

2030 GreenShip-K Promotion Strategy

The 1st National Plan for the Development and Popularization of Green Ship

February 9th, 2021

Junkeon Ahn, PhD
KOMSA Researcher

Contents

1. Background
2. Technology Development
3. Test Infrastructure
4. Greenship-K Project
5. Green-fuel Supply Chain
6. Market Activation
7. Expected Effect

01 Background

- According to *‘the Act on Development and Popularization of Green Ship (Promulgation No. 16167),’*
 - *“Minister of Trade, Industry and Energy and Minister of Oceans and Fisheries formulate the national plan per five years.”*
 - *“The national plan shall have the R&D roadmap, long-term objectives, infrastructure for power sources, etc.”*



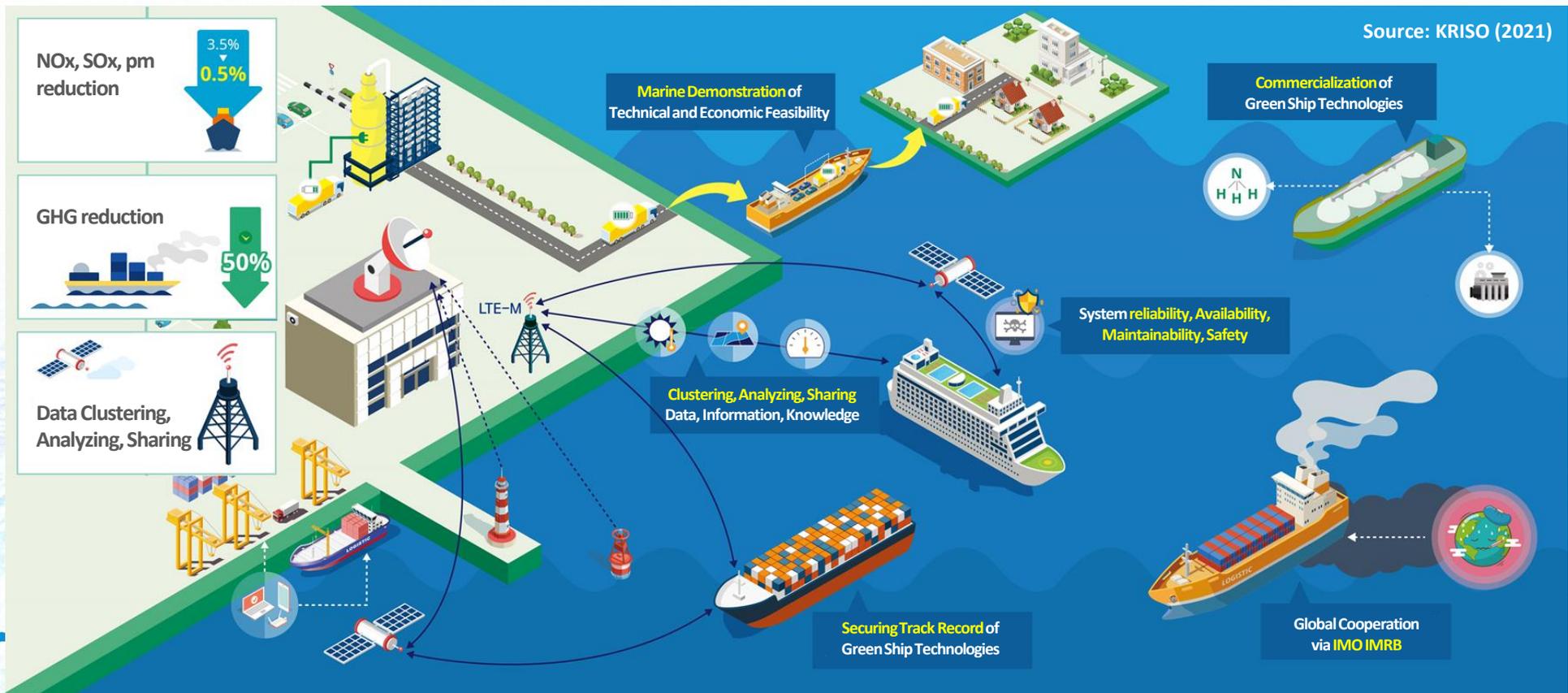
Ministry of Oceans
and Fisheries



Ministry of Trade,
Industry and Energy

01 Background

- **Based on the Act,**
 - 'The 1st National Plan for the Development and Popularization of Green Ship' is publicly released in December 2020.
 - The Government of the Republic of Korea plans to invest \$870 million (2022 - 2031) for the innovative R&D program of green ships considering life-cycle.



