



Arab Academy
for Science Technology & Maritime Transport

The International Maritime
Transport and Logistics Conference

“Marlog 11”

Path and Strategies for Low-carbon and Sustainable Development of the Shipping Industry in China

WANG Renjie
TPRI



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Carbon Peaking and Carbon Neutrality Goals of China



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President Xi Jinping's Important Expositions on Carbon Peaking and Carbon Neutrality since the 18th CPC National Congress

China-US Joint Announcement on Climate Change	Video Summit on Climate between China, France and Germany
China-US Joint Announcement on Climate Change	U.S.-China Joint Presidential Statement on Climate Change
Opening Ceremony of the Paris Conference on Climate Change	President Xi Jinping's Inspection to Guangxi
General Debate of the 75th Session of the United Nations General Assembly	Meeting of the Political Bureau of the CPC Central Committee
United Nations Summit on Biodiversity	The 29th Collective Study of the Political Bureau of the CPC Central Committee
The 3rd Paris Peace Forum	President Xi Jinping's Call with UN Secretary-General Antonio Guterres
The Twelfth BRICS Leaders' Meeting	The 19th Meeting of Central Committee for Deepening Overall Reform
Leaders' Side Event on Safeguarding the Planet of the G20 Riyadh Summit	President Xi Jinping's Congratulatory Letter to the First Batch of Units of Baihetan Hydropower Station on the Jinsha River
Climate Ambition Summit	CPC and World Political Parties Summit
Central Economic Working Conference	The Annual APEC Economic Leaders' Meetings
Thematic Seminar for Provincial and Ministerial Leaders to Study and Practice the Guiding Principles of the Fifth Plenary Session of the 19th CPC Central Committee	CPC symposium with Non-Party Members
World Economic Forum Davos Agenda Meeting	Meeting of the Political Bureau of the CPC Central Committee
The 9th Meeting of the Central Committee for Financial and Economic Affairs	The Thirteenth BRICS Leaders' Meeting
President Xi Jinping's Inspection to Fujian	President Xi Jinping's Inspection to Yulin, Shaanxi
President Xi Jinping's Participation in Tree Planting in Beijing	General Debate of the 76th Session of the United Nations General Assembly

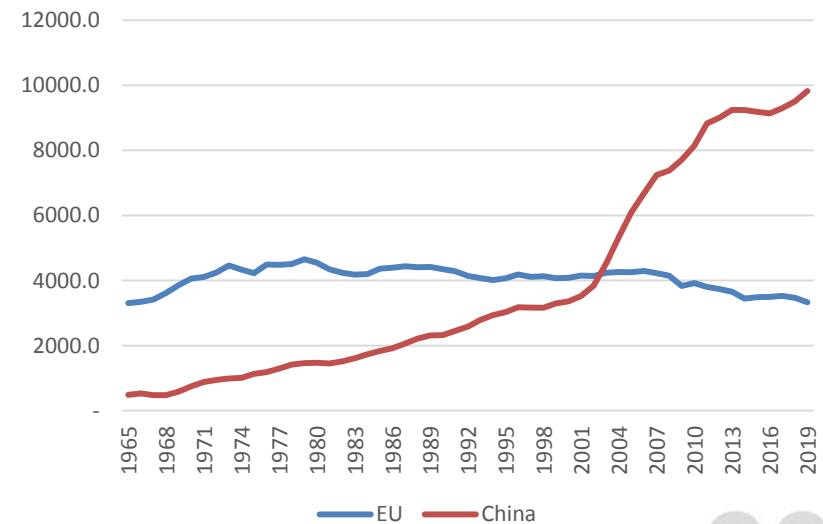


On September 22, 2022, Chinese President Xi Jinping attended the 75th Session of the United Nations General Assembly, and solemnly declared that China aims to have CO₂ emissions peak before 2030 and achieve carbon neutrality before 2060.



