9th Plenary Meeting of Global Shipping Think Tank Alliance

July 3-4, 2025
Naples, Italy

Navigating the Future

Geopolitics, Sustainability, and
Digital Transformation in Maritime Transport

Conference Booklet

srm

9th Plenary Meeting of Global Shipping Think Tank Alliance

July 3-4, 2025 Naples, Italy

Agenda

Thursday July 3, 2025

09:00 - 16:30 **PLENARY MEETING**

Gallerie d'Italia in Naples | 177, via Toledo

Coordinators:

MASSIMO DEANDREIS - General Manager of SRM

ALESSANDRO PANARO - Head of Maritime & Energy Service, SRM

09:00 - 09:30 **Registration and welcome coffee**

09:30 - 10:10 **Opening Ceremony**

EGYPT **ALAA M. MORSY** - Chairman of GSTTA

ITALY **MASSIMO DEANDREIS** - General Manager of SRM

ITALY **MARIO MATTIOLI** - President of Federazione del Mare

Alliance working report

CHINA **ZHENGYU LIU** - Deputy Secretary-general of GSTTA

10:10 - 10:40 **Global Shipping Think Tank Alliance, General discussion**

hosted by **ALAA M. MORSY**, Chairman of GSTTA

- Suggestions for the future sustainable development of the alliance
- Suggestions to enhance influence in the industry
- Sharing collaboration opportunities among members
- Volunteer to host next year's plenary meeting

10:40 - 11:00 **Coffee break and Group photos**

11:00 - 13:30 **Discussion Topic** | Sustainable Investments in Shipping: Balancing Profitability and Green Innovation

Speeches by participants

EGYPT — AASTMT - Arab Academy for Science, Technology & Maritime Transport

ALAA M. MORSY

Green Transition vs. Economic Constraints:
The Future of Sustainable Supply Chains

CHINA — CATS - China Academy of Transportation Sciences

XIAOLEI LIU

Exploring Innovative Models for Waterway Infrastructure Investment, Financing, and Green Development

SPAIN — CETMO - CENIT

JORGE SELFA CLEMENTE

Framing Ports and Shipping in the Western Mediterranean within Global Trends

GREECE — University of Piraeus

IOANNIS THEOTOKAS

Investments in Shipping: Approaches to Profitability and Sustainability

GERMANY — ISL - Institute of Shipping Economics and Logistics

BURKHARD LEMPER

Climate Targets for Maritime Shipping Are Hardly Achievable.
Ambitious Targets, Challenges and Solutions

GREECE — NKUA - National and Kapodistrian University of Athens

DIMITRIS GAVALAS

Green Gains: Aligning Profitability with Sustainable Investment in Ports and Shipping

HONG KONG, CHINA — PolyU Maritime Data and Sustainable Development Centre

DONG YANG

Decarbonizing Ports through Green Corridors:
Harnessing New Energy for Low-Carbon Shipping

ITALY — Port Network Authority of the Ionian Sea – Port of Taranto (former)

SERGIO PRETE

Port Generations

CHINA — SISI - Shanghai International Shipping Institute

JINGWEN ZHENG

The Process and Outlook of Greenization in Container Liner Shipping

13:30 - 14:30 **Light lunch**

Gallerie d'Italia in Naples | Top-floor terrace

14:30 - 16:00 **Discussion continues**

ITALY — Study Center ALIS

ANNA TEDESCO

The ALIS Cluster Intermodal System, Investments and Results

BELGIUM — University of Antwerp

JOOST HINTJENS

Volatility in Container Shipping Prices. Lessons from COVID-19

ITALY — Intesa Sanpaolo Banking Group

DANIELA CORSINI

Energy and Wars: How Infrastructure and Logistics Influence the New Global (Dis)Order

ITALY — SRM - Research Center for Economic Studies

ANNA ARIANNA BUONFANTI

Italian Ports: Traffic Trends and Impact of the Trade War

ITALY — SRM - Research Center for Economic Studies

OLIMPIA FERRARA

Impact of US Protectionist Trade Policies on Global Maritime Trade

16:00 - 16:30 **Summary, recommendation and closing ceremony**

16:30 - 17:30 **VISIT TO GALLERIE D'ITALIA MUSEUM**

The Gallerie d'Italia in Naples exhibits works from the historical-artistic heritage of Intesa Sanpaolo, in particular Neapolitan art from the 17th to 20th century.

20:00

MARITIME GALA DINNER

R.Y.C.C. Savoia | 13, Banchina Santa Lucia

The Reale Yacht Club Canottieri Savoia is an exclusive club in Naples, founded in 1893, located a few steps from Castel dell'Ovo and in the heart of the seafront.

Dress code: business formal

Friday July 4, 2025

09:30 - 13:30

ITALIAN MARITIME ECONOMY CONFERENCE 2025

Gallerie d'Italia in Naples | 177, via Toledo

This international conference is held annually in order to present the findings of the research project launched by SRM and called “Permanent Observatory on the Economy of Maritime Transport and Logistics”.

Working language: Italian

14:00 - 17:00

TECHNICAL VISIT TO THE PORT OF NAPLES BY SEA with the the Coast Guard ship

Meeting point: Gallerie d'Italia (entrance) | 177, via Toledo

Contents

Participants at the 9th Plenary Meeting

ALLIANCE MEMBER ORGANIZATIONS

ARAB ACADEMY FOR SCIENCE, TECHNOLOGY AND MARITIME TRANSPORT (AASTMT)
Alexandria, Egypt

CETMO - CENIT
Barcelona, Spain

CHINA ACADEMY OF TRANSPORTATION SCIENCES (CATS)
Beijing, China

INSTITUTE OF SHIPPING ECONOMICS AND LOGISTICS (ISL)
Bremen, Germany

NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS (NKUA)
Athens, Greece

POLYU MARITIME LIBRARY AND RESEARCH & DEVELOPMENT CENTRE
Hong Kong, China

SHANGHAI INTERNATIONAL SHIPPING INSTITUTE (SISI)
Shanghai, China

SRM
Naples, Italy

UNIVERSITY OF PIRAEUS
Piraeus, Greece

DELEGATES

XUEHANG BIAN
Director of Research Development Institute China Academy of Transportation Sciences (CATS) | **CHINA**

ANNA ARIANNA BUONFANTI
Senior Researcher, Maritime & Energy Service, SRM | **ITALY**