01 Background

- The Government of the Republic of Korea has established *'the Green New Deal'* to achieve net-zero emissions and accelerates the transition towards a low-carbon and green economy.



Green Transition of Infrastructure

- Zero-energy building
- The ecosystems
- Clean and safe water

Low-carbon and Decentralized Energy

- Efficient energy management
- Renewables and Fair transition
- **Hydrogen vehicles, etc.**

Innovation in the Green Industry

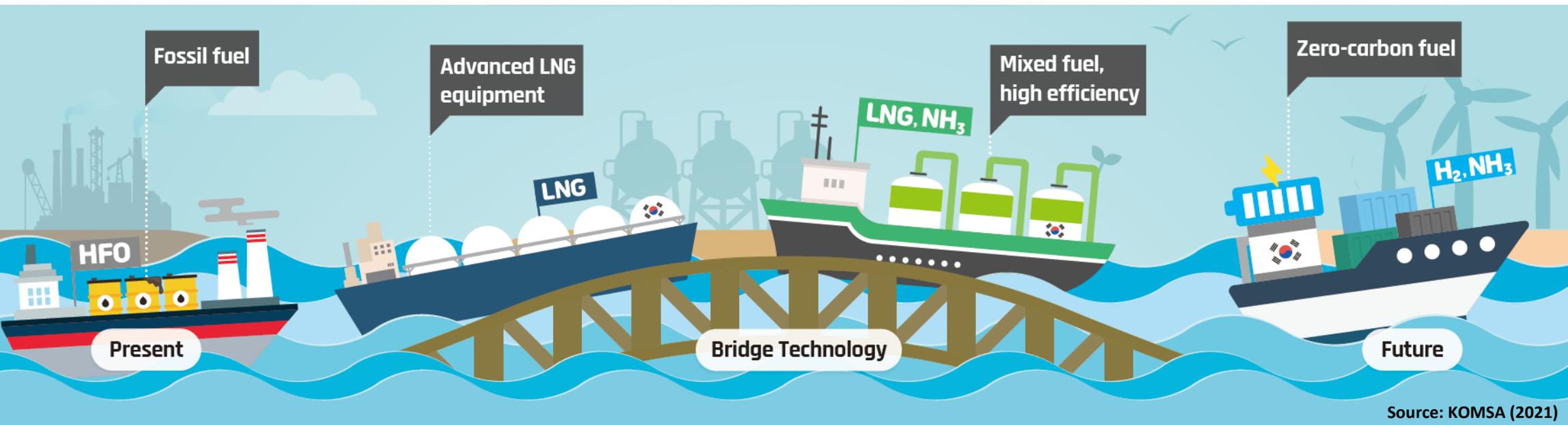
- Low-carbon industrial complexes
- Foundation for green innovation



Source: Korean New Deal (2020)