Understanding Difficulties and Challenges Faced by China in Carbon Peaking

- **Comparison of global carbon peaking processes**
 - In EU, carbon peaking is a natural process, in other words, we can only know when the carbon dioxide emissions peak after it happens.
 - After carbon peaking, there is a long plateau period and the CO₂ emissions then begin to decline slowly.
 - Then, it declines rapidly towards carbon neutrality.
- **Challenges faced by China in carbon peaking**
 - China has artificial set out its timetable for carbon peaking.
 - It is now still on the way.
 - More efforts shall be made for carbon peaking.



Source: BP Statistical Review of World Energy 2020

Building the “1+N” Policy System for Carbon Peaking and Carbon Neutrality

- China is now accelerating the formulation of top documents for carbon peaking and carbon neutrality, and studying policy measures for carbon peaking and carbon neutrality in various industries and sectors. Currently, China is vigorously formulating the **Action Plan for Carbon Dioxide Peaking Before 2030**, studying and preparing the implementation plans for carbon peaking in such **industries and sectors** as electric power, steel, non-ferrous metals, petrochemical industry, building materials, construction and **transportation**, actively planning green and low-carbon scientific problem tackling, increase of carbon sequestration capacity and other support plans, and further defining the timetable, roadmap and working plan for carbon peaking and carbon neutrality.

Policy measures and actions will be taken in ten sectors under the “1+N” policy system to accelerate the transformation and innovation.

XIE Zhenhua

Building the green and low-carbon transportation system. Optimize the transport structure, give priority to the development of public transport, and develop hydrogen fuel cell vehicle and other clean zero-emission vehicles. Build hydrogen refueling stations, battery-swap stations, and charging stations.



Challenges faced by China's transport sector in carbon peaking

- Transportation is the basic support and guarantee for residents' travel and logistics services. As the economy and society rapidly develop and people's living standards keep improving, **the total transportation needs** and **carbon emissions** will witness continuous growth.
- **The demands for improvement of service quality keep growing.** The society raises even higher requirements for the timeliness, personalization and comfort of transportation. China's energy consumption of unit transport turnover has been similar to that of the developed countries and **unit carbon emissions encounter bottleneck in decline.**
- **There are great demands for funds.** It is stated in the Sixth Assessment Report of Intergovernmental Panel on Climate Change (IPCC AR6) that the cost of carbon emission reduction in transportation industry is **significantly higher than that in industry and construction industry.**

Development Status of the Shipping Industry in China

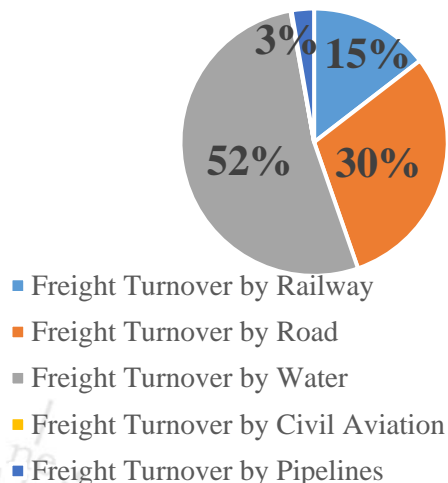


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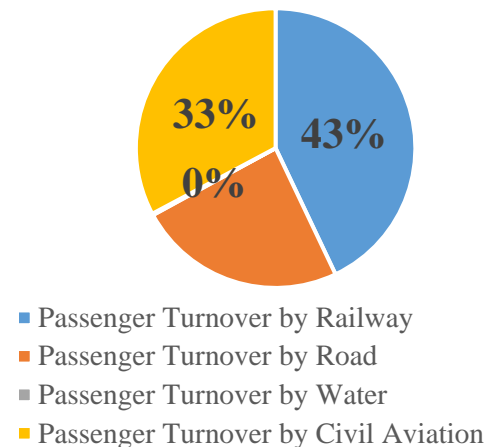
Overview of Waterway Transport in China

Ratio of Freight Turnover of Various Means of Transport in 2020



- Waterway transport is the major means of freight transport in China.
- Waterway transport has witnessed favorable development in recent years, with gradually increased foreign trade, increasingly frequent bulk cargo transportation and continuously expanded scale.

