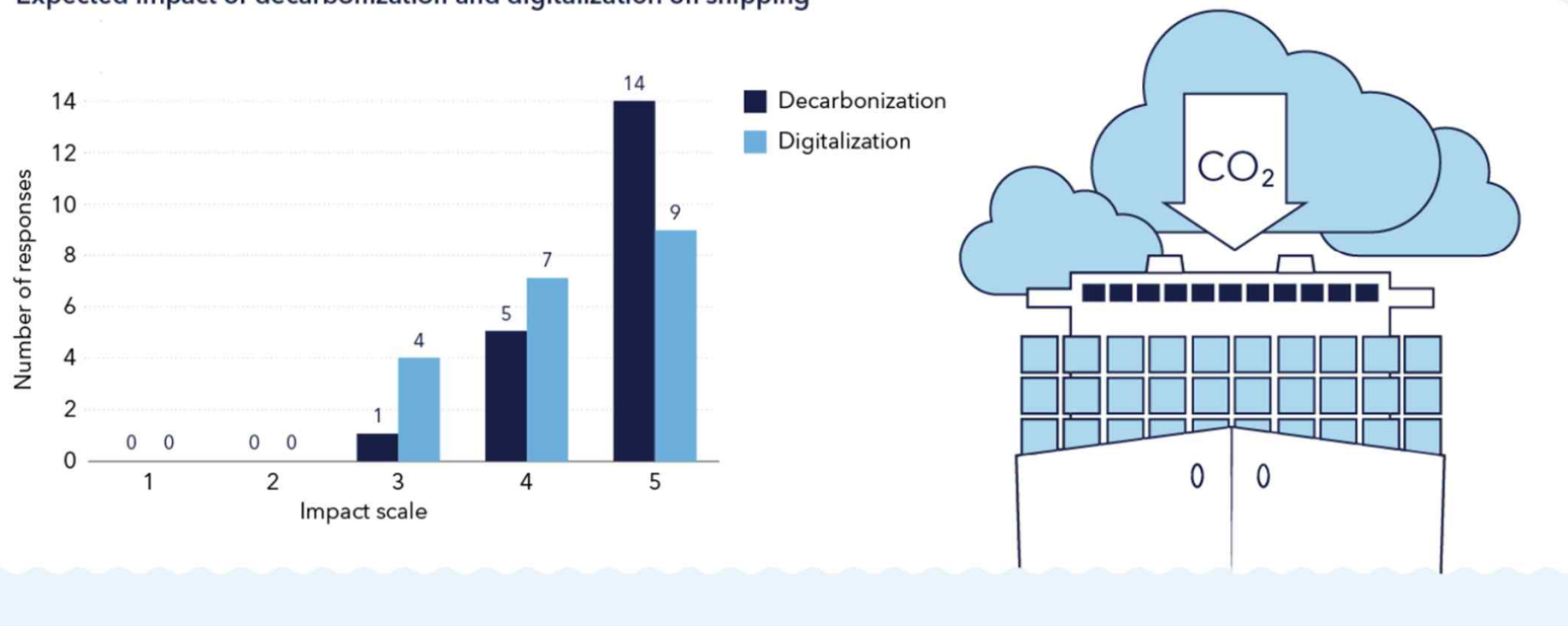


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## 2-5 Recommendations and International Cooperation

