

Headway has established more than **120** sales/after-sales service stations in **56** countries and regions around the world.



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**OceanGuard<sup>®</sup>**  
**ONBOARD CARBON CAPTURE SYSTEM**



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# ABOUT HEADWAY

Headway is a high-tech enterprise with the purpose of scientific and technological innovation, dedicated into providing low carbon solutions and technical service worldwide. Headway owns independent R&D center and production base in Qingdao, China.

Headway established independent R&D centers and manufacturing facilities. The BWMS manufacturing facility has an annual production capacity of 1,000 sets. With branches in Shanghai, Singapore, Japan and Greece, 15 agencies in Guangzhou, Dalian, Zhoushan, and more than 120 service/technical support stations in 56 countries and regions, Headway built a comprehensive global service network.

Headway's product portfolio includes 3 segments: Carbon Neutralization, Water Treatment and Smart Shipping, which are all developed under the long adherent R&D ideology of "Be Innovative, Stay Excelsior".

Headway is willing to continue the cooperation with global partners based on mutual trust and benefit, to embrace the future of green shipping and sustainable development, pioneer in decarbonization strategy, zero-emission shipping and marine environmental protection.

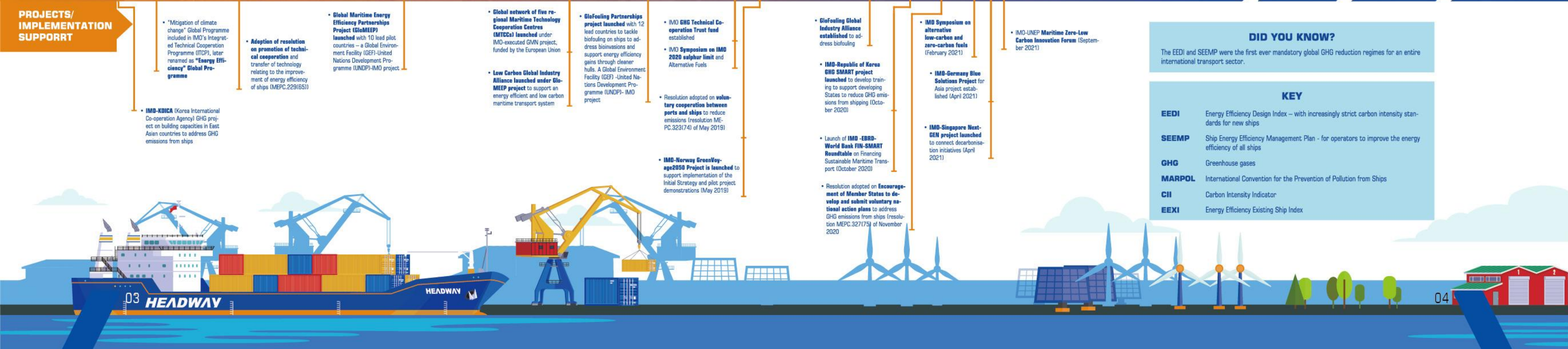






# BACKGROUND

Data: IMO – Addressing Climate Change: A Decade of Action to Cut GHG Emissions from Shipping



**DID YOU KNOW?**

The EEDI and SEEMP were the first ever mandatory global GHG reduction regimes for an entire international transport sector.