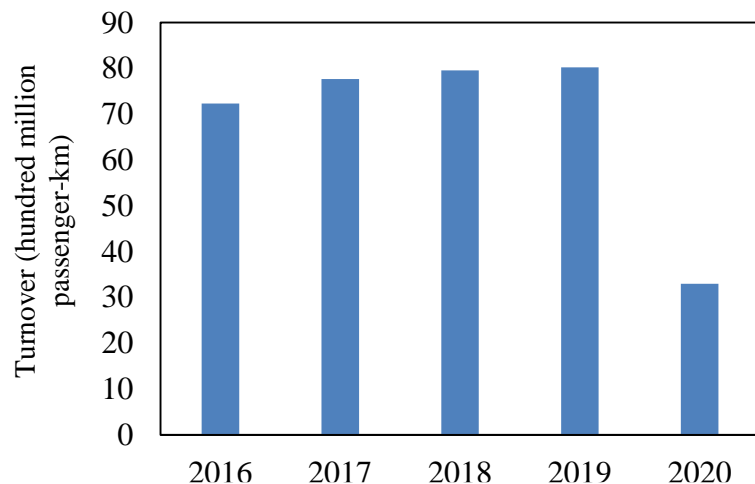
Ratio of Passenger Turnover of Various Means of Transport in 2020



- However, waterway passenger transport develops slowly limited by geographical conditions and transportation characteristics. Passenger transport occupies relatively low share in waterway transport less than 1%.

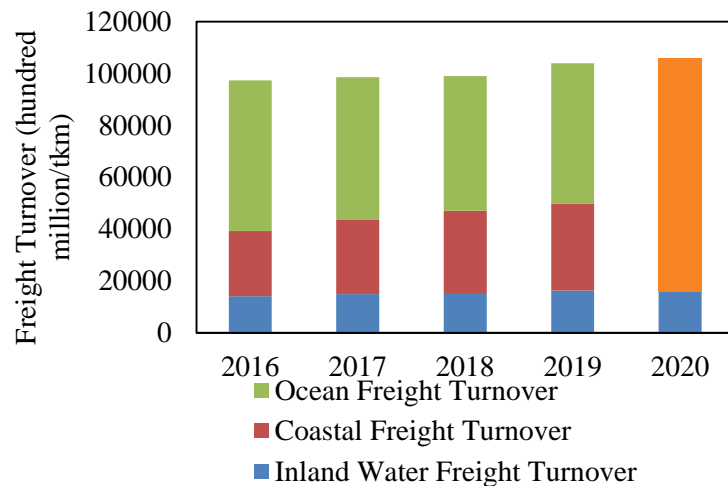
Development Status of Turnover by Waterway Transport

Passenger Turnover by Water from 2016 to 2020



- In recent years, passenger turnover by water has witnessed steady rise. In 2020, the passenger turnover declined dramatically affected by COVID-19 pandemic. The passenger turnover by water was 3.3 billion passenger-km, down by 58.9% on last year.

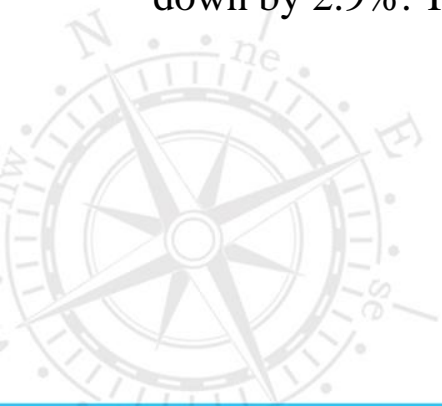
Freight Turnover by Water from 2016



- The freight turnover by water in China has kept steady growth. In 2020, the freight turnover by water was 1058340000/tkm. In the statistical statement in 2020, the coastal transport and ocean transport were combined as the marine transport.

Waterway Transport Equipment

- Data over the past 5 years indicates that the number of ships declines.
- By the end of 2020, there were 127,000 waterway transport ships in China, down by 3.6% on last year. More and more large ships were used, with the deadweight totaling 270,602,000 tons, up 5.4%.
- In 2020, the passenger capacity of waterway transport ships in China was 860,000 person-times, down by 2.9%. The container capacity was 2,930,000 TEUs, up by 30.9%.



Forecast on Carbon Emissions of the Shipping Industry in China



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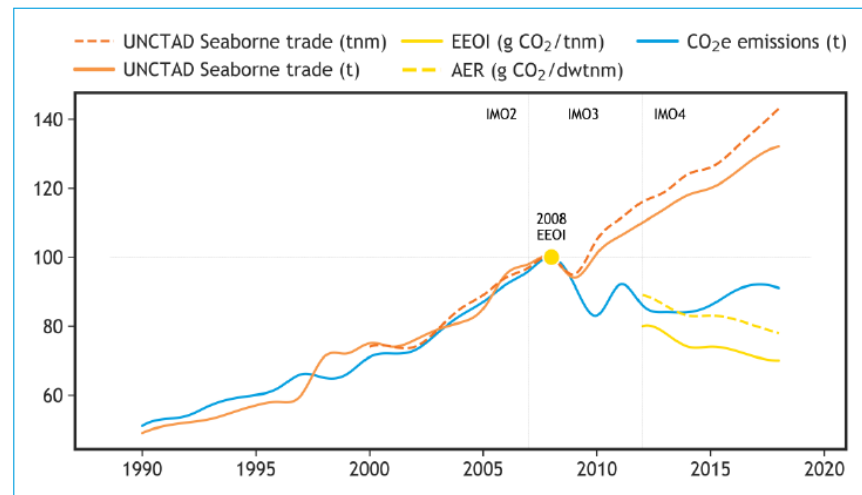
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Global Change of Carbon Emissions of Ships

➤ Basic Consensus Emissions

- From 2012 to 2018, the global GHG emissions (CO₂, CH₄ and N₂O) from ships (**domestic, international and fishing**) increased from 977 million tons to 1.076 billion tons, with the ratio in global emissions increased from 2.76% to 2.89%. Among them, carbon dioxide emissions increased from 962 million tons to 1.056 billion tons.
- The carbon intensity of international shipping decreased by **10%~30%** (based on different calculation units).
- As the demands for maritime transportation keep increasing, it is expected that by 2050 the carbon dioxide emissions will be increased by about 50% and 90~130% compared with that in 2018 and 2008 respectively.

Changes in International Shipping Emissions and Emission Intensity
(Cited from the Fourth IMO GHG Study Report)



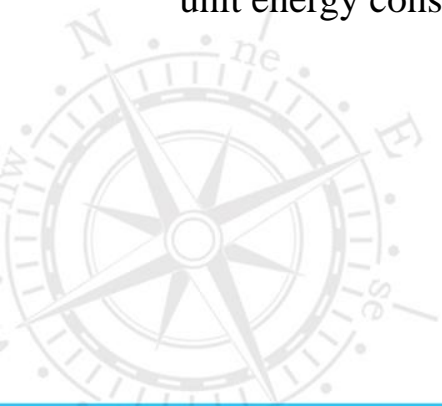
Method for Determining Carbon Emissions in the Shipping Industry in China

□ **Ship** The carbon emissions are measured, calculated and estimated based on the turnover, unit energy consumption and carbon emission factor.

