

# Green growth and maritime industries

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Ministry of Land, Infrastructure,  
Transport and Tourism (MLIT)

JAPAN

# 1. Today's presentation

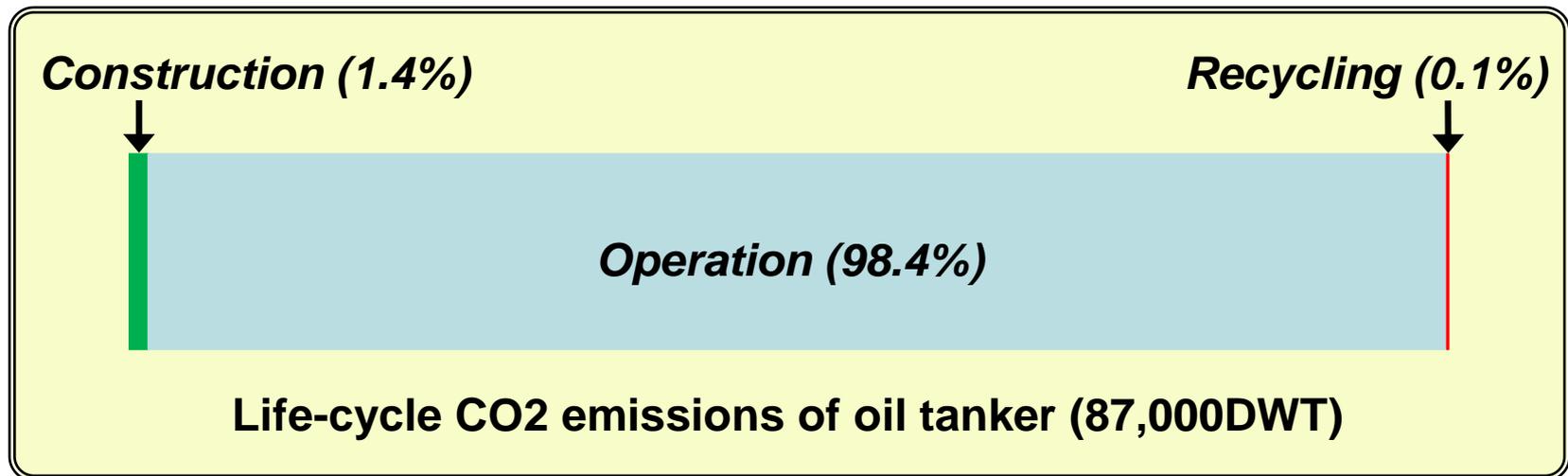
**“Green growth”** means fostering economic growth and development while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies.

Investment  
Innovation  
Productivity  
New market  
etc.

- ❑ Major driving forces of green growth in maritime sector:
  - ✓ Regulations : International, regional, domestic
  - ✓ Commercial strategies: increase competitiveness
  - ✓ Corporate Social Responsibilities (CSR) : corporate branding
  
- ❑ Today's presentation
  - ✓ **Overviews of international framework for maritime sector**
  - ✓ **Introduction of efforts for green growth by Japan**
  - ✓ **Challenges for green growth in maritime sector**

### □ Life-cycle of ships: construction, operation, recycling

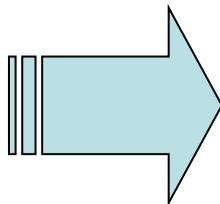
- ✓ More than 98% of environmental impacts are from the operation phase (in case of CO<sub>2</sub> emissions from oil tanker).



- Focusing on the operation phase is the most efficient and effective way.