SALVIO CAPASSO
Head of Business & Territory Service, SRM | **ITALY**

CONSUELO CARRERAS
Senior Researcher, Maritime & Energy Service, SRM | **ITALY**

MASSIMO DEANDREIS
General Manager, SRM | **ITALY**

OLIMPIA FERRARA
Head of Maritime Economy Observatory, SRM | **ITALY**

DIMITRIS GAVALAS
Associate Professor, Ports Management and Shipping Dpt. National and Kapodistrian University of Athens (NKUA) | **GREECE**

BURKHARD LEMPER
Managing Director, ISL - Institute of Shipping Economics and Logistics | **GERMANY**

ZHENGYU LIU
Department Director Shanghai International Shipping Institute | **CHINA**

XIAOLEI LIU
Director of Research Institute China Academy of Transportation Sciences (CATS) | **CHINA**

CLAUDIO LUBATTI
Head of ESG and Innovation in Maritime Logistics Office, SRM | **ITALY**

ALAA M. MORSY
Dean, Port Training Institute & Maritime Research & Consultation
Center of Arab Academy for Science, Technology & Maritime Transport (AAST&MT) | **EGYPT**
Chairman of GSTTA

ALESSANDRO PANARO
Head of Maritime & Energy Service, SRM | **ITALY**

ENRIC PONS
GTMO5+5 Coordinator CETMO-CENIT | **SPAIN**

SERGIO PRETE
Member of the Expert Commitee, SISI and
Former President of Port Network Authority of the Ionian Sea | **ITALY**

DARIO RUGGIERO
Senior Researcher, Maritime & Energy Service, SRM | **ITALY**

JORGE SELFA CLEMENTE
Study Coordinator CETMO - CENIT | **SPAIN**

IOANNIS THEOTOKAS
Chair of the Department of Maritime Studies, University of Piraeus | **GREECE**

SIYUAN WANG
Research Associate China Academy of Transportation Sciences (CATS) | **CHINA**

DONG YANG
PolyU Maritime Data and Sustainable Development Centre | **HONG KONG, CHINA**

JINGWEN ZHENG
Deputy Director, International Shipping Research Department
Shanghai International Shipping Institute | **CHINA**

GUEST SPEAKERS

DANIELA CORSINI
Senior Economist, Intesa Sanpaolo Banking Group | **ITALY**

JOOST HINTJENS
Lecturer/Researcher, Department of Transport and Regional Economics, University of Antwerp | **BELGIUM**

MARIO MATTIOLI
President of FEDERMARE | **ITALY**

ANNA TEDESCO
Study Center ALIS | **ITALY**

ATTENDEES

ANDREA ANNUNZIATA
President of the Port Network Authority of the Central Tyrrhenian Sea | **ITALY**

MARCO FERRETTI
Professor, University of Naples 'Parthenope | **ITALY**

GIUSEPPE IANNACCONE
Strategic Analysis Specialist, FS Logistix | **ITALY**

PAUL KYPRIANOU
External Relations Manager, Grimaldi Group | **ITALY**

ANTONELLA LOMBARDI
Head of Strategic Analysis, FS Logistix | **ITALY**

FLAVIA MELILLO
Legal Specialist, ANIA | **ITALY**

FABRIZIO MONTICELLI
Chief Executive Officer, ForMare | **ITALY**

TIZIANA MURGIA
Communication and environment manager, Assoporti | **ITALY**

SAVERIO ORALDO
University of Naples 'Federico II'. Member of SRM's #Meets4Future community | **ITALY**

ALBERTO PERA
Economic Analysis Department, Ports of Genoa | **ITALY**

MARCELLO RISITANO
Professor, University of Naples 'Parthenope' | **ITALY**

PAOLO SELLARI
Professor, University of Rome 'Sapienza' | **ITALY**

LUCA SESSA
Senior Economist, Banca d'Italia | **ITALY**

LUCIA SIMONETTI
Professor, University of Naples 'Federico II' | **ITALY**

ONLINE ATTENDEES

TAO JI

Customer Manager, Drewry Shipping Consultants Ltd. | **SHANGHAI**

JO JI SUNG

Director of International Supply Network Department, Maritime Research Division, Shipping Logistics, KMI | **SOUTH KOREA**

WEI CUI

Head of Greater China Region, CrimsonLogic | **SINGAPORE**

TAHEYA ELSHERBENY

International Cooperation and Career Development Coordinator, Port Training Institute, AASTMT | **EGYPT**

TANG HAO

Research Associate, Institute of Shipping Development, Dalian Maritime University | **CHINA**

XIAOLONG SONG

Sales Director, Greater ChinaGlobal Maritime Economics & Country Risk, S&P Global Market Intelligence | **CHINA**

HEE LYE JASON TEO

Manager, Centre for Maritime Studies, NUS | **SINGAPORE**

XIANG WANG

General Manager, VesselsValue (Veson Nautical) | **CHINA**

Welcome Speech

Good morning, everyone.

It gives me a great pleasure and a deep sense of honor that I welcome you all to this, our first plenary meeting under my chairmanship. To all our distinguished members present today, your esteemed presence powerfully demonstrates the unity and dedicated resolve of the Global Shipping Think Tank Alliance.

I would like to extend a special thank you to **SRM** for generously hosting this crucial meeting here in Naples. Your hospitality and support are invaluable to the continued success of our alliance.

Today, I am honored to formally welcome our newest member to the GSTTA family: **CETMO-CENIT - Think Tank in Transport and Mobility**. Your expertise and insights will undoubtedly enrich our discussions and collaborations, and we look forward to integrating your contributions into our shared goals.

Our recent strategic initiatives meeting clarified GSTTA's mission: to be the leading maritime and logistics intelligence hub. We'll achieve this with concrete actions. First, a strong promotion strategy will enhance our global visibility through improved newsletters, website upgrades, and proactive industry recruitment. We're also considering an 'associate member' category to foster deeper engagement. Our aim is to attract a broader range of distinguished members from research, academia, and industry, connecting these key sectors.By actively fostering unparalleled knowledge exchange

and collaborative opportunities, including the potential **transformation of our quarterly newsletter into a scientific journal** with a dedicated scientific committee, we will ensure that our alliance remains at the absolute forefront of shaping the future of global maritime transport.

Before the conclusion of this meeting, I eagerly look forward to receiving all suggestions and comments regarding this vision and the proposed actions from each member. Our main **strategy** will be based on interactive and collaborative efforts **among** member, with each individual contributing actively to enhancing GSTTA's global brand and reputation

Finally, I want to extend my sincere appreciation to the **Shanghai International Shipping Institute** team for their continuous efforts to enhancing GSTTA.