Expected impact of decarbonization and digitalization on shipping



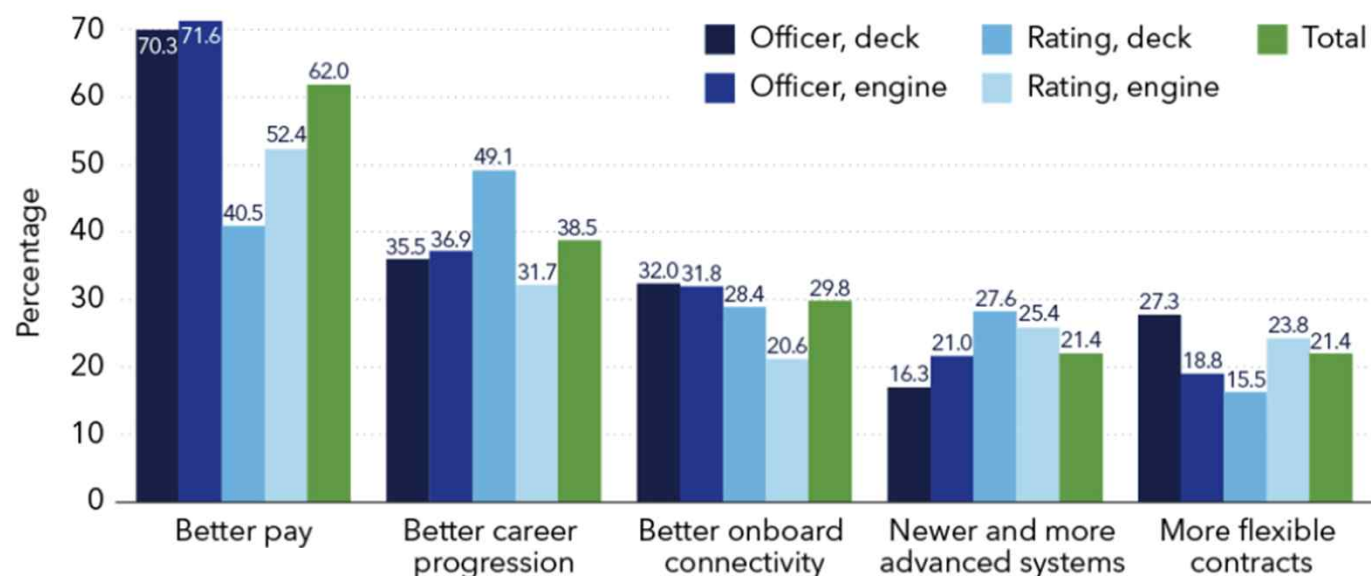
### The impact of decarbonization

Survey participants anticipate tightening global and regional emission regulations as well as new fuel technologies to have the most significant impact on education and training requirements. A significant skill gap is seen with regard to handling emerging fuels such as ammonia, methanol and hydrogen. Only 40% of respondents have served on ships using LNG, batteries, or synthetic fuels, and over 75% of respondents (of whom 78% were deck and engine officers) indicated a need for partial or complete training on these energy sources.

## 2-6 Recommendations and International Cooperation

### Attracting and retaining seafarers

Two areas that would allow the attraction of/the retention of the onboard role of seafarers



Source: DNV

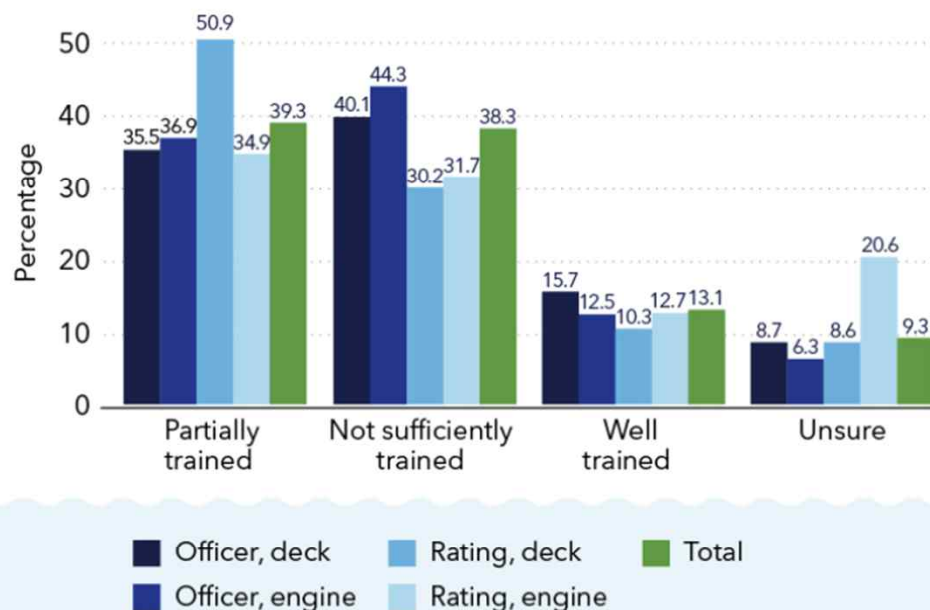
### Attracting and retaining seafarers

The general shortage of skilled labour is especially felt in the maritime industry, which is faced with significant challenges attracting and retaining qualified seafarers. This is in part owing to the long time periods spent away from home. Based on the survey, the following strategies could help make seafaring a more attractive and sustainable career choice.