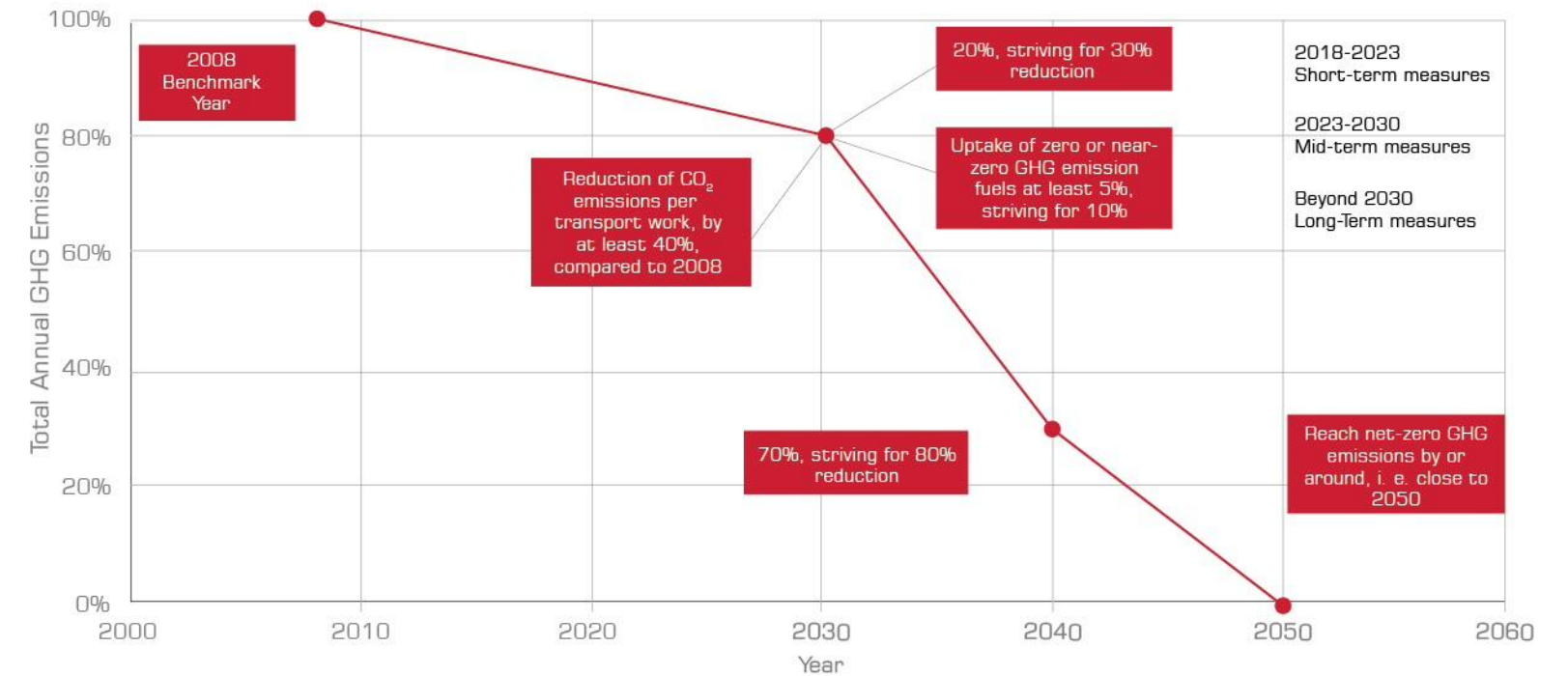
**KEY**

- EEDI** Energy Efficiency Design Index – with increasingly strict carbon intensity standards for new ships
- SEEMP** Ship Energy Efficiency Management Plan - for operators to improve the energy efficiency of all ships
- GHG** Greenhouse gases
- MARPOL** International Convention for the Prevention of Pollution from Ships
- CII** Carbon Intensity Indicator
- EEXI** Energy Efficiency Existing Ship Index



	EEXI	CII
Apply to	GT ≥ 400 International Voyage	GT ≥ 5,000 International Voyage
Before 2023.1.1	<ul style="list-style-type: none"> <li>EEXI applicable from the first annual, intermediate or renewal IAPP survey on or after 2023.1.1;</li> <li>Submit EEXI Technical File;</li> <li>Submit Onboard Management Manual (OMM), if necessary;</li> <li>Issue IEE Certificate.</li> </ul>	Before 2023.1.1 Update SEEMP (CII Procedure, etc.)
2023.1.1 (Entry into Force)		Calculate CII (23.1~23.12) <ul style="list-style-type: none"> <li>Submit CII Calculation;</li> <li>Issue SoC for CII Rating;</li> <li>Ships rated as D for 3 consecutive years or as E shall undertake the corrective plan in accordance with the revised SEEMP and verified by the administration or RO.</li> </ul>
2024	-	Calculate CII (24.1~24.12)
2025	-	Calculate CII (25.1~25.12)
Before 2026.1.1	The EEXI and CII reduction rate for 2027~2030 will be decided by 1 <sup>st</sup> January 2026, based on an evaluation of the measures.	
By 2030	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;	

### IMO GHG Reduction Targets



MEPC 80 sets the "2023 IMO Strategy on Reduction of GHG Emissions from Ships", with two key milestones for achieving net-zero emissions:

1. By 2030, reduce shipping greenhouse gas emissions by at least 20% compared to 2008 levels, striving for 30%.
2. By 2040, reduce shipping greenhouse gas emissions by at least 70% compared to 2008 levels, striving for 80%.



# INTRODUCTION

OceanGuard<sup>®</sup>, based on IMO EEXI and CII regulations, can autonomously calculate and adjust the amount of CO<sub>2</sub> to be collected. It has many advantages, including high decarbonization efficiency, compact size, low energy consumption, and convenient storage and transportation. The absorption unit employs the latest technology, significantly accelerating the CO<sub>2</sub> capture process while greatly reducing its dimension, to make installation and transport more convenient. Additionally, the system can collect and utilize exhaust heat and excess steam generated during ship operation. Compared to traditional capture systems, it can save approximately 40% of energy consumption. When installed together with the OceanGuard<sup>®</sup> EGCS, it can reduce ship fuel cost by around 25%.