02 Technology Development

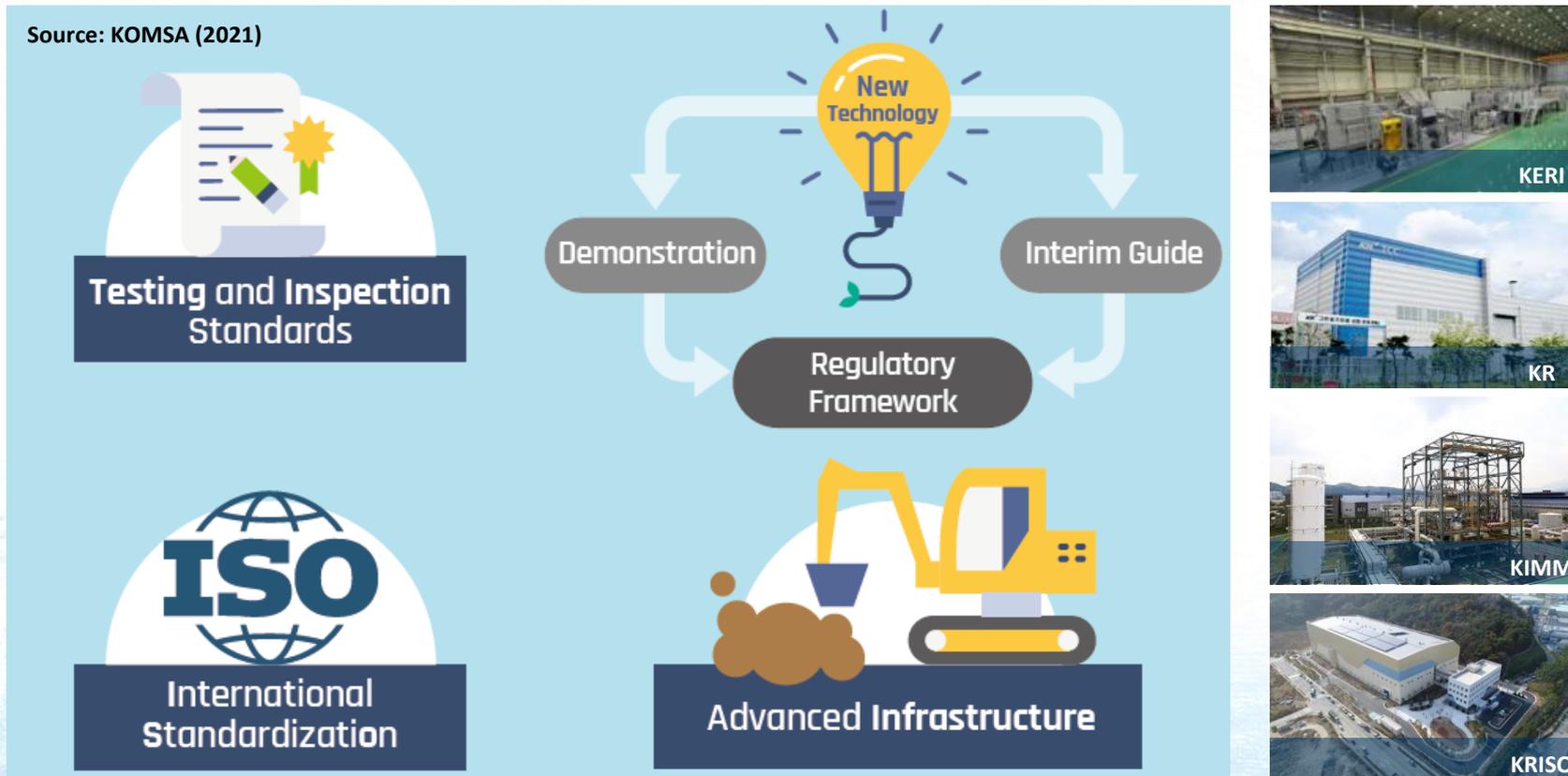
- There are three goals to secure the future green ships:
 - Carbon-free technology with hydrogen, ammonia, etc.
 - Low-carbon technology with fuel mixture, energy-saving device, etc.
 - Localisation of the core technology about LNG, electrification, and hybridisation.



Source: KOMSA (2021)