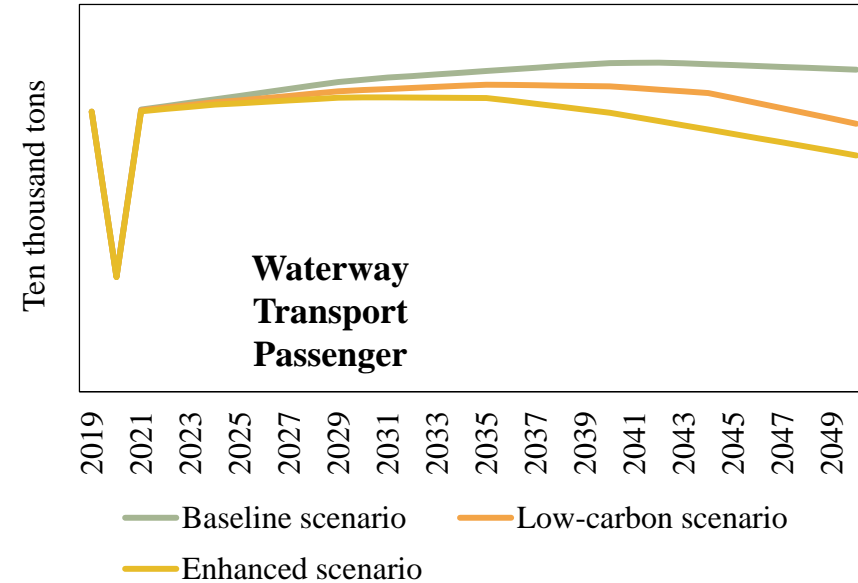
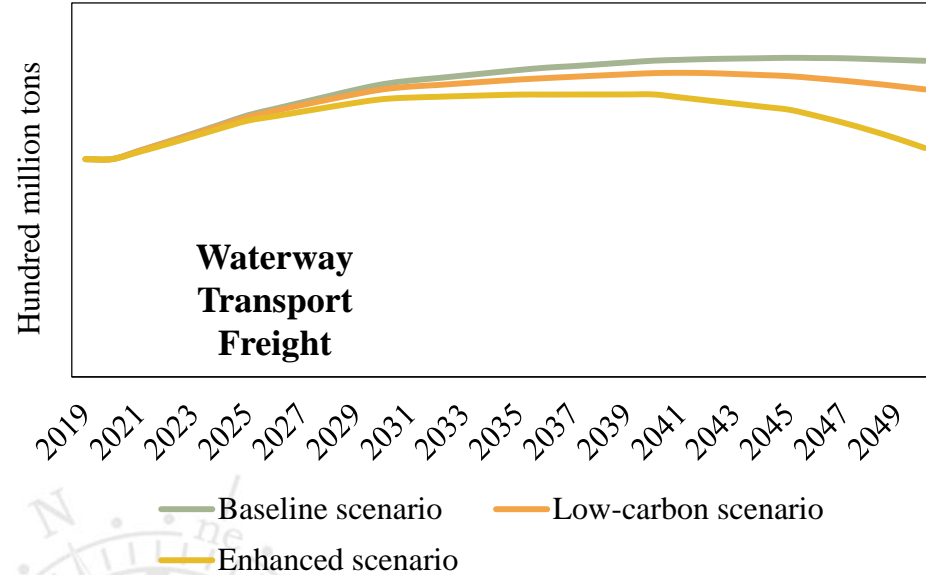
$$E = \sum (Y_j \times Ef_j)$$