## HIGH-SPEED CENTRIFUGAL DECARBURIZATION

Enhanced by the High-Speed Centrifugal Decarburation Technology, OceanGuard® Onboard Carbon Capture System (OCCS) adopts the high centrifugal field generated by the hyper-speed rotating to replace the gravity field in conventional solutions. The technology provides better contact between gas and liquid and dramatically increases the mass transfer rate.

Empowered by digital modeling and flow field analysis, Headway established models for the liquid holdup, effective contact area, liquid/solid contact surface, and liquid dispersion based on the flow characteristics and dynamic variation of liquid drops. The research provides theoretical support for the experimental research and technology improvement.

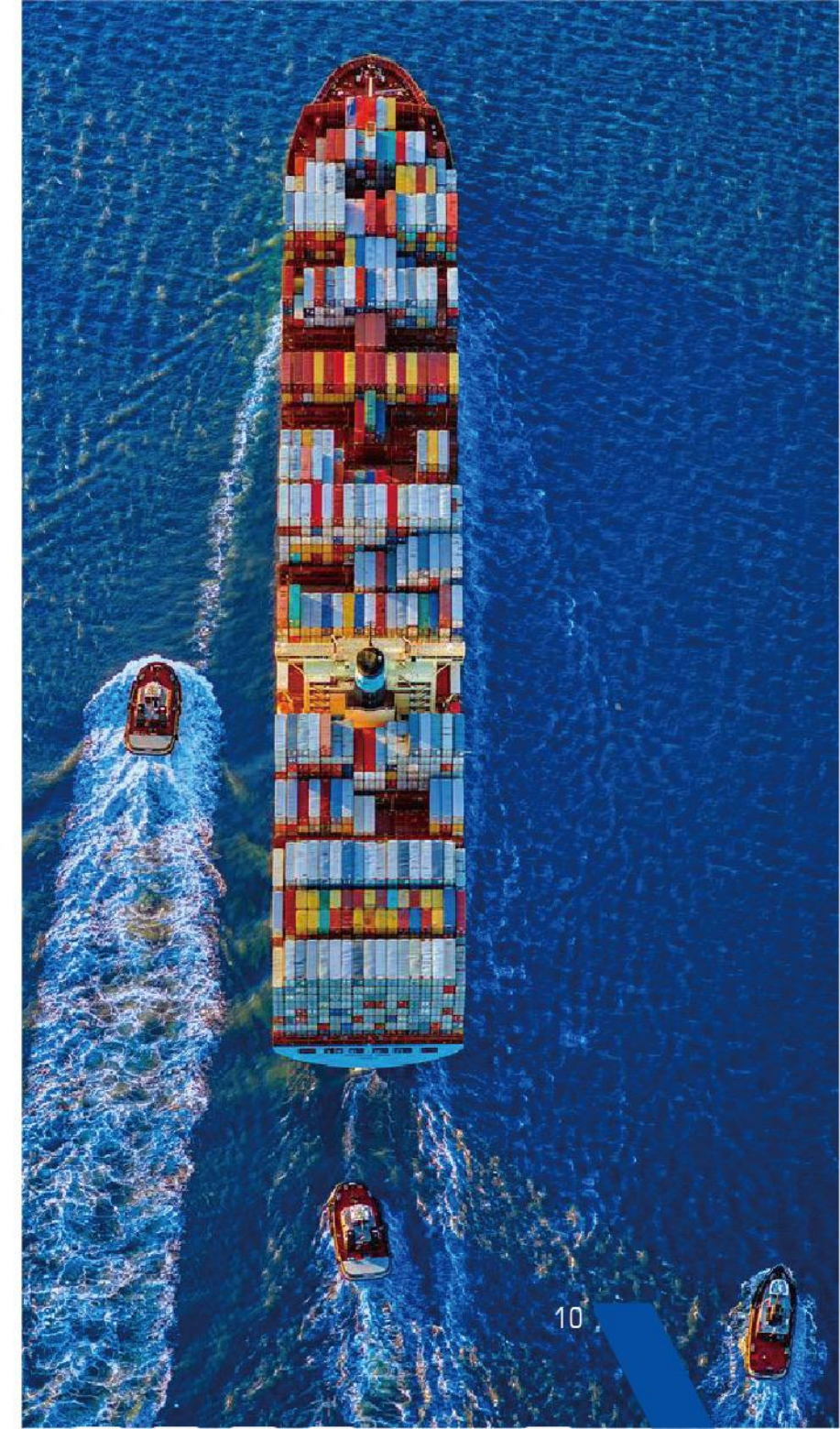


**MORE COMPACT**  
Absorption Unit

**LOWER CONSUMPTION**  
of Inputed Heat