### 3. Background: who can contribute?

Life-cycle phase	Construction	Operation	Recycling
Sources of environmental impacts	Shipyards, Manufacturing facilities	Ships	Recycling facilities, Ships
Who can contribute?			
Shipbuilding industry (incl. machinery/equipment manufacturers)	A	A	A
Shipping industry	—	A	B
Recycling industry	—	—	A



*Shipbuilding industry can contribute in ALL phases.*

### □ Characteristics of shipping

- ✓ High degree of international nature
- ✓ Rules need to be applied universally to all ships regardless of nationality to avoid market distortion.
  - International Maritime Organization (IMO).
- ✓ Long ship life: over 25 years

### □ Advantages of international framework

- ✓ All international ships are subject to the same rules.
  - Huge impacts can be expected.

### □ Disadvantages of international framework

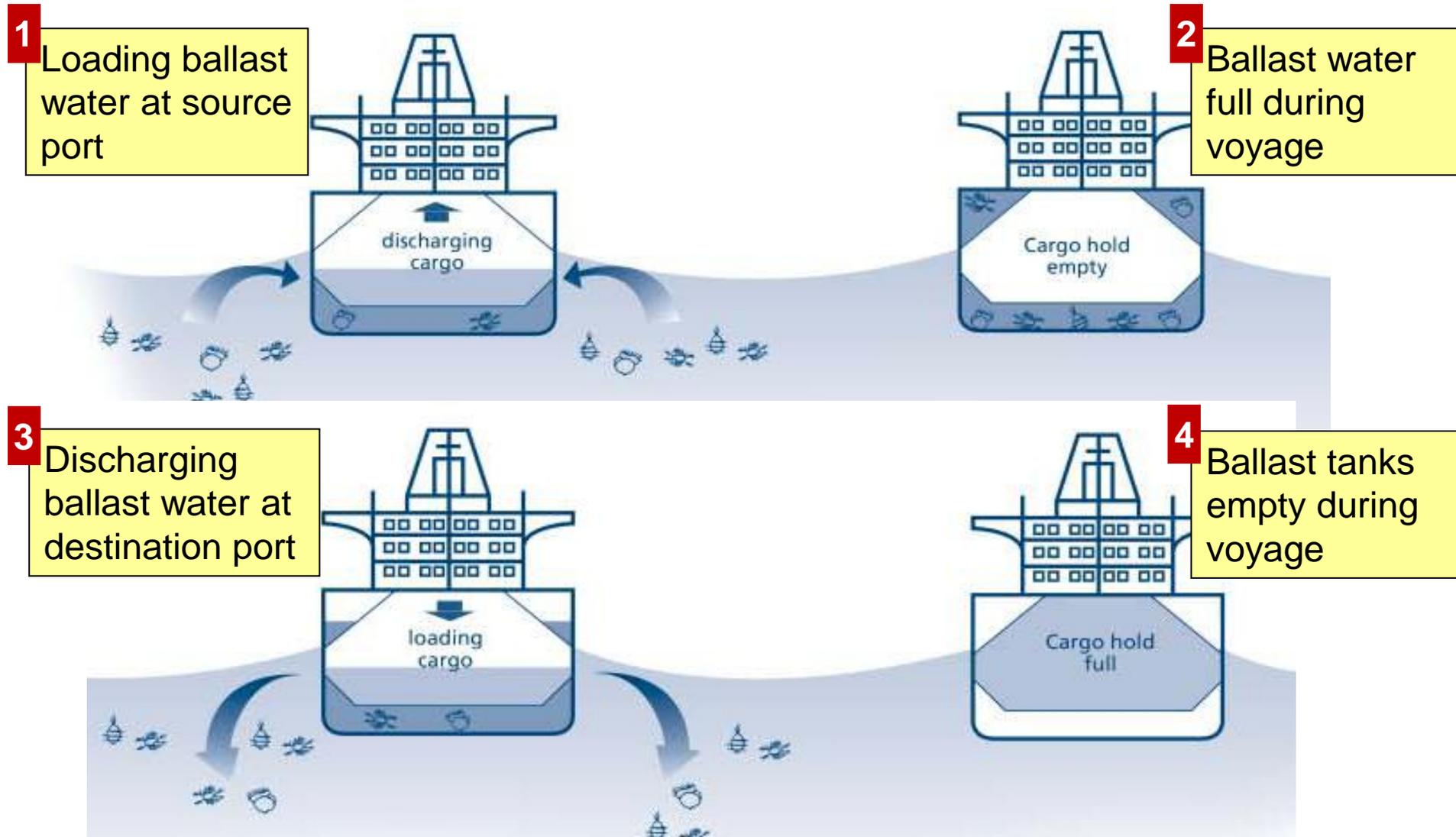
- ✓ Time-consuming: in particular, new conventions