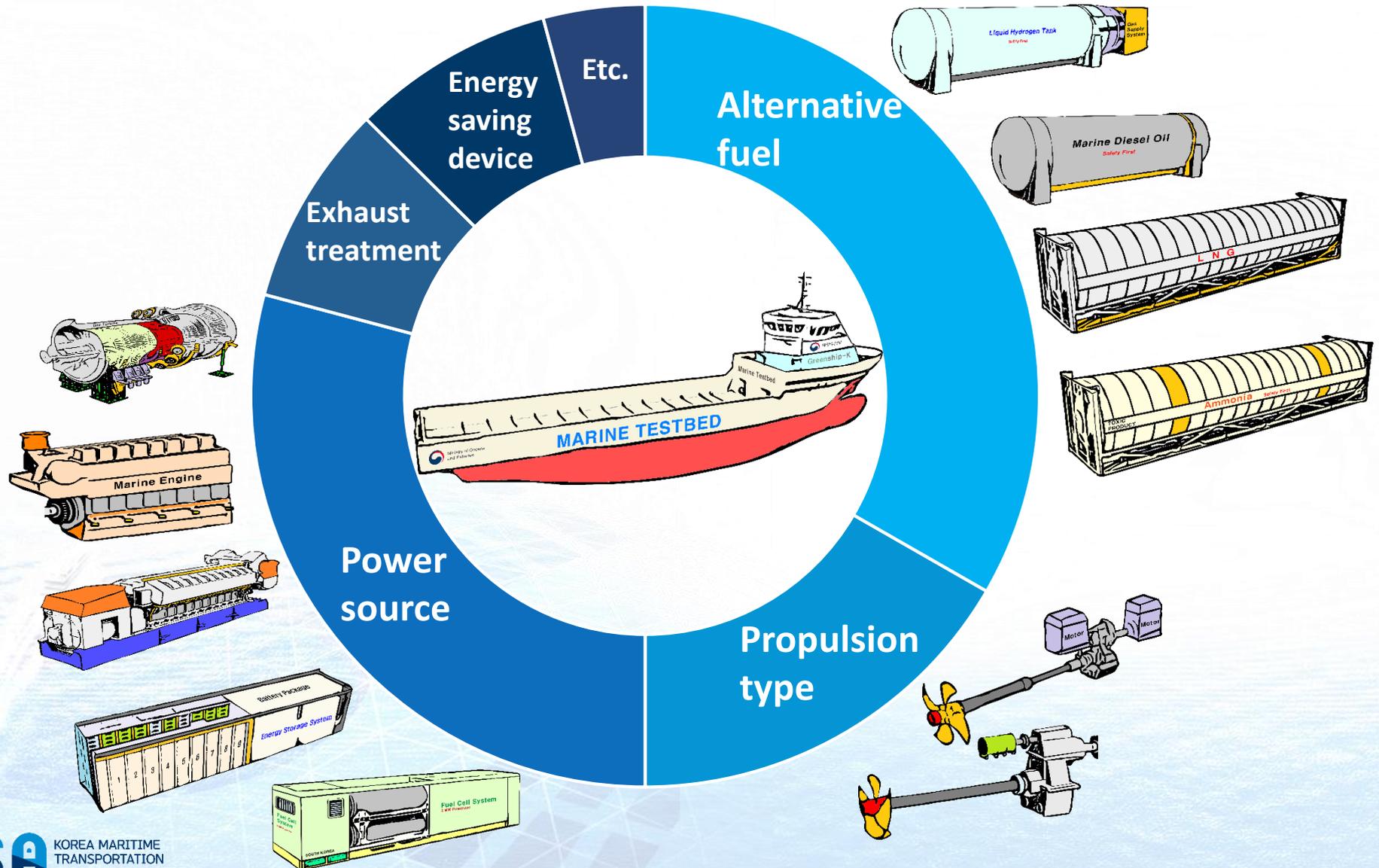
03 Test Infrastructure

- The R&D results will be the basis of testing and inspection standards.
- New technology will be verified by onshore facilities before a marine application.



04 GreenShip-K Project

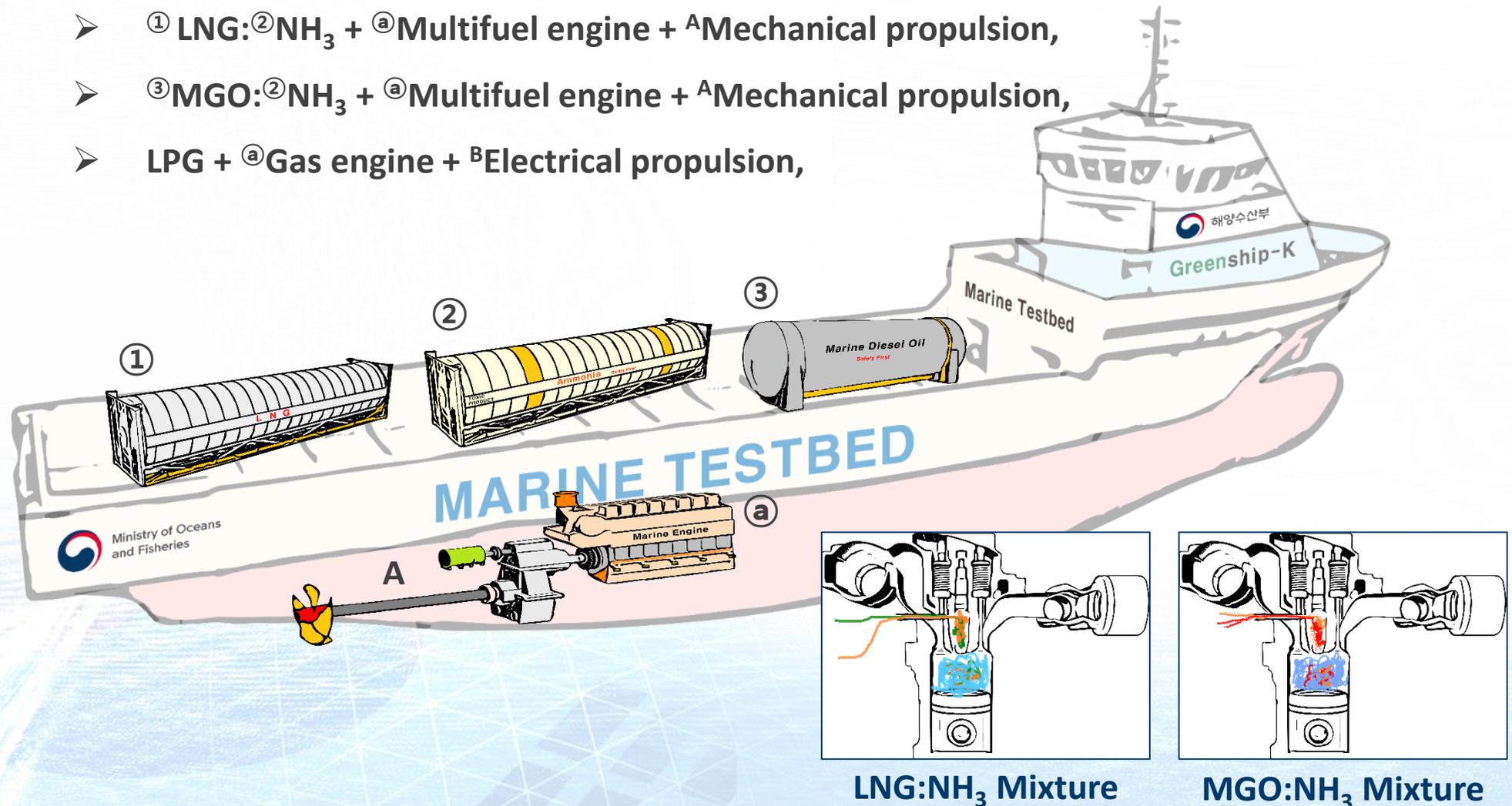
- A marine testbed tests the technology developed to prove the feasibility.