Thank you all for being here. Let's make this a productive and insightful meeting.

Alaa M. Morsy
Chairman of GSTTA

GLOBAL SHIPPING THINK TANK ALLIANCE

GSTTA Strategic Meeting

Thank you

INTESA SANPAOLO

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Welcome

CETMO

Meeting Agenda

GSTTA Objectives

Future Vision
2025-2028

Members Feedback
Collaborative Action Plan

1- Objectives

Sharing research achievements

Hot Topics Discussion

Enhancement of Cross-Region Exchanges and Cooperation

2- Future Vision

2025 - 2028

Marketing Strategies for Expansion

Membership

Scientific Journal

Marketing Strategies for Expansion

1- Social Media

LinkedIn

MAY 2025

By Port training Institute, AASTMT

Marketing Strategies for Expansion

2- Newsletter

- Members Engagement
- Public Subscription
- Schedule (Monthly/Quarterly)

Marketing Strategies for Expansion

3- Website Upgrade

AUG 2025

Marketing Strategies for Expansion

3- Website Upgrade

AUG
2025

Membership

1- Current Membership Categories

UTEP HUNT INSTITUTE FOR GLOBAL COMPETITIVENESS

THE HONG KONG POLYTECHNIC UNIVERSITY 香港理工大學

S&P Global Market Intelligence

KMI

Marsoft

Drewry

NUS

DNV

CrimsonLogic

Membership

2- Potential New Categories

Freight Forwarder

Port Authority

MAERSK

msc

Hapag-Lloyd

COSCO SHIPPING

CMA CGM

Shipping Line

Membership

3- Members Directory

Contact Person for Each Member

Scientific Journal

Publication Schedule

Quarterly – Semi Annual - Annual

Scientific Committee

Managing Director
Editor-in-Chief
Editors

Citation Procedures

Members Feedback

Suggestions and Collaborative Action Plan

Next Plenary Meeting

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THANK YOU

Annual Report 2025: Global Shipping Think Tank Alliance

Presented by Liu Zhengyu, Deputy Secretary General of GSTTA

Esteemed Members and Friends,

Welcome to the 9th Plenary Meeting of the Global Shipping Think Tank Alliance. I am Livia, from Shanghai International Shipping Institute. Please allow me, on behalf of the Secretariat, to extend a warm welcome and sincere gratitude to our member representatives— both attending in person and joining us online —as well as special guests from different regions and countries. It is with great honor and pleasure that we gather here today in the historic port city of Naples – so far the only city to host our Alliance twice. Our profound gratitude extends to SRM for their exceptional hospitality and steadfast partnership.

We would like to begin our report by acknowledging the visionary leadership of our Chairman, Prof. Alaa Morsy, whose dedication in his inaugural year has steered the Alliance toward new horizons. We also want to pay tribute to our former Chairman Prof. Burkhard Lemper, whose foundational contributions remain instrumental to our collective progress.

Against a backdrop of shifting trade flows and geopolitical pressures, the maritime industry continues to navigate accelerating green and digital transitions. Building on the major frameworks established at COP29 and MEPC 83, the theme of this year's meeting is closely aligned with the imperative of global decarbonisation, reinforcing GSTTA's commitment to pioneering sustainable solutions. We hope this meeting provides valuable insights and fosters productive deliberations for all participants.

Thanks to the hard work and collaboration of our members, the past year has seen us reach several significant milestones. GSTTA members contributed their expertise to critical discussions on climate resilience at MARLOG 2024 and COP29. The SISI-KMI International Shipping Forum celebrated its 15th anniversary, strengthening its role as a vital bridge for maritime collaboration between China and Korea. Our research partnership with SRM has grown stronger, and the studies of our members will be featured in the latest edition of Italian Maritime Economy.

Based on members' suggestions from last year's meeting, our NEWSLETTER has been published for five issues, promoting information sharing and exchange among members. Chairman ALAA took a technical tour of Shanghai's Waigaoqiao Terminal and NeZha Port Technology; Dr. Li Haobin from NUS lectured on digital twinning at SISI; KMI participated in the Asian Multimodal Transport Expo

which was co-organized by SISI; WMU Prof. Chen Gang offered a seminar on synchronized digital freight at SISI; and study programs such as Korean students' visit to Yangshan Port's smart terminal was organized. These initiatives reflect our ethos of open knowledge-sharing.

Moreover, our Alliance continues to grow. We are delighted to welcome four new institutions to our Alliance: they are University of Piraeus, National and Kapodistrian University of Athens, Vessels Value and CETMO CENIT. Representatives from three of these organizations join us in person today—Prof loannis Theotokas, Prof. Dimitris Gavalas, Mr. Enric Pons and Mr. Jorge Selfa Clemente, and Mr. Xiang Wang from Vessels Value joins online—Let's warmly welcome them.

Looking ahead, the Alliance will build on this momentum by focusing on three strategic priorities: increasing our global influence by partnering with leading international bodies; encouraging international cooperation on studies and products focusing on cutting-edge agendas such as digitalization, decarbonisation and supply chain resilience; and exploring sustainable development mechanism of the alliance.

Next year, the Global Shipping Think Tank Alliance will celebrate its 10th anniversary. We hope that under the leadership of Prof Alaa, the Alliance will fully harness its collective expertise to drive innovation and best practices across the shipping sector. By actively convening think tanks and facilitating strategic collaborations, we will amplify the Alliance's positive impact—advancing open knowledge sharing, fostering mutually beneficial partnerships, and ultimately powering the sustainable growth of global maritime industry.

In the end, I wish this meeting a complete success, and I wish all the guests a happy meeting, a good trip and a full benefit.