# 5. IMO rules for environmental protection

Category	Purpose	Status
<b>Marine pollution</b>	Prevention of discharge of marine pollutants from ships (e.g., oil, chemical, sewage, garbage)	Regularly reviewed and tightened
<b>Air pollution</b>	Prevention of emissions of air pollutants from ships (e.g., NO <sub>x</sub> , SO <sub>x</sub> , VOCs)	Regularly reviewed and tightened
<b>Bio-diversity / local ecosystem</b>	Prevention of invasive marine species through ballast water from ships	Ballast water management convention was adopted, <b>yet to enter into force</b>
<b>Environmental protection</b>	Prevention of environmental damages by release of noxious and hazardous materials onboard ships	Ship recycling convention was adopted, <b>yet to enter into force</b>
<b>Climate Change</b>	Control of greenhouse gas emissions from ships	<b>Under consideration</b>

## ❑ Problem of ballast water of ships

✓ Transfer of invasive marine species through ballast water



- ❑ BWM convention adopted in 2004 requires ballast water treatment to eliminate harmful aquatic organisms.
- ❑ At the time of adoption of the Convention, **there were no available technologies to meet the standards.**
- ❑ **Industry has invested considerably, and new technologies have appeared** and started to be utilised in actual ships.

### ❑ Example of regulation-driven green growth

- ✓ Achieve both innovation for *environmental protection* and *creation of new market*.

➤ Some estimates say the market is \$37 billion (75,000 system) in the next decade.

## Measures to reduce GHG emissions from ships

### ➤ **Technical measures:**

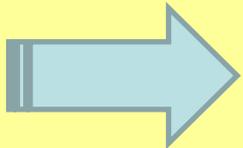
- ✓ Energy efficiency design index (EEDI)



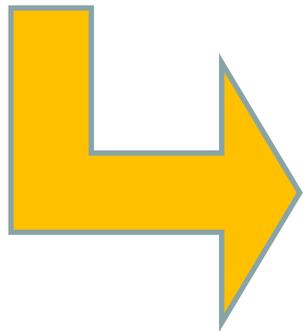
- IMO's conventional approach: focus on ships

### ➤ **Market-based measures (MBM):**

- ✓ Efficiency incentive scheme (EIS)
- ✓ Emission Trading System (ETS)



- IMO's new approach: focus on economic incentives



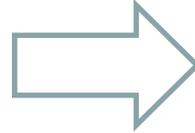
Already spurred development of innovative ships



Regulation-driven green growth

IMO may have served green growth to some extent.

But...



IMO did not establish environmental regulations for the purpose of economic growth.

### Challenges

- ❑ For green growth of maritime sector, more proactive approach may be necessary.
- ❑ **How to secure combining of economic and environmental policies in maritime sector?**
  - Expansion of IMO mandates?
  - Collaboration with other international organizations?

## Another aspect

- ❑ International shipping is regulated as an industry.
- ❑ Benefits of green growth concept can be increased if implemented in cross-industry.
  - ✓ Putting too stringent regulations on shipping, without considering balance between other transport modes, may cause adverse effects.

## Challenges

- ❑ New coordination mechanism may be necessary to **seek for green growth as a transport sector**.
  - ✓ Economic mechanism to encourage the use of transport mode of less environmental impacts.