04 GreenShip-K Project

Low-carbon technology may have the following cases:

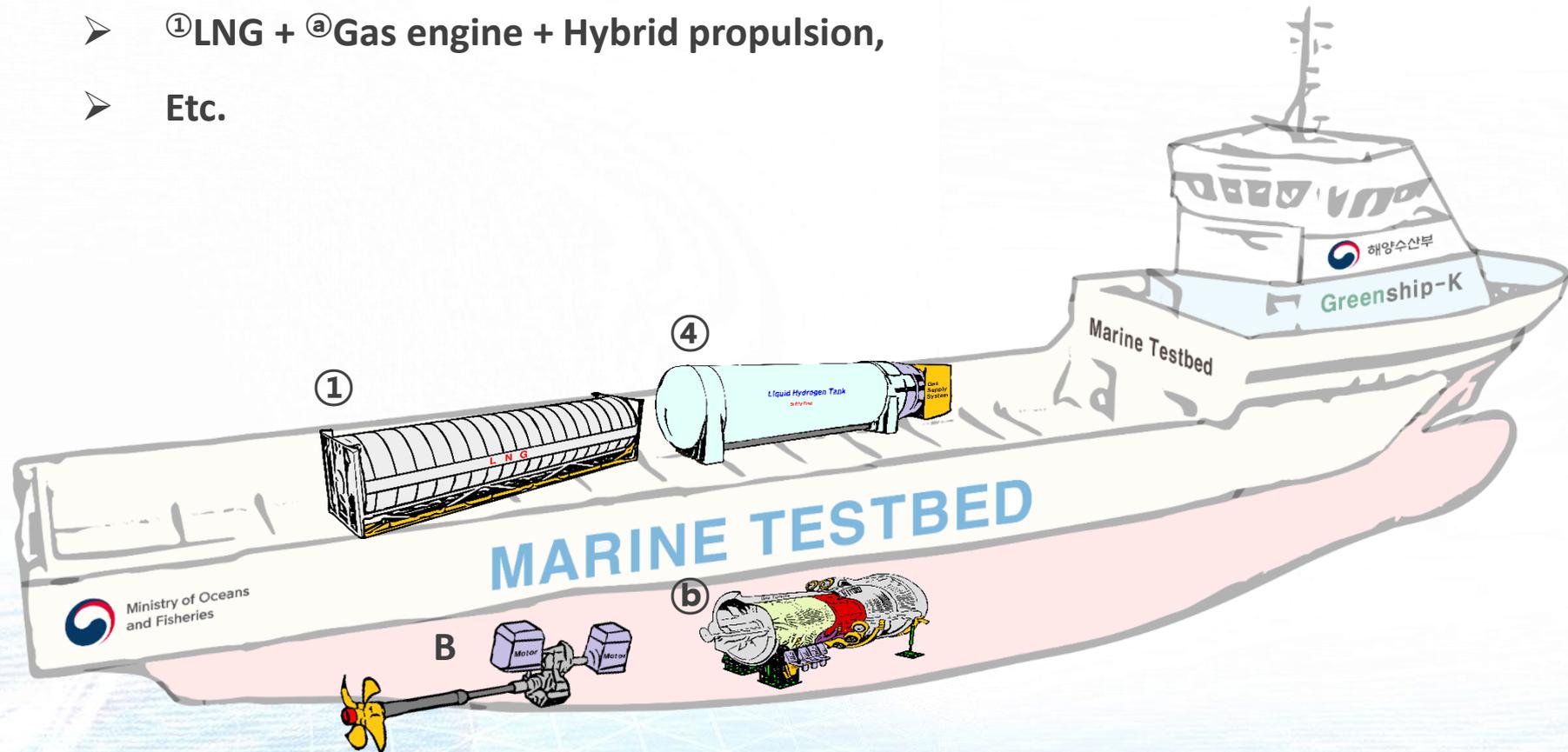
- ① LNG + ^aGas engine + ^BElectrical propulsion,
- ① LNG:②NH₃ + ^aMultifuel engine + ^AMechanical propulsion,
- ③MGO:②NH₃ + ^aMultifuel engine + ^AMechanical propulsion,
- LPG + ^aGas engine + ^BElectrical propulsion,