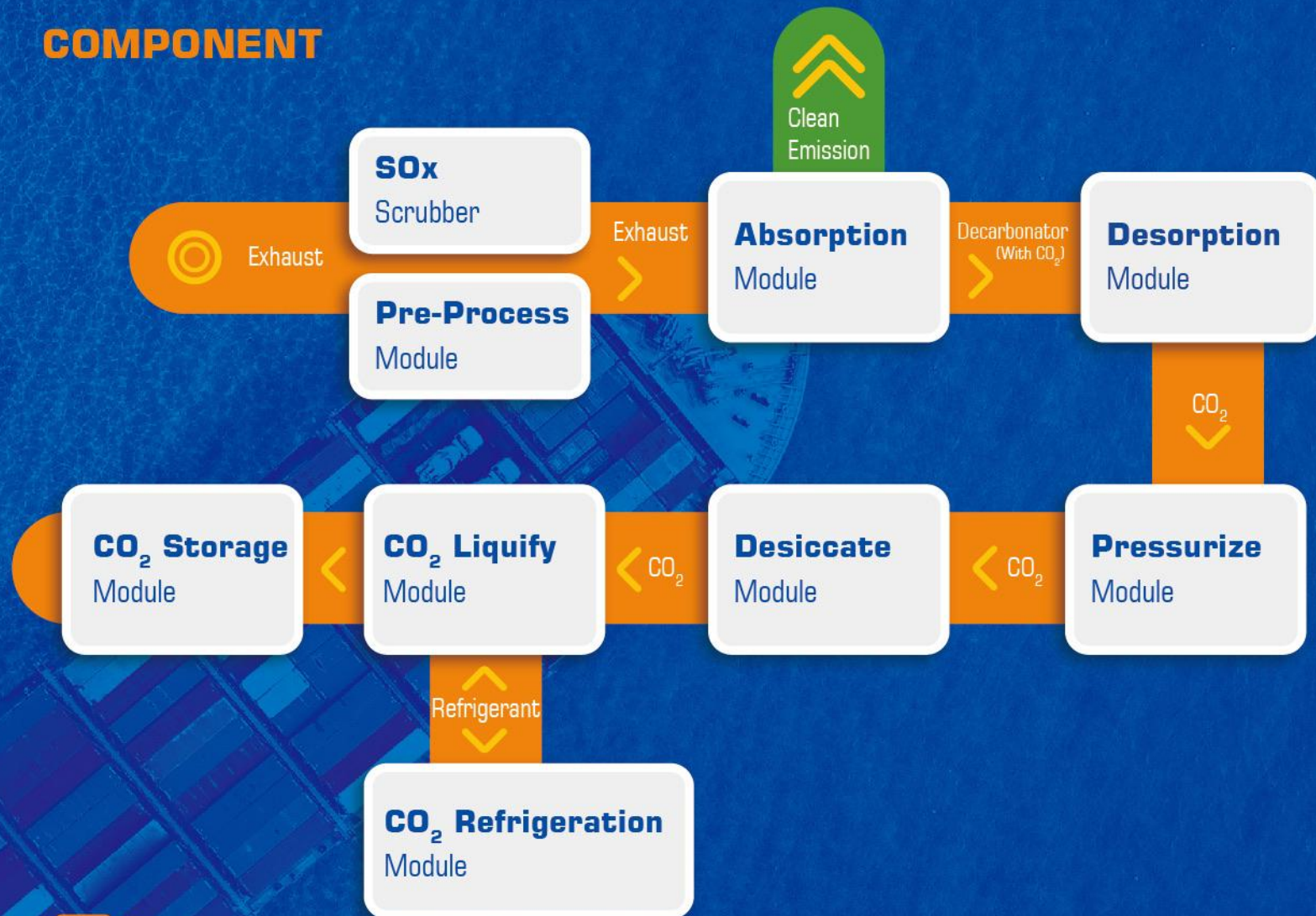
**HIGHER EFFICIENCY**  
of Molecular Reaction





# INTRODUCTION

## COMPONENT



# APPROVAL



OceanGuard® OCCS is currently undergoing the NTQ certification process.





# R&D TEAM

Headway's professional OCCS R&D team, composed of 6 divisions, offers full process solutions.

## SPECIFICATION CALCULATION



Oversee the calculation and optimization of OCCS specifications

## STRUCTURE DESIGN



Oversee the structure design and optimization of the components

## COMMISSION



Oversee the commissioning, troubleshooting and repair of OCCS

## REGULATION



Oversee the documents to send to Class for inspection along with the explanation of regulations

## INSTALLATION



Oversee the design and optimization of pipelines for OCCS

## ELECTRICAL DESIGN



Oversee the logic design, electrical design and optimization of those designs





# CARBON CYCLE ECOSYSTEM