The GSTTA Secretariat

Shanghai International Shipping Institute (SISI)

9th Plenary Meeting of Global Shipping Think Tank Alliance

July 3-4, 2025
Naples, Italy

Delegate Speaker Presentations


Presentation of the
12th Annual Report
Italian Maritime Economy
Italian ports:
traffic trends and impact
of the trade war
Anna Arianna Buonfanti
Senior Researcher,
Maritime & Energy Service, SRM
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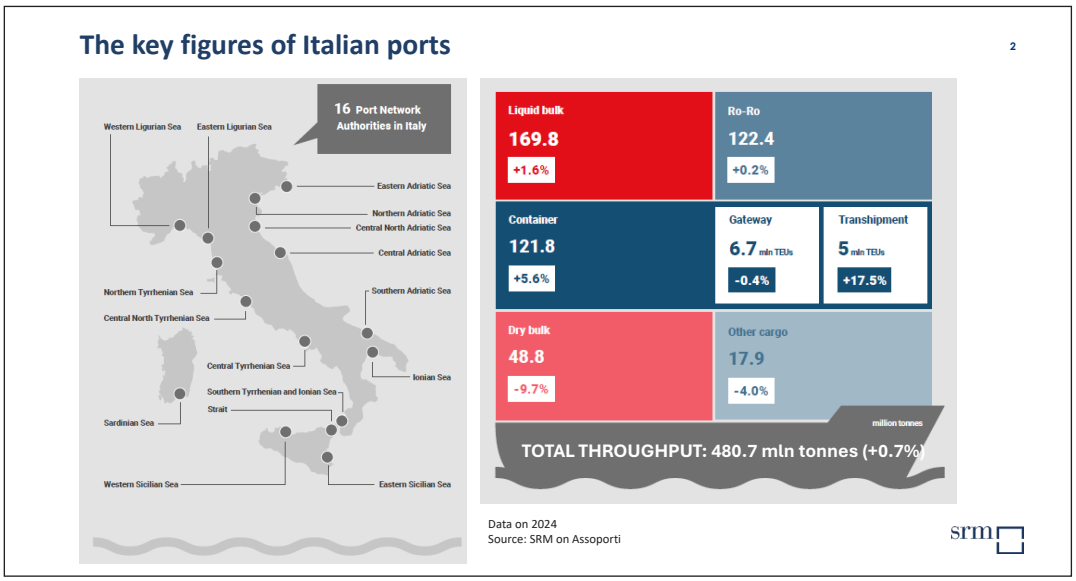
Naples, July 3, 2025
9th Plenary Meeting of Global Shipping Think Tank Alliance


The key figures of Italian ports
2
16 Port Network Authorities in Italy
Western Ligurian Sea
Eastern Ligurian Sea
Eastern Adriatic Sea
Northern Adriatic Sea
Central North Adriatic Sea
Central Adriatic Sea
Northern Tyrrhenian Sea
Central North Tyrrhenian Sea
Southern Adriatic Sea
Central Tyrrhenian Sea
Ionian Sea
Southern Tyrrhenian and Ionian Sea
Strait
Sardinian Sea
Western Sicilian Sea
Eastern Sicilian Sea
Liquid bulk
169.8
+1.6%
Ro-Ro
122.4
+0.2%
Container
121.8
+5.6%
Gateway
6.7 mln TEUs
-0.4%
Transhipment
5 mln TEUs
+17.5%
Dry bulk
48.8
-9.7%
Other cargo
17.9
-4.0%
million tonnes
TOTAL THROUGHPUT: 480.7 mln tonnes (+0.7%)
Data on 2024
Source: SRM on Assoporti
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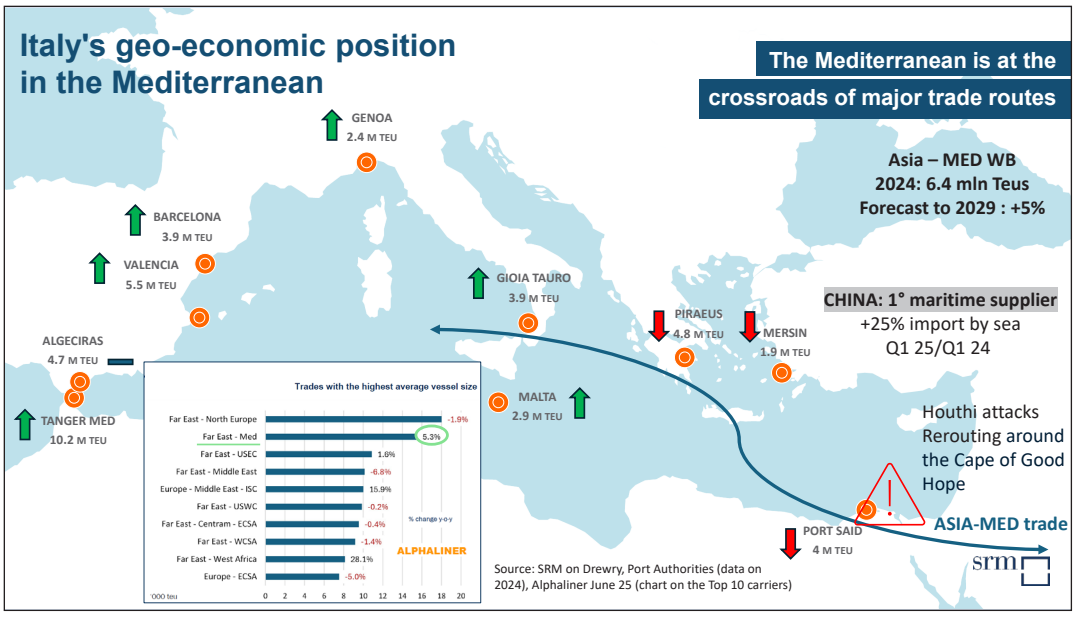
Italy's geo-economic position
in the Mediterranean
The Mediterranean is at the
crossroads of major trade routes
GENOA
2.4 M TEU
BARCELONA
3.9 M TEU
VALENCIA
5.5 M TEU
ALGECIRAS
4.7 M TEU
TANGER MED
10.2 M TEU
GIOIA TAURO
3.9 M TEU
MALTA
2.9 M TEU
PIRAEUS
4.8 M TEU
MERSIN
1.9 M TEU
PORT SAID
4 M TEU
Asia – MED WB
2024: 6.4 mln Teus
Forecast to 2029 : +5%
CHINA: 1° maritime supplier
+25% import by sea
Q1 25/Q1 24
Houthi attacks
Rerouting around
the Cape of Good
Hope
ASIA-MED trade
Trades with the highest average vessel size
Far East - North Europe -1.9%
Far East - Med 5.3%
Far East - USEC 1.6%
Far East - Middle East -6.8%
Europe - Middle East - ISC 15.9%
Far East - USWC -0.2%
Far East - Centram - ECSA -0.4%
Far East - WCSA -1.4%
Far East - West Africa 28.1%
Europe - ECSA -5.0%
% change y-o-y
ALPHALINER
000 teu
0 2 4 6 8 10 12 14 16 18 20
Source: SRM on Drewry, Port Authorities (data on 2024), Alphaliner June 25 (chart on the Top 10 carriers)
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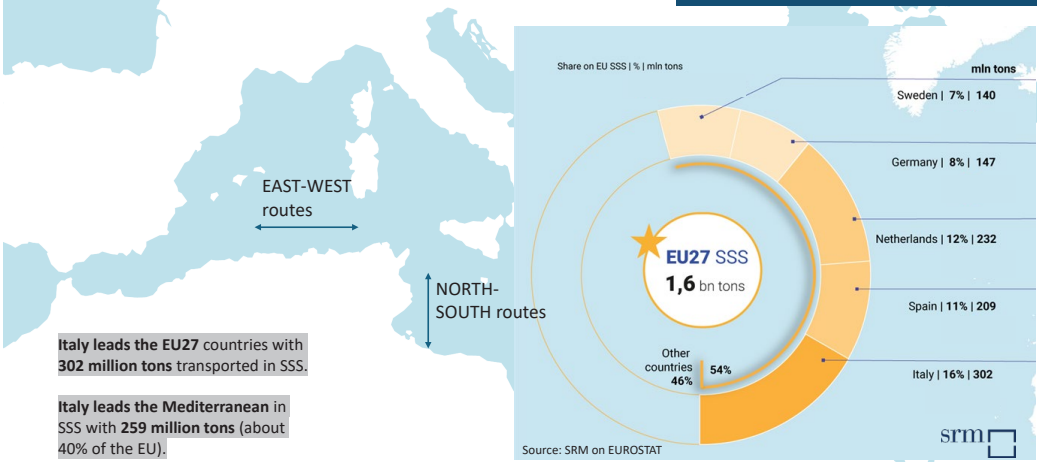
Italy's geo-economic position in the Mediterranean