04 GreenShip-K Project

Low-carbon technology may have the following cases:

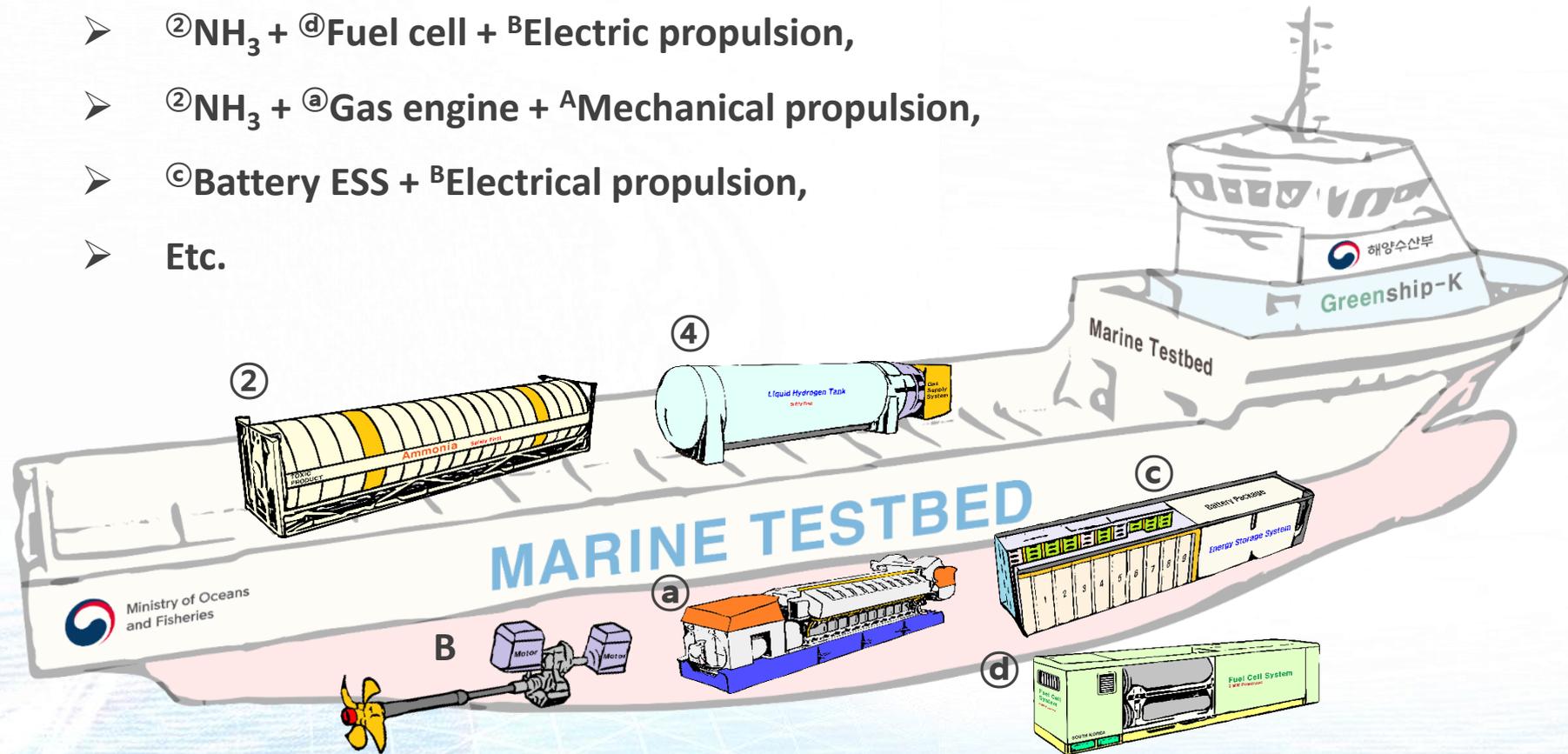
- ①LNG:④H₂ + ③Gas turbine + ②Electrical propulsion,
- ①LNG + ③Gas engine + Hybrid propulsion,
- Etc.