- ❑ Intensive research and development projects have been made for green technology.
- ❑ *Shipbuilding:*
  - ✓ Improvement of energy efficiency
  - ✓ LNG fueled ships
  - ✓ Minimization of hazardous materials onboard
  - ✓ Natural gas hydrate pellet carriers (NGHP carriers)
- ❑ *Other sectors with shipbuilding technologies:*
  - ✓ Wind power generation at sea
  - ✓ Development of undersea resources

## 12. Improvement of energy efficiency

- ❑ Demands for high efficient ships are expected to expand significantly.
- ❑ New technologies for increased energy efficiency:
  - ✓ Bow shape
  - ✓ Waste heat recovery
  - ✓ Air lubrication
  - ✓ Solar and/or wind power, etc.

### Concept ships with new technologies

30%  
UP



<http://www.mhi.co.jp/news/story/1010144987.html>

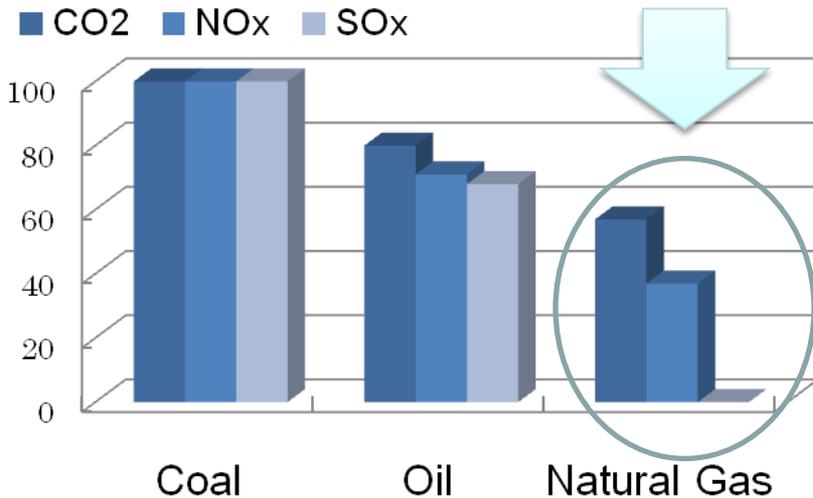
70%  
UP



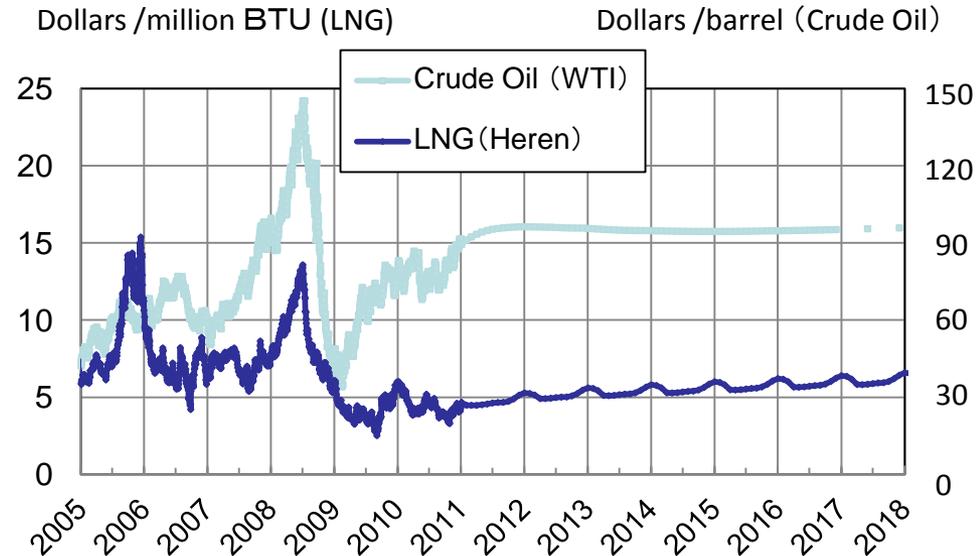
<http://www.nyk.com/csr/envi/ecoship.htm>