The Mediterranean is at the crossroads of major trade routes



Italy leads the EU27 countries with **302 million tons** transported in SSS.

Italy leads the Mediterranean in SSS with **259 million tons** (about 40% of the EU).

Italy's geo-economic position in the Mediterranean

The Mediterranean is at the crossroads of major trade routes

US: 1° maritime customer accounting for **24% of our maritime export**
-5% export by sea
Q1 25/Q1 24

TRANSATLANTIC trade

WB Transatlantic
2024: 3.3 mln Teus
Forecast to 2029 : +1%

US "trade war"
Threat of protectionist tariffs against the EU

Seaborne import-export Italy-US in 2024: Top 5 products

Products	Export (mld€)	% on total export by sea
Motor cars and other motor vehicles	3.2	8%
Beverages and spirits	2.9	8%
Electrical machinery and equipment	2.0	5%
Furniture; Bedding; Lamps and Lighting fittings	1.5	4%
Machinery, plant or laboratory equipment	1.2	3%

Total exports: €37.4 bn

Products	Import (mld€)	% on total import by sea
Mineral fuels, mineral oils and products of their distillation	5.1	48%
Natural or cultured pearls, precious or semi-precious stones, precious metals	0.5	5%
Plastics and articles thereof	0.5	5%
Fruit and nuts	0.4	4%
Oil seeds and oleaginous fruits	0.4	3%

Total imports: €10.6 bn

Source: SRM on Drewry, EUROSTAT

Maps of challenges and opportunities for Italian ports

Geopolitical tensions

US announced tariffs

ETS impact (estimated $ 4bn in 2025) – ECA area

Conflicts

Presence of major logistic players

Growth of SSS

Green investments

New Corridors

Development of container traffic

Intermodal rail transport

Italian port infrastructure: planned investments of **€12.1 billion.**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Thank you for your attention
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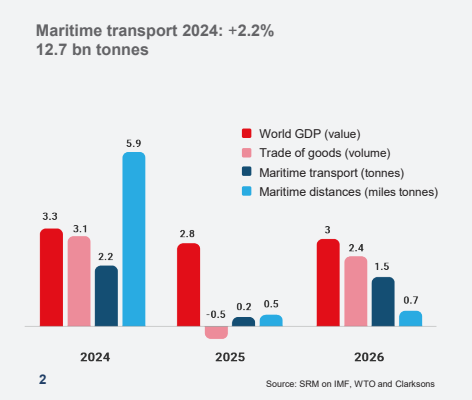
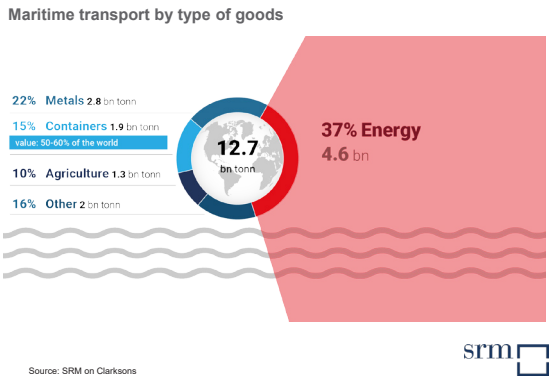
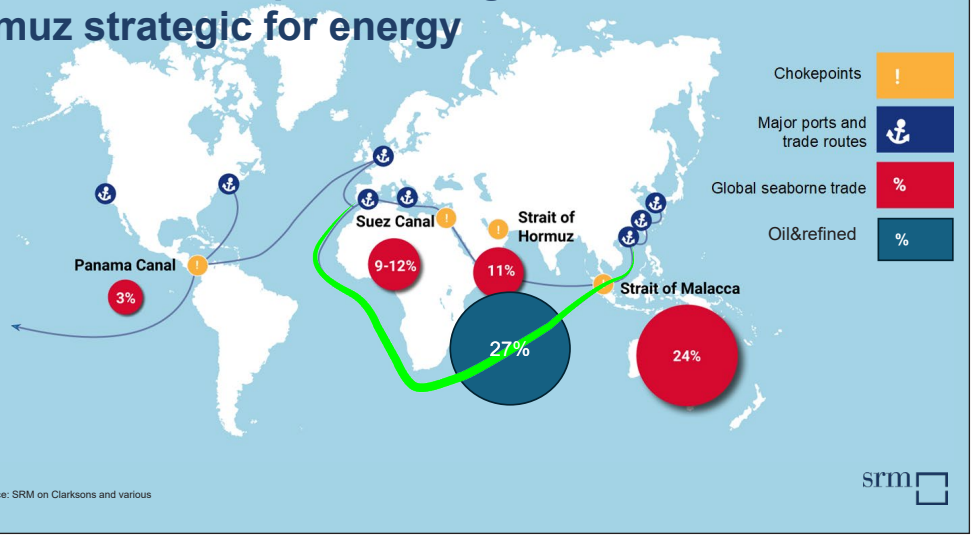
The global economy and maritime transport continue to grow

But instability remains





Where does trade pass through? Hormuz strategic for energy



3 Source: SRM on Clarksons and various

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US tariffs are altering the balance of trade

The US **first importer worldwide** ($3.3 tn in 2024) and **second exporter** ($2.1 tn)

The arrow indicates the change in ranking compared to Dec 24.