$$Y_j = Z_j \times F_j$$

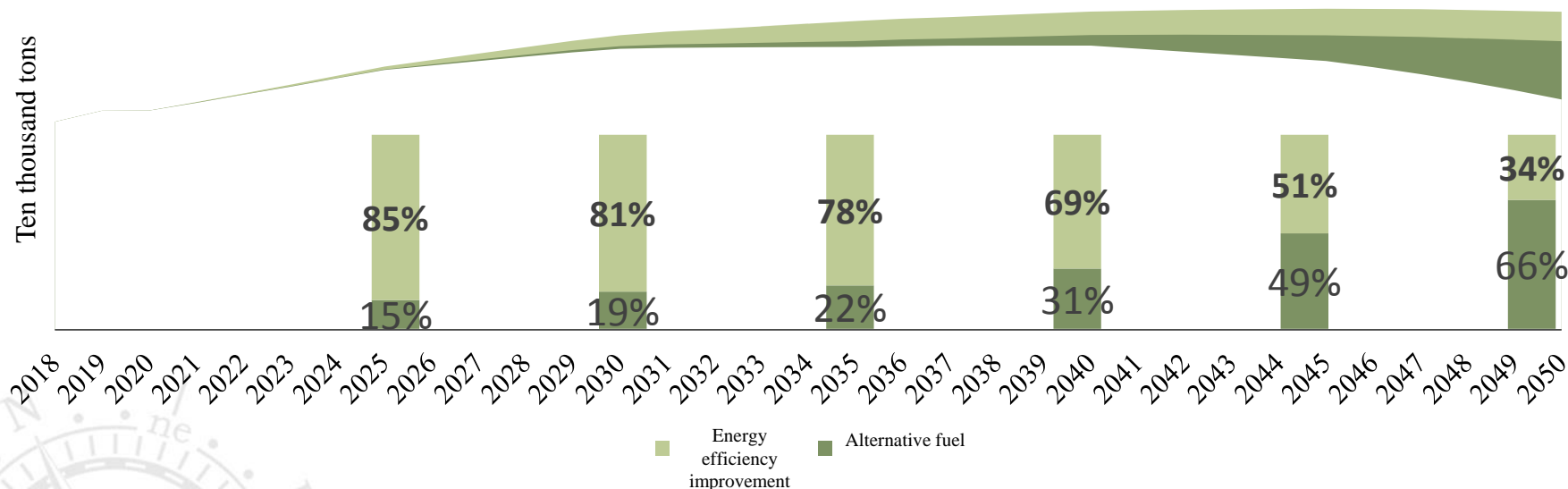
Where, E is the emission volume in t; j is the fuel type; Y_j is the consumption of the jth type of fuel; Z_j is the turnover completed by the transportation equipment using the jth type of fuel; F_j is the unit energy consumption; Ef_j is the emission factor of the jth type of fuel.



Forecast of Carbon Emission of Ships in China



Potential of Reduction of Carbon Emissions by Ships



➤ Energy efficiency improvement is a key initiative to accelerate the carbon emission peaking of waterway transport in the earlier stage.

Efforts will also be made to launch technical R&D and preparation of low-carbon and zero-carbon fuel and transport equipment.

➤ As alternative fuel gradually works, the alternative fuel is continuously accelerated, realizing the scale application.

➤ The contribution rate of energy efficiency improvement to emission reduction is 85% by 2025 and declines to 34% by 2050.

➤ The contribution rate of alternative fuel to emission reduction is 15% by 2025 and increases to 66% by 2050.

