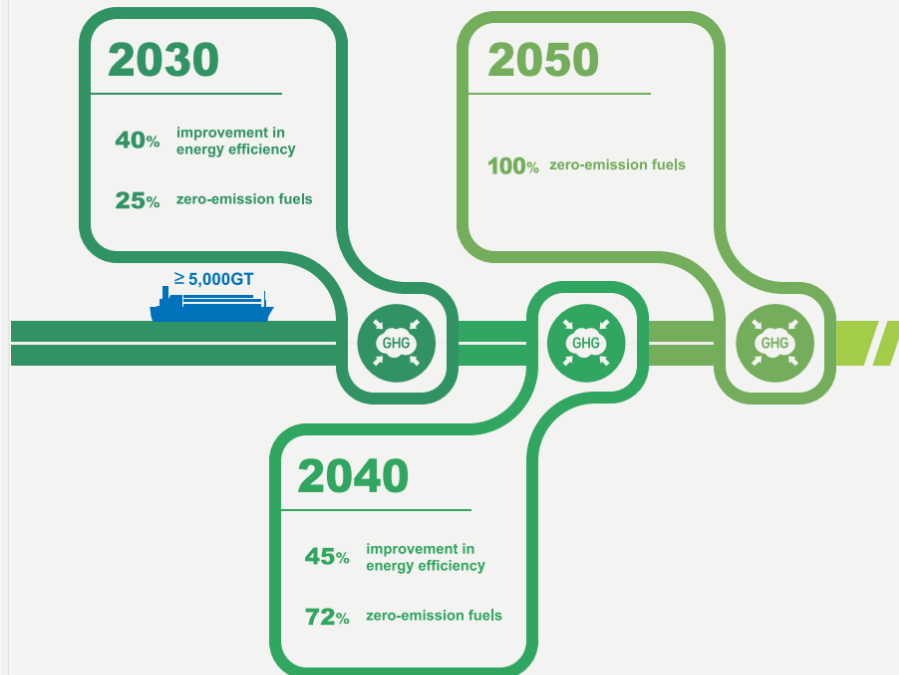


## Pathway to Zero-Emission in International Shipping

— Understanding the 2023 IMO GHG Strategy —

[ English ]



# Pathway to Zero-Emission in International Shipping

— Understanding the 2023 IMO GHG Strategy —

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Zero-Emission Transition Center  
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## In July 2023, IMO GHG Strategy revised (adopted at MEPC 80)

Emissions to be taken into account	Initial Strategy (2018)	Revised Strategy (2023)
	(Tank-to-Wake)	(Well-to-Wake: Life cycle)
Vision	Phase out GHG emissions as soon as possible in this century.	Phase out GHG emissions as soon as possible.
Levels of ambition	<p>■ Total annual GHG emissions (compared to 2008)</p> <p>At least 50% reduction by 2050</p>	<p>At least 20% (striving for 30%) reduction by 2030 (Indicative checkpoint)</p> <p>At least 70% (striving for 80%) reduction by 2040 (Indicative checkpoint)</p> <p>Reach net-zero GHG emissions by or around, i.e. close to 2050</p>
	<p>■ Uptake of zero or near-zero GHG emissions technologies, fuels, energy sources</p>	<p>At least 5% (striving for 10%) by 2030</p>
	<p>■ Carbon intensity improvement (CO<sub>2</sub> emissions per transport work) (compared to 2008)</p> <p>At least 40% reduction by 2030</p> <p>At least 70% reduction by 2050</p>	<p>At least 40% reduction by 2030</p>

### Key Points of the Revised Strategy (2023)

- ✓ Reach **net-zero GHG emissions** by or around 2050
- ✓ Take into account the GHG emissions across the entire **life cycle**, from production, transportation, storage, to onboard use, for the fuels used by ships (Well-to-Wake)
- ✓ Monitor the level of achievement of the targets in terms of **total GHG emissions**
- ✓ Adopt **a target of uptake** of zero or near-zero GHG emissions technologies, fuels, and/or energy sources

### What is the significance of the numerical targets outlined in the 2023 IMO GHG Strategy?

- ✓ What are the **allowable GHG emissions** for international shipping to achieve the numerical targets?
- ✓ What extent of **zero-emission fuels and zero-emission ships** need to be introduced in international shipping to achieve the numerical targets?

## White Paper “Pathway to Zero-Emission in International Shipping” (October 2023)

— Understanding the 2023 IMO GHG Strategy —



[https://www.classnk.or.jp/hp/pdf/info\\_service/ghg/PathwaytoZero-EmissioninInternationalShipping\\_ClassNK\\_EN.pdf](https://www.classnk.or.jp/hp/pdf/info_service/ghg/PathwaytoZero-EmissioninInternationalShipping_ClassNK_EN.pdf)

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## Overview and assumptions of the estimation

Revised Strategy (2023) (Well-to-Wake: Life cycle)	
Vision	Phase out GHG emissions as soon as possible.
Levels of ambition	Total annual GHG emissions (compared to 2008) <b>At least 20% (striving for 30%)</b> reduction by 2030 (Indicative checkpoint) <b>At least 70% (striving for 80%)</b> reduction by 2040 (Indicative checkpoint) Reach <b>net-zero GHG emissions</b> by or around, i.e. close to 2050
	Uptake of zero or near-zero GHG emissions technologies, fuels, energy sources <b>At least 5% (striving for 10%)</b> by 2030
	Carbon intensity improvement (CO <sub>2</sub> emissions per transport work) (compared to 2008) At least <b>40% reduction</b> by 2030

### ■ Overview of the estimation

- ① **Allowable GHG emissions** to achieve the **2030/2040 indicative checkpoint**
- ② **Zero-emission fuels/ships needed** to achieve
  - the **2030 fuel introduction target**
  - the **2030/2040 indicative checkpoint**