04 GreenShip-K Project

Carbon-free technology may have the following cases:

- ④ Hydrogen + ④ Fuel cell + ^BElectric propulsion,
- ② NH₃ + ④ Fuel cell + ^BElectric propulsion,
- ② NH₃ + ③ Gas engine + ^AMechanical propulsion,
- ③ Battery ESS + ^BElectrical propulsion,
- Etc.

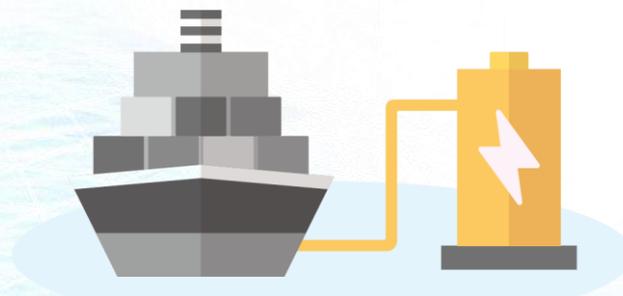


05 Green-fuel Supply Chain

- **LNG bunkering capability grows up to 1,400,000 tons per year in 2030.**
 - The small-scale bunkering vessel (500 m³) supplies LNG fuel to coastal ships.
 - The major ports (Busan, Ulsan, etc.) will have onshore facilities for LNG bunkering.
- **Alternative maritime power supplies the ship`s hotel loads as well as will charge the battery of a fully-electric ship.**
- **A testing facility of H₂ (or NH₃) will be the basis of a large-scale bunkering service.**