Technological Path for Low-carbon and Sustainable Shipping Industry in China



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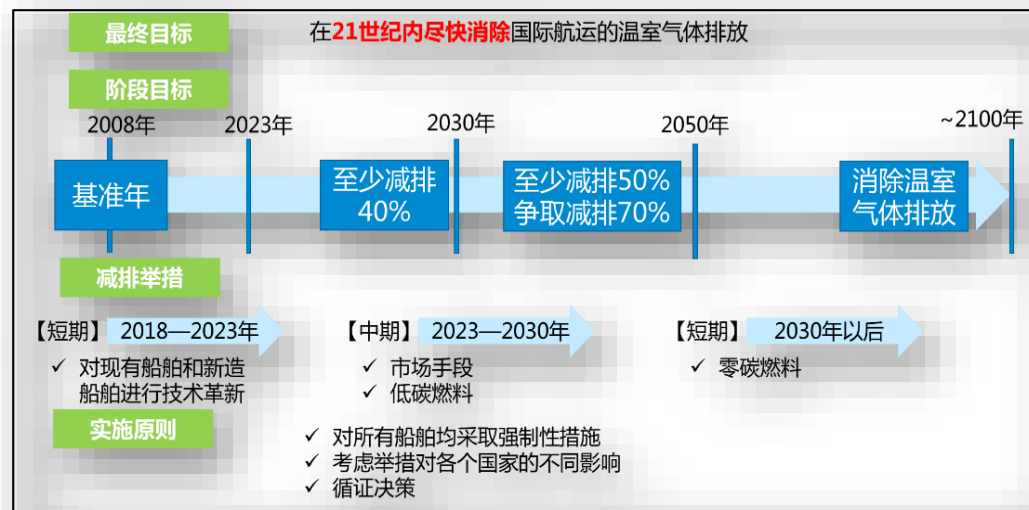
Path Selection and Measures for Reduction of Emissions by Ships

➤ Emission reduction visions and goals of global shipping industries are continuously strengthened

- IMO will determine the emission reduction strategies at MEPC 80
- More emission reduction mechanisms, such as operating energy efficiency, fuel standards and emission taxes, are under discussion.

➤ Common difficulties and challenges faced

- Uncertain **regulatory environment**
 - Coordination of rules in different countries and regions
- Uncertain **alternative fuels**
 - Unclear development prospect of technologies regarding new energy
 - Inconsistent understanding of emission reduction benefits of energy
- Uncertain **ship technologies**
 - Ship types, motors, auxiliary facilities, etc.



Path Selection and Measures for Reduction of Emissions by Ships of Shipping Companies

➤ Strategic planning of shipping companies

- A lot of shipping companies have begun to plan the path for low-carbon development
- Shipping companies don't reach consensus on alternative fuels