# 13. Development of LNG-fueled ships

**Natural Gas fuel emits low CO<sub>2</sub>, NO<sub>x</sub>, and SO<sub>x</sub>**



**Natural Gas prices are expected to remain low**



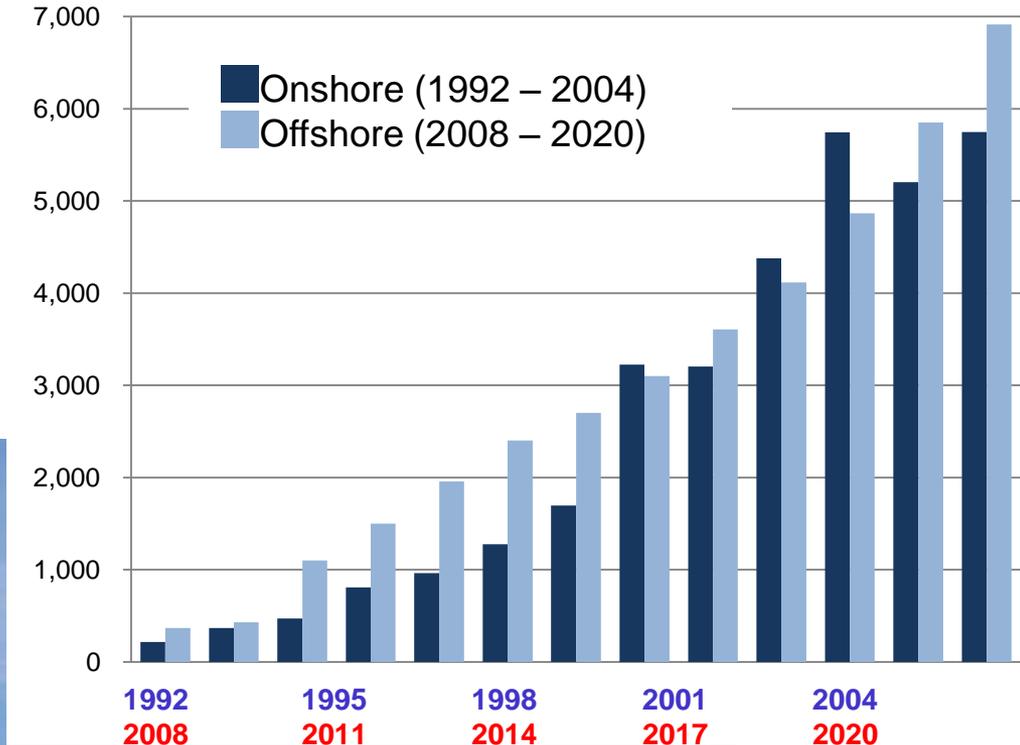
## Japanese Activities

- ❑ Conceptual design
- ❑ Development of new technology
  - ✓ Machinery
  - ✓ Storage tanks



# 14. Wind power generation at sea

- ❑ Clean and renewable energy
- ❑ Growing market



<http://www.ewea.org/>

Shipbuilding industry can provide critical technologies:  
floating position control, stability, etc.

- International mechanism for green growth of maritime industries:
  - ✓ IMO's instruments have good mechanisms covering the majority of ships, but are not designed for economic growth.
  - ✓ How to combine such mechanisms and economic policies is a key to green growth in maritime sector.
  - ✓ New coordination mechanism may be necessary to seek for green growth as a transport sector.

## □ Efforts by Japanese maritime industries:

- ✓ Strenuous efforts have been made for development of green technologies.
  - Low-emission ships, LNG fueled ships, wind power generation, etc.
- ✓ For industry, regulations have served as good signposts, and promote industries' efforts.
  - Industry invests with confidence in new technologies, when demands for technologies are promised by regulations: