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CHINA CLASSIFICATION SOCIETY
中国船级社

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Green Shipping Outlines



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Green Shipping Outlines

Initial IMO Strategy

Fit for 55

Industry Alliance — Getting to Zero Coalition; SSI Sustainable Shipping Initiative

Full decarbonization by 2050;
Zero carbon ships put into operation in 2030.
Rapid decarbonization of shipping before 2050.
... ...

Existing Requirements

New ships

2013

EEDI

Existing ships

2023

EEXI

CII

Approach

Technical measure (emission reduction≈3%-20%)

- Design optimization
- Energy saving device
- Energy saving technology
- ...

Operational measure (emission reduction≈5%-30%)

- Improve fleet management
- Route optimization
- Improve interaction with port
- ...

Alternative fuel (emission reduction≈10%-100%)

- Technology readiness level (TRL): Engine; Supply system; Tank; Bunkering system
- Regulatory completeness: International rules; Domestic regulations
- Carbon reduction potential: Ship end emissions; Life cycle emissions
- Economy: Capital Expenditure (Compared to fuel oil); Fuel cost (Methanol as an example); Levy/Penalty
- Availability (Methanol as an example): Production capacity; Bunkering capacity; Sufficient grey methanol; Huge gap in green methanol; Ship To Ship; Shore To Ship; Truck To Ship

	Technology readiness level (TRL)	Carbon reduction potential	Economy		
	Engine	Ship end emissions	Capital Expenditure	Fuel cost	Levy/Penalty
LNG		Fuel oil + CCUS	Methanol ≈ ↑ 10%	Gray methanol ↑ 25%-30%	Ship emissions
Methanol		Green methanol	LNG ≈ ↑ 20%	Green methanol ≈ ↑ 150%	Life cycle emissions
Hydrogen	IEC	Hydrogen	Ammonia ≈ ↑ 15%		
Ammonia	FC	Green ammonia; Green hydrogen;			

Maturity: Low — High

Carbon capture & utilization & storage (emission reduction≈20%-80%)

- Carbon reduction
- CO_2 recycle
- CO_2 leakage
- High cost
- Under development
- ...

MBMs

IMO

- Penalty
- Levy
- GFS

Compliance approach

- Carbon credit — Such as CCER
- CO_2 Pool
- Cash payment

EU

- EU ETS
- Fuel EU maritime

Measures/ methodology

- Marine fuel life cycle assessment (**LCA**) Guidelines
- Ship fuel oil consumption data collection system (**DCS**)
- Monitoring, reporting and verification (**MRV**)
- Fuel EU maritime calculation method
- Marine fuel certification

Legend: IMO; EU; Undetermined