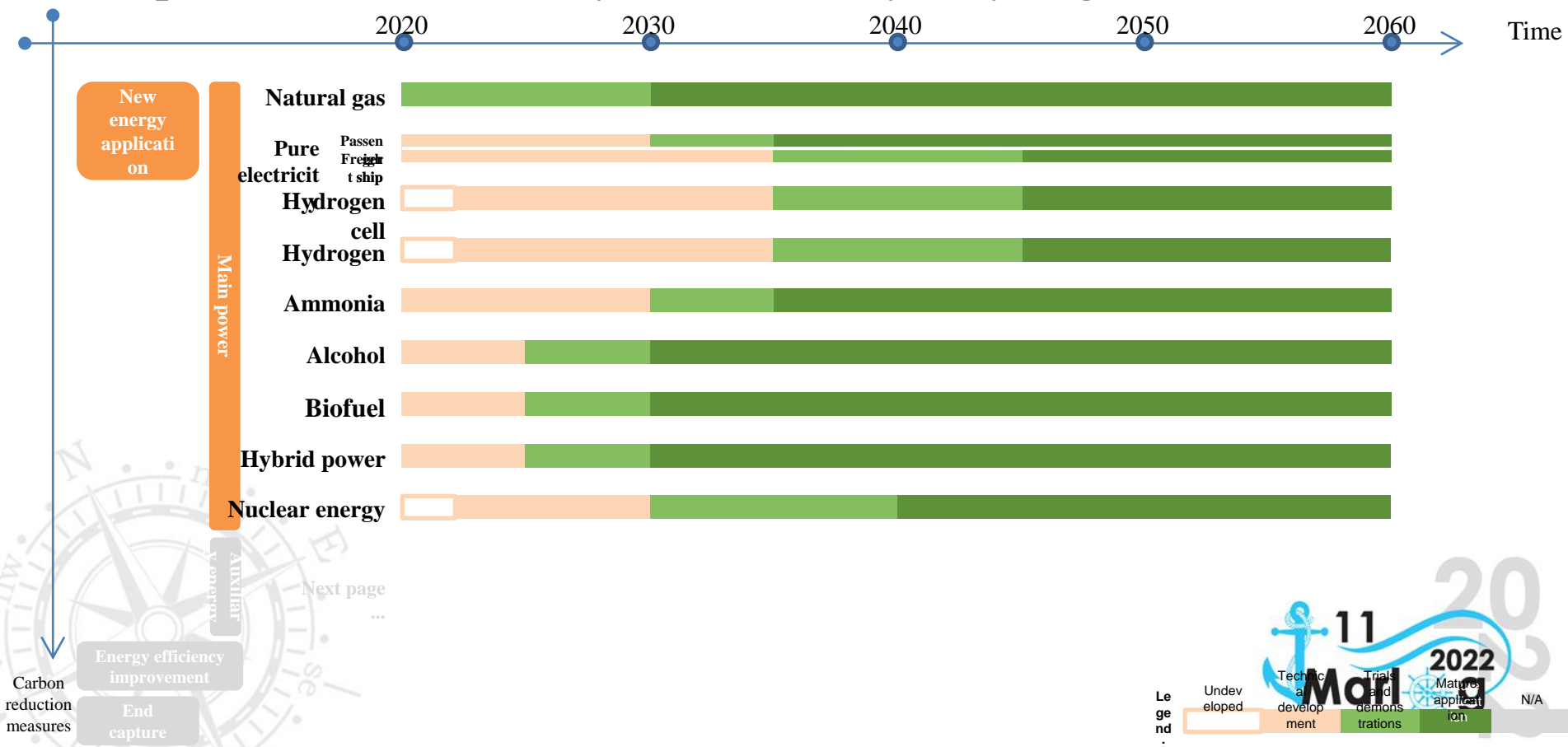
Alternative Fuels Chosen by Shipping Companies

	氢燃料	生物燃料	氢燃料	LNG	甲醇	甲烷	其他
A.P. Moller - Maersk	★	★		▼	★		LPG
Mediterranean Shipping Company (MSC)	★	★	★		★		
CMA CGM		★	★	★			
Hapag-Lloyd				★			
MOL		★	★			★	
GENCO Shipping & Trading Ltd.	★						
East Pacific Shipping	★				★		
Precious Shipping	★						
United European Car Carriers (UECC)		★					
Exmar	★						LPG
MSC Curise				★			LNG燃料电池
Wilhelmsen Ship Management			★				
ZIM				★			
Fortescue Future Industries	★						

The keynote speech entitled New Marine Fuel and Supply System of ZHAO Rui from Headway Technology Group (Qingdao) Co., Ltd. at the Seminar on Green Shipping - Greenhouse Gas Emission Reduction



The coastal waterway transport enters an acceleration period of energy replacement dominated by water-electrolytic hydrogen after 2045



Strategies for Low-carbon and Sustainable Development of the Shipping Industry in China



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Key Carbon Peaking and Carbon Neutrality Policies in the Shipping Industry in China

Management policies

- Building and optimizing the **carbon emission statistical accounting system** in the shipping industry
- Tightening **the policies on access and exit of ships**
- Upgrading the **ship emission control area**
- Launching the **Yangtze River pioneer zone** for ship electrification
- Implementing the **Energy Efficiency Leader** system for shipping companies

Technical policies

- Building the standard system for carbon emission reduction in the shipping industry
- Encouraging the R&D of technologies for carbon emission reduction in the shipping industry

Economic policies

- Accelerating the formulation of subsidy policies for kicking out aged ships
- Launching incentive policies for promotion of new energy ships
- Studying the market-oriented capital mechanism in the shipping industry
- Establishing carbon peaking and carbon neutrality fund in the shipping industry

Thank You



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