### ■ Assumptions of the estimation

- Ships in the scope : 5,000 GT and above engaged in international voyages  
(ships subject to IMO DCS)
- Marine transport volume : 25%/39% increase from 2021 to 2030/2040
- Carbon intensity : 23%/30% improvement from 2021 to 2030/2040

## ① Allowable GHG emissions to achieve the 2030/2040 indicative checkpoint

- ✓ Estimated the upper limit for the allowable lifecycle GHG emissions in international shipping to achieve the indicative checkpoints for 2030/2040

(Unit: million tons CO<sub>2eq</sub>)

GHG emissions	2008 (Base year)	2021 (Latest)	2030 indicative checkpoint (20% reduction from 2008)	2040 indicative checkpoint (70% reduction from 2008)
<b>Life cycle GHG emissions (Well-to-Wake)</b>	<b>731</b>	<b>798</b>	<b>585</b>	<b>219</b>
(Breakdown) Well-to-Tank	110	122	88	33
Tank-to-Wake	621	676	497	186

- ✓ GHG emissions in 2008 < GHG emissions in 2021  
(Life cycle) (Life cycle)

**Approximately a 27% reduction is required by 2030 compared to 2021 levels.**

## ②-1 Zero-emission fuels/ships needed to achieve the 2030 fuel introduction target

✓ A minimum 5% introduction of zero or near-zero GHG emissions technologies, fuels, and/or energy sources

		2030 fuel introduction target achieved (5% zero-emission fuels)	Current production scale for all sectors
Zero-emission "fuels" needed	for <b>Green Methanol</b> <sup>1</sup>	Share <b>5%</b> Volume <b>21 mil. tons/year</b>	Green Methanol <b>10 – 20 thousand tons/year</b> (106 million tons/year, incl. non green methanol)
	for <b>Green Ammonia</b> <sup>1</sup>	Share <b>5%</b> Volume <b>23 mil. tons/year</b>	Green Ammonia <b>10 – 20 thousand tons/year</b> (183 million tons/year, incl. non green ammonia)
Zero-emission "ships" needed	<b>Total Amount</b>	<b>72 mil. GT</b>	
	- 2026	Orderbook 12 mil. GT	
	2027 - 2030	Newbuildings <sup>2</sup> & Retrofits 15 mil. GT/year	-
Life cycle GHG emissions (Well-to-Wake)		731 mil. tons CO <sub>2eq</sub> *585 mil. tons CO <sub>2eq</sub> for 2030 indicative checkpoint	

<sup>1</sup> Methanol/ammonia with zero GHG emissions throughout their entire life cycle from manufacturing, transportation, and storage to onboard use

<sup>2</sup> The world's current annual newbuilding deliveries are about 60 million GT per year (in recent years).

**Only a 5% introduction of zero-emission fuels in 2030 makes it difficult to achieve the indicative checkpoint for 2030.**

## ②-2 Zero-emission fuels/ships needed to achieve the 2030/2040 indicative checkpoint

✓ A minimum of 20%/70% reduction by 2030/2040 (compared to 2008)

		2030 indicative checkpoint achieved (20% reduction from 2008)	2040 indicative checkpoint achieved (70% reduction from 2008)	Current production scale for all sectors
Zero-emission "fuels" needed	for <b>Green Methanol</b> <sup>1</sup>	Share <b>25%</b> Volume <b>106 mil. tons/year</b>	Share <b>72%</b> Volume <b>311 mil. tons/year</b>	Green Methanol <b>10 – 20 thousand tons/year</b> (106 million tons/year, incl. non green methanol)
	for <b>Green Ammonia</b> <sup>1</sup>	Share <b>25%</b> Volume <b>114 mil. tons/year</b>	Share <b>72%</b> Volume <b>333 mil. tons/year</b>	Green Ammonia <b>10 – 20 thousand tons/year</b> (183 million tons/year, incl. non green ammonia)
Zero-emission "ships" needed	<b>Total Amount</b>	<b>352 mil. GT</b>	<b>1,122 mil. GT</b>	
	- 2026	Orderbook 12 mil. GT	←	-
	2027 - 2030	Newbuildings <sup>2</sup> & Retrofits <b>85 mil. GT/year</b>	←	-
	2031 - 2040		Newbuildings <sup>2</sup> & Retrofits <b>77 mil. GT/year</b>	-

<sup>1</sup> Methanol/ammonia with zero GHG emissions throughout their entire life cycle from manufacturing, transportation, and storage to onboard use

<sup>2</sup> The world's current annual newbuilding deliveries are about 60 million GT per year (in recent years).

**A 25%/72% introduction of zero-emission fuels at 2030/2040 is required to achieve the indicative checkpoints for 2030/2040.**

## Discussion: achieving the numerical targets of the 2023 IMO GHG Strategy

- **A substantial amount of zero-emission fuels** is required in international shipping to achieve the indicative checkpoints 2030/2040.
- Given the current scale of zero-emission fuel production, **prompt investment promotion** in the manufacturing and distribution of fuels, surpassing the pace of decarbonization in the overall energy sector, **will be necessary**. **Early adoption and implementation of a regulatory framework**, including effective carbon pricing, **is essential** to encourage these investment decisions.
- With regard to the newbuildings and retrofits of zero-emission fuel ships, there will not appear to be a significant bottleneck in supply capacity as long as a certain amount of zero-emission fuel ships are built and retrofitted each year. **It will be essential to secure newbuildings and retrofits capacity** in line with the pace of development of the zero-emission fuel production and distribution infrastructure.
- **Collective efforts** from all stakeholders, including international organizations, national governments, the maritime industry, the energy sector, shippers, and the financial sector **are needed**.





**THANK YOU**

**for your kind attention**

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