LNG Bunkering



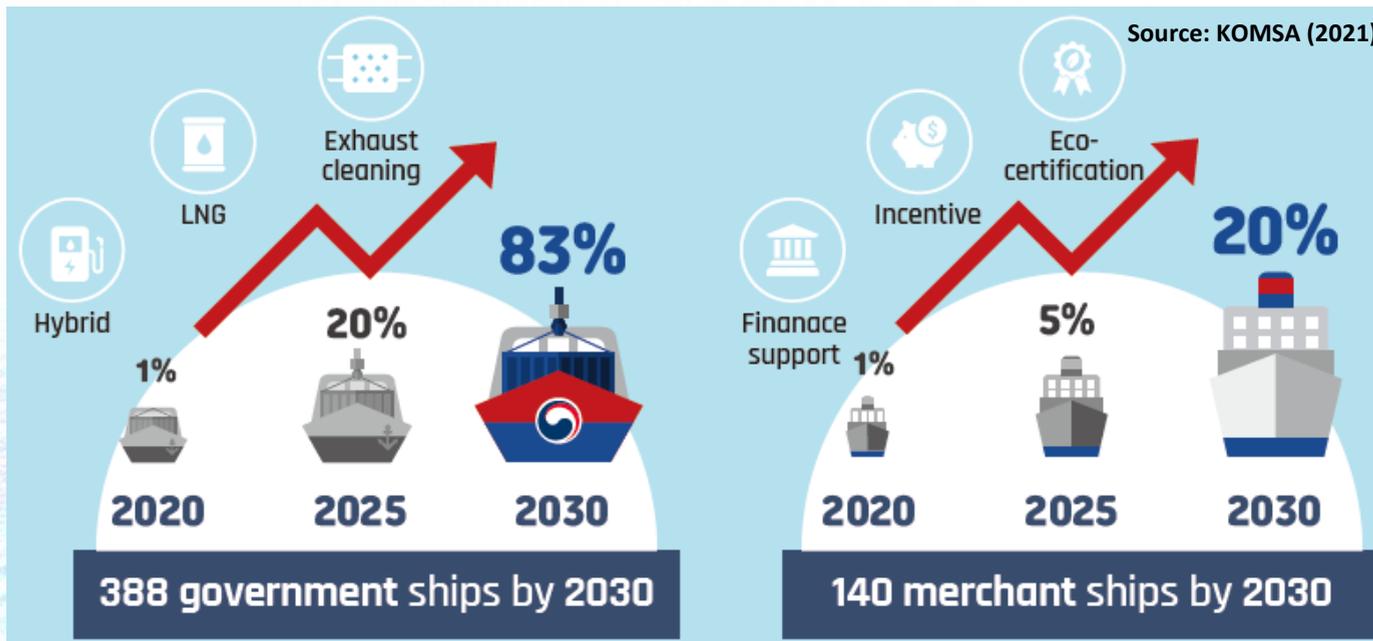
Alternative Maritime Power



Carbon-free Fuel Bunkering

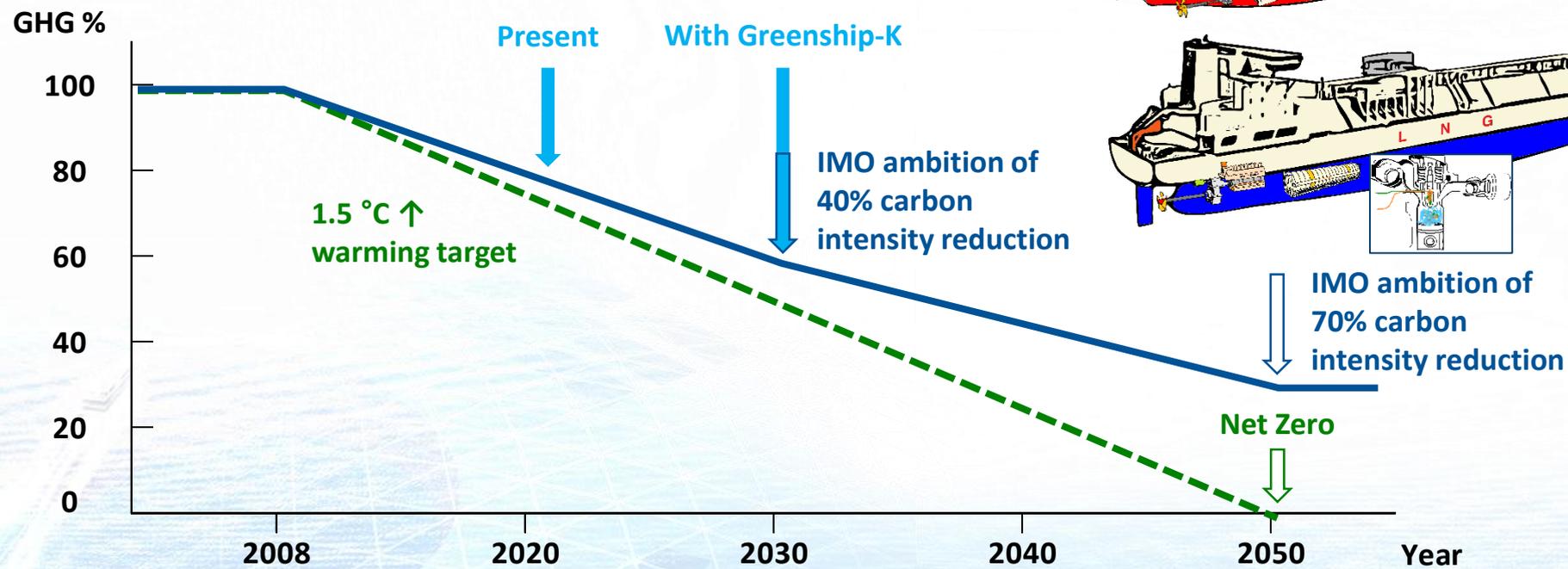
06 Market Activation

- **Ships that the Government-owned should take eco-friendly technology;**
 - Newbuilt green ships replace the old-fashioned ships (over 26 years),
 - Ships in service will take exhaust treatment equipment (SCR, DPF, etc.).
- **Merchant ships can have the benefits:**
 - New Deal Fund, Financial Incentive, and Tax Reduction.



07 Expected Effect

- The global marine sector shall halve the absolute GHG emissions by 2050 compared to 2008 (baseline).
 - The international shipping GHG reduction should be achieved based on decarbonised fuel, ship efficiency, carbon market, etc.



Thank you for your attention.

February 9th, 2021

Junkeon Ahn, PhD
KOMSA Researcher