Import USA from:	1st Mexico	2nd Canada	3rd China ↓	12th Italy ↓
$ bn	173.2	138.4	128	26.1
var % Apr 24/Apr 25	+6.5%	+2.6%	-0.9%	+4%
% on total	14.1%	11.3%	10.5%	2.1%

Export USA vs:	1st Canada	2nd Mexico	3rd China	5th Netherlands
$ bn	115	111.9	40	30.7
var % Apr 24/Apr 25	-1.5%	+2.1%	-16.7%	+4.8%
% on total	16.1%	15.7%	5.6%	4.3%

4 Source: SRM on US Census Bureau

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SHIPS for America Act

The contribution required to "Chinese" ships

1. Ships of Chinese operators or **shipowners** calling at US ports

From 14 October, tax of **50$** per net tonne of the vessel. Progressive over three years: **it will rise from $80 from April 17, 2026**, to **$110 from April 17, 2027 and to $140 from April 17, 2028**. This fee will be charged up to **five times a year** for each ship.

2. Operators (excluding US operators as long as they are owned by at least 75% US citizens) of **ships built in China**

The higher figure among: **$18 per net ton or $120 per container unloaded; The figures will rise every six months** until **April 2028** to **$33 per net ton or $250 per container unloaded, respectively.**

3. Operators of Car Carriers and Ro-Ro built abroad

To these ships will be charged a duty of **$14/net ton for each port of call (new proposal compared to $150 per CEU).**

7-9% of calls in the US will be subject to this measure

Share of Chinese-built Containerships in Carrier fleets and orderbooks

	Fleet	Orderbook
CMA CGM	41%	54%
COSCO	64%	100%
Evergreen Marine	14%	17%
Hapag-Lloyd	21%	89%
HMM	6%	0%
Maersk	20%	79%
MSC	24%	92%
ONE	27%	56%
Yang Ming	8%	0%
ZIM	41%	0%

Source: SRM on CNBC

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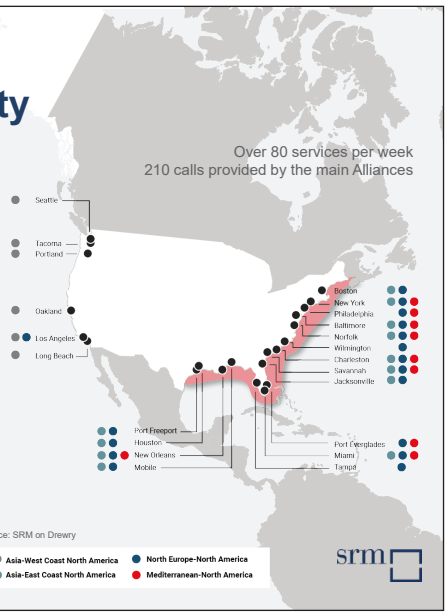
The real assets of the USA: competitiveness and connectivity

U.S. container ports are among the most connected in the world to both Asia and Europe, an asset for both the U.S. and shipping and the economy in general.

Even if there are no US players in the big alliances

Over 80 services per week
210 calls provided by the main Alliances



Source: SRM on Drewry

Asia-West Coast North America
Asia-East Coast North America
North Europe-North America
Mediterranean-North America

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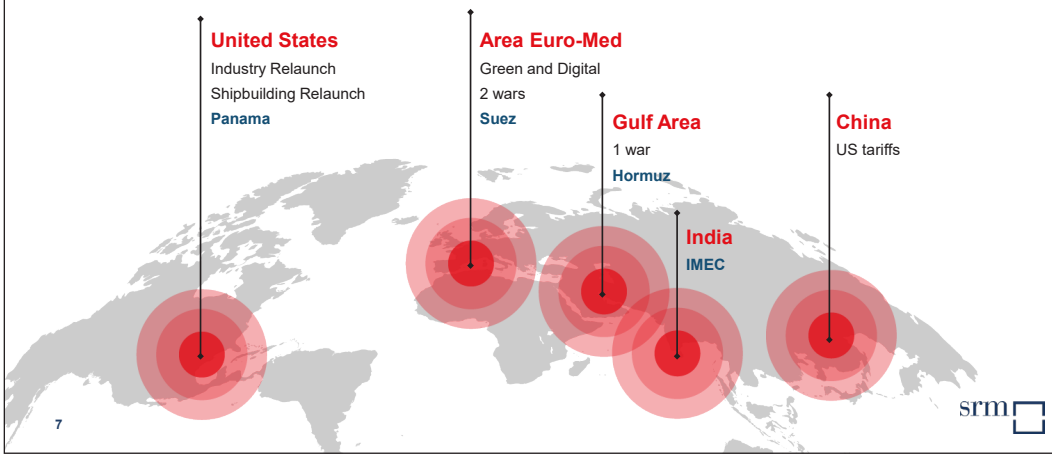
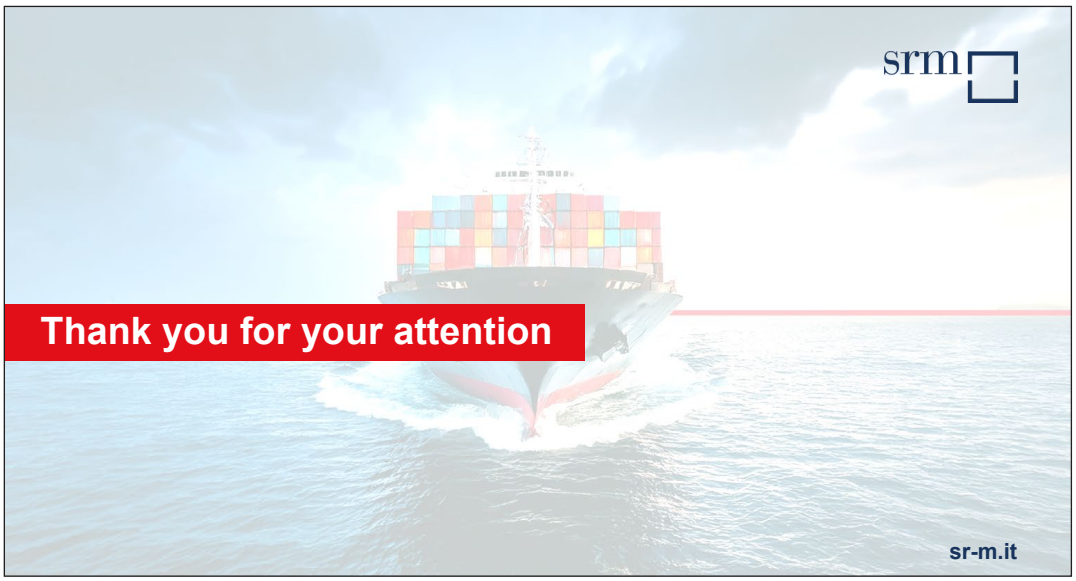
The global scenario