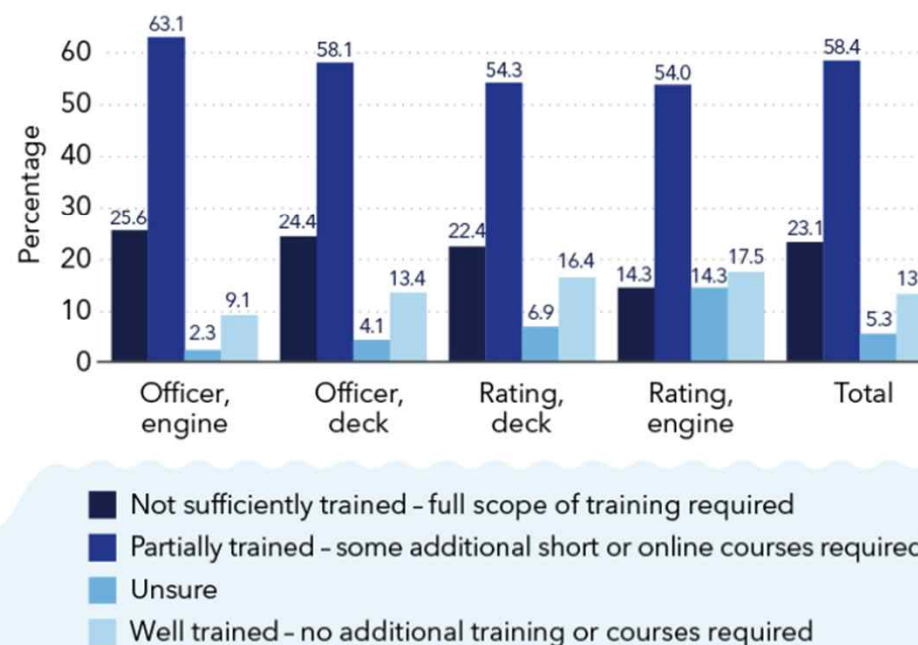
## 2-7 Recommendations and International Cooperation

### Skill gaps

Trained in new fuels (such as batteries, LNG and synthetic/biofuels)



Trained to deal with more advanced technology



Source: DNV

### Skill gaps

With increasing on-board system integration and intensifying ship-to-shore communication, cybersecurity training should be made mandatory to help crew members recognize and mitigate associated risks. Working with other emerging technologies such as remote and autonomous operation will likewise require specific training, including operating and maintaining remotely controlled and autonomous ships and drones. In terms of new fuels, 87% of respondents (with 91% being deck and engine officers) expressed a need for partial or full training, with a strong preference for in-person training at maritime training centres or academies.



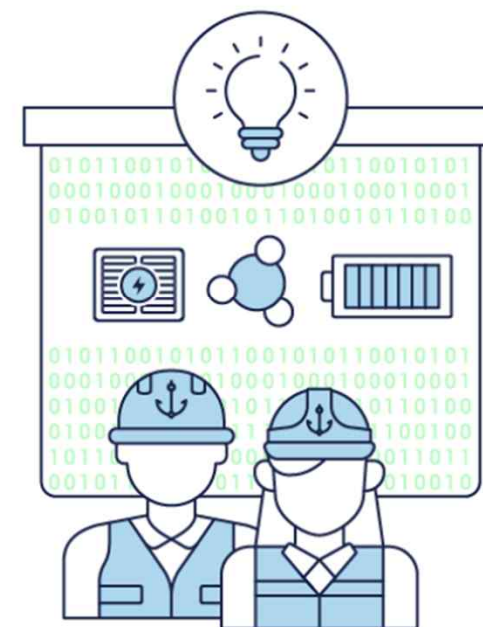
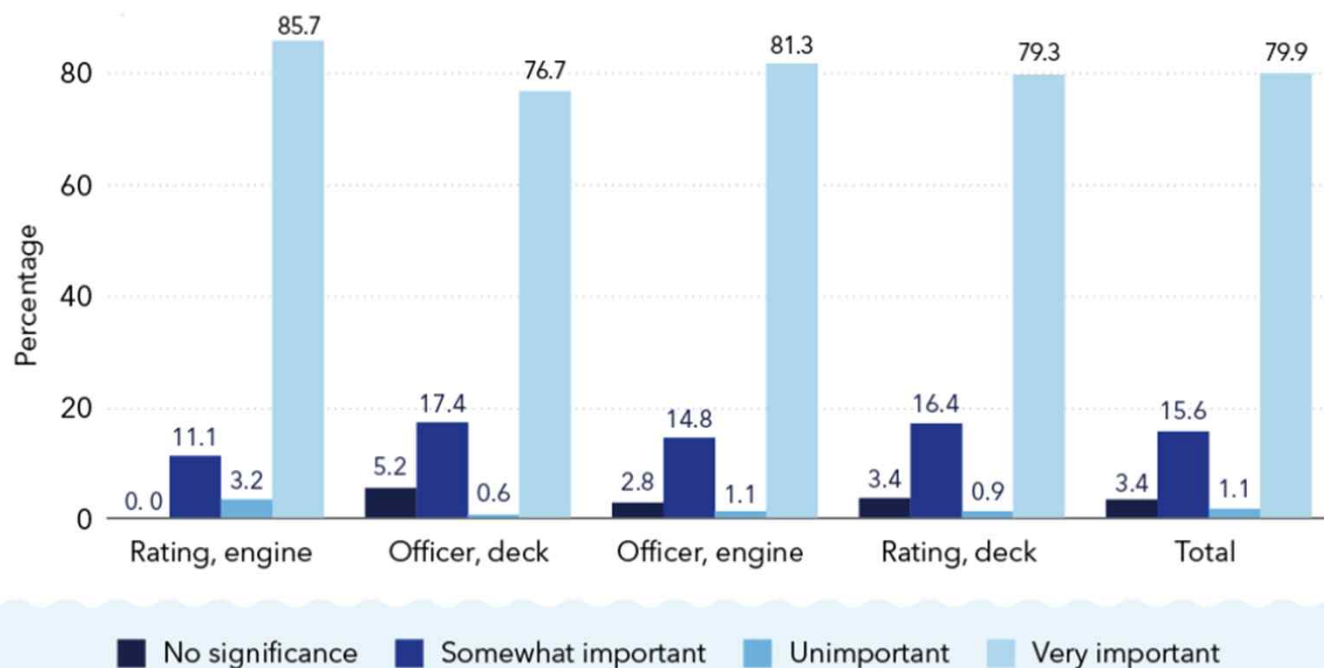
## Future seafarer

Skills and competencies for future seafarers - findings



## 2-9 Recommendations and International Cooperation

**Consequences for seafarer training and development – recommendations**  
Role of onboard mentoring/training for new technologies and fuels



Source: DNV

### Consequences for seafarer training and development - recommendations

The study recommends that key stakeholders - the IMO, Flag States, shipowners, operators and managers, and training academies - address the skill gaps revealed in the study during the current decade to ensure thorough and timely education of seafarers. Training programmes should impart the skills needed to operate ships competently in the digital age, and familiarize them with alternative energy technologies, including fuel-specific firefighting techniques. LNG and batteries are key technologies of interest for the near future. Senior officers should be trained first so they can provide on-the-job guidance on new technologies and fuels. Training may include virtual reality and simulators.

# 2-10 Recommendations and International Cooperation

## THE MASS HUMAN ELEMENT – COLLATING SEAFARERS' VOICES: PERSPECTIVES AND EXPECTATIONS



**President Dr. Jong-Deog Kim**  
Korea Maritime Institute

We sincerely expect that this report will contribute comprehensively to the development of the human-centered approach in shipping. This report will support the maritime mobility industry in the era of Artificial Intelligence (AI) with the necessary regulatory development for seafarers who will be affected greatly by the introduction and implementation of Maritime Autonomous Surface Ships (MASS).



**Chair of Seafarers' Section, Mr David Heindel**  
International Transport Workers' Federation

The recognition for contributing to 90% of the world trade, and the blame for 90% of the accidents and incidents on human error put seafarers in an unenviable position. 'Out of sight', and 'unsung heroes'; seafarers have ironic titles. I commend this project for its courageous and honest projections of seafarers' voices. I strongly urge MASS regulatory developers to consider the expectations stated in this report and not to shy away from addressing the identified existing challenges. Give seafarers a positive and inclusive trajectory in the industry's future.



**President Min-Jong Kim**  
Korea Institute of Maritime Fisheries and Technology

This report, which highlights the expectations, insights, and challenges of adopting Maritime Autonomous Surface Ships through the voices of seafarers who are on the front lines of maritime transportation, is invaluable at a time when legal regulations for MASS operations are being developed, and I hope that, it will contribute to securing the safe operation of MASS by enhancing the human element encompassing the seafarers.



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# 2-11 Recommendations and International Cooperation

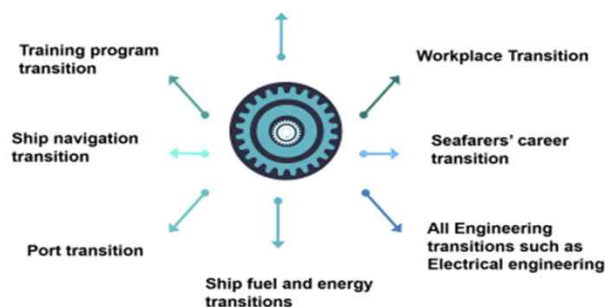


Figure 2: Examples of transitions due to MASS

## Projections of seafarers' labour market

According to the forecast analysis of seafaring manpower demand, mentioned in studies conducted by the United Nations Conference on Trade and Development (UNCTAD), the International Chamber of Shipping (ICS), and the Baltic and International Maritime Council (BIMCO), seafarer demand can be explained by the number of vessels and the number of people on board per vessel. In other words, changes in maritime transport volume lead to changes in vessel capacity, which in turn changes the demand for crew members. As the globalised economy has positive maritime trade growth, seaborne goods volume is expected to continue to increase. Accordingly, the global merchant fleet is predicted to increase by 17.7% by 2025. Therefore, the global merchant fleet will increase by 0.66% per year for general cargo ships through 2025, while LNG will increase by 10% per year from 426 to 790 vessels, passenger ships at 1.04% per year, bulk carriers at 2.97% per year, and container ships at 1.97% per year. Crude oil carriers are predicted to show an overall annual growth rate of 1.86%, including a 2.84% increase. As shown in Table 1, the increase in demand for marine engineers due to the increase in the world merchant fleet is 91,000 (12%) between 2015 and 2020 and is expected to increase by 71,000 (8%) between 2020 and 2025. It has been predicted that 3,065 new sailors would be produced every year, and a total of 31,000 (4%) over 10 years, increasing by 15,500 every 5 years<sup>1</sup>.

<sup>1</sup> ICS & BIMCO (2021). ICS & BIMCO Seafarers Workforce Report / The Global Supply and Demand for Seafarers.



Table 1- Forecasting of global demand, supply, and shortage of seafarers

Year	2015	2020	2025
Demand	790,500	881,500	952,500
Supply	774,000	789,500	805,000

leadership and other key positions in the seafarers' organisations. The participants organisations taken together represent nearly 353,000 member seafarers. Of the 17 research participants, 16 were interviewed and 1 participant provided typed responses to the interview questions. The experience of the participants was varied and included lobbying and negotiation, seafaring (including command), defence, legal, superintendent, rail transport sector, education and training, doctoral researcher, ILO and IMO expertise.

14 COUNTRIES ACROSS 4 CONTINENTS REPRESENTING NEARLY 3,53,000 SEAFARERS



Figure 12: Countries covered in the KMI, ITF, and KIMFT MASS Human Element Project (May 2023)  
Source: ITF



The research interviews were conducted online on Zoom and were video recorded. Each interview lasted for an average of 55 minutes. The interviews were summarised retaining the essence of the discussion and select key extracts were transcribed verbatim. The interviews were thematically analysed to identify the themes in the data indicative of the important areas to seafarers' organisations in connection with MASS. The 16 interview summaries are available in the appendices of this report. The findings of the research are presented in section 5 of this report.

Table 2: Countries, participants, and declared membership (May 2023)

S.No.	Country	Participants	Seafarer <sup>23</sup> members	Female members
1.	Philippines	2	111604	4200
2.	United States of America	1	58671	5062
3.	Russia	1	57000	2300
4.	Republic of Korea	1	34428	28
5.	Hong Kong, China	2	24955	10
6.	India	1	19750	30
7.	Canada	1	15353	1582
8.	United Kingdom	2	11027	948

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