A complex geopolitical framework





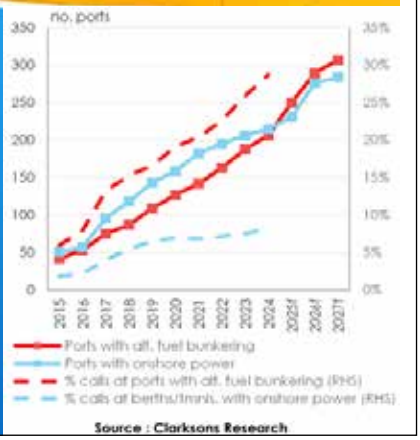

HELLENIC REPUBLIC
National and Kapodistrian University of Athens
Global Shipping Think Tank Alliance
9th Plenary Meeting
Naples, July 2-5, 2025
Dimitris Gavalas
Associate Professor


Green Gains: Aligning Profitability with Sustainable Investment in Ports and Shipping


The Fueling Transition in Global Shipping
Importance of reducing GHG emissions (1.05bn tonnes CO_2e in 2024)
Investment focus: Alternative-fuel vessels vs shoreside infrastructure
8% of current fleet GT, 53% of tonnage on order
Projected >20% fleet by 2030

Shoreside Fueling Facilities

- 210 active ports (2015: 42 → 2027: 307)
- Focus on LNG, with methanol, ammonia, H_2 emerging
- 5% of world ports with active/planned facilities
- 216 ports active (2015: 51 → 2027: 284)
- Key regions: Asia-Pacific (136), NW Europe (92), N. America (37)



Port Call Activity Trends

29% OF CALLS BY TONNAGE AT ALTERNATIVE FUEL PORTS (VS 6% IN 2015)

8% OF TONNAGE VISITS TO OPS-ENABLED TERMINALS (VS 2% IN 2015)

13% OF PORTS HAVE ≥1 GREEN FACILITY

TOP 100 PORTS: 86 HAVE ACTIVE/PLANNED GREEN INFRASTRUCTURE

INCLUDES EGCS, BALLAST, CARBON CAPTURE, WIND SUPPORT

Why Ports Matter

- Overview of the need for emissions reduction in global shipping
- Focus has been on vessels, but ports are equally critical
- Ports, terminals, and berths must align with vessel technology for real progress

Port Infrastructure in Numbers

5,944 active ports tracked globally

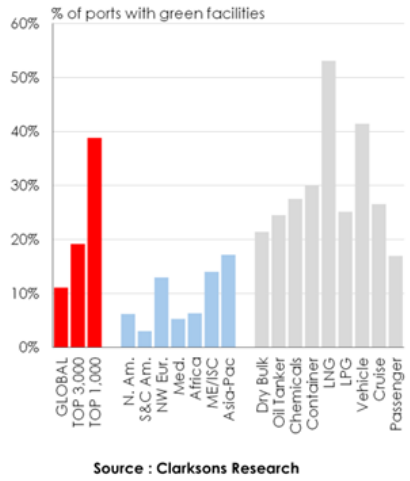
Port capabilities by sector:

- 2,079 dry bulk
- 1,959 passenger
- 1,440 oil
- 1,235 container

Specialized: 867 cruise, 228 LNG

What Constitutes a "Green" Port?

- Definition: Ports with one or more of the following:
  - Alternative fuel bunkering
  - Onshore power supply (OPS)
  - Exhaust gas cleaning
  - Ballast water discharge
  - Carbon capture
  - Windfarm support
- 658 ports globally (11%) have active or proposed facilities



Source : Clarksons Research

Where Are the Green Ports?

Asia-Pacific leads with 17% of ports having green facilities

NW Europe: 13%, Middle East/ISC: 14%

Lagging regions: N. America, S&C America, Africa, Med. (<7%)

Which Port Sectors Are Going Green?

Top 1,000 ports: 39% have green facilities

Container ports: 30%

Oil ports: 25%

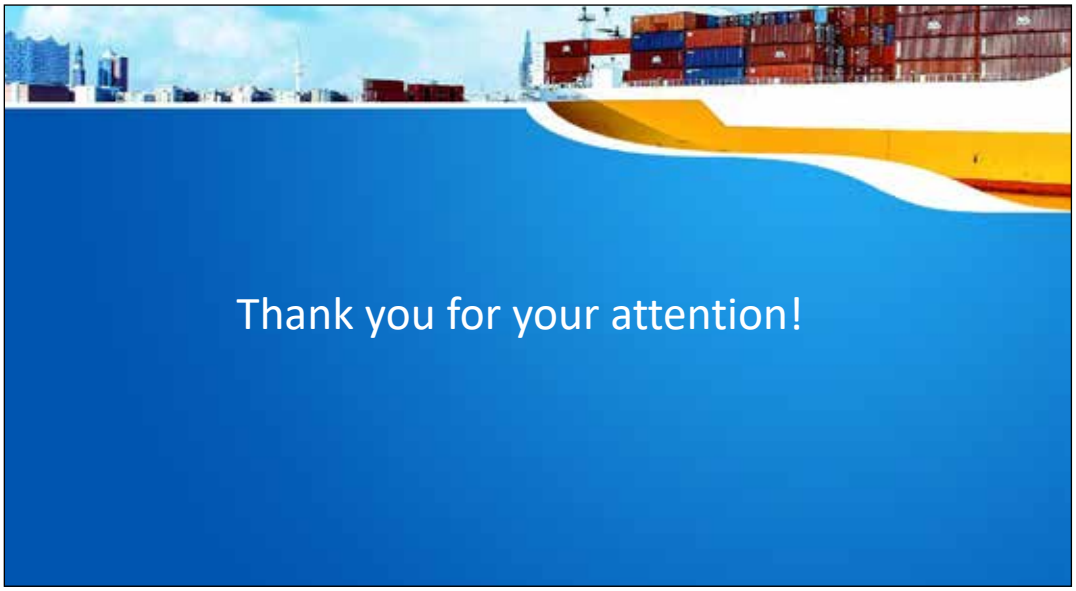
Dry bulk ports: 21%

Cruise ports: even higher share (not quantified)

Summary & Strategic Considerations

- Green investment is increasing, but unevenly distributed
- Priority focus: larger ports, key sectors, high-traffic locations
- Leverage data to plan investments
- Collaboration needed across governments, port authorities, and shipping lines

Ports are not just endpoints in supply chains; they are strategic enablers of decarbonization, innovation, and resilience.


Thank you for your attention!

Climate targets for maritime shipping are hardly achievable

Ambitious targets, challenges and solutions

Prof. Dr. Burkhard Lemper
Institute of Shipping Economics and Logistics, Bremen

Fossil fuel ship propulsion systems

1 Focus on climate emissions from shipping

World population
1970: 3.696 billion 2023: 8.09 billion

Transport performance (World Seaborne Trade)
1970: 10.666 trill. tonne-miles 2023: 62.037 trill. tonne-miles

Consumption of bunker oils in maritime transport
1972: 119 million tonnes 2023: 220.8 million tonnes
8 billion tonnes of bunker oil in the last 50 years

CO_2 emissions in maritime transport
1970: 353.8 million tttw 2022: 709.7 million tttw
in the last 50 years ~ 25 billion tonnes of CO_2

2 The IMO's long journey to the Kyoto Protocol

1973 - Establishment of the Marine Environment Protection Committee (MEPC)
- International Convention for the Prevention of Pollution from Ships

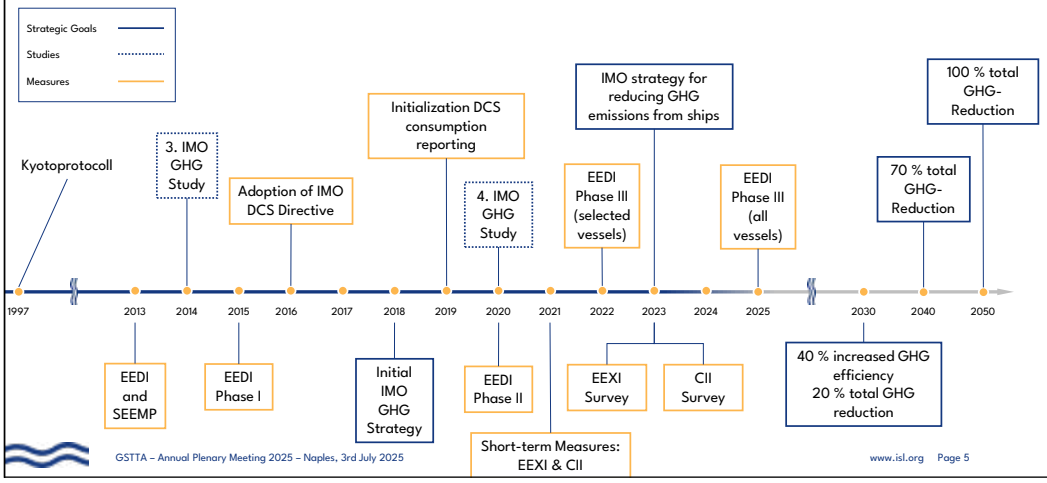
1979 First World Climate Conference (WCC) Geneva

1988 Second World Climate Conference in Toronto
„Dangers to the Earth's atmosphere already so serious ... that immediate action is essential "

1989 World Summit on Environment and Development in Rio den Janeiro (UNFCC)
(154 countries sign the Framework Convention on Climate Change)

1997 UN Climate Conference in Kyoto
The international community recognizes global climate change as a serious problem and is committed to action.
It was agreed that 37 industrialized countries and the European Union would reduce emissions of the six most dangerous greenhouse gases (Appendix A; GHGs: CO2, CH4, N2O; HFCs; PFCs; SF6) by an average of 5.2% compared to 1990 levels.
Kyoto Protocol, according to Article 2 paragraph 2, directly addresses the IMO to continue limiting or reducing greenhouse gases.

3 The IMO's long road to climate strategy



4 Fleet expansion with alternative fuels

Existing Fleet with alternative fuels **(Mid of June 2025)**

Main Fuel	Total Number of ships	Less 300 gt	Total Fleet 300 gt+	Of which offshore 300 gt+	Of which Other NC	Od which dredger	Of which tugs	~ Fleet (Bulker, Cont., GenCarg., Cruise, Ferries) 300gt+
Ammonia (NH_3)	4	1	3	3	-		1	-
Methanol (CH_3OH)	63		63	1	-		1	61
H_2	18	3	15	3	3	1	1	7
Biofuel	197	3	194	7	-	6	13	168
Sum of„ Green Fuels	***282***	***7***	***275***	***14***	***3***	***7***	***16***	***238***
	1,390	4	1,386	45	6	13	30	1,292
	141	-	141	-	-	-	-	141
Ethane (C_2H_6)	29	-	29	-	-	-	-	29
CNG	4	-	4	2	-	-	-	2
Nuklear	**11**	-	11	-	10	-	-	1
Sum of Alternativ fuels	*1,857*	***11***	***1,846***	***61***	***19***	***20***	***46***	***1,700***
Conventional	*82,151*	*19,786*	*62,365*	*5,821*	*499*	*548*	*5,255*	*50,242*
Total„ Knowh	*84,008*	***19,797***	***64,211***	***5,882***	***518***	***568***	***5,301***	***51,942***
	29,674	*10,224*	*19,462*	*1,978*	*916*	*1,290*	*1,278*	*14,000*
Total	*113,682*	***30,021***	***83,661***	***7,860***	***1,434***	***1,858***	***6,579***	*65,930*
	0.3%	**0.0%**	**0.4%**	**0.2%**	**0.6%**	**1.2%**	**0.3%**	**0.5%**

Source: ISL, based on data of Clarkson Research

4 Fleet expansion with alternative fuels

Alternative fuels in the order book (without „Options“ (49 altern. Fuels of 162 total)) **Mid of June 2025**

Main Fuel	Number of ships	2025	2026	2027	2028	2029	2030+	% share of „known“
Ammonia (NH_3)	44	2	16	15	9	2		0,8%
Methanol (CH_3OH)	334	55	107	82	62	23	5	6,0%
H_2	37	10	11	5	6	1	4	0,7%
Biofuel	9	6	3	-	-	-	-	0,2%
Sum of„ Green Fuels“	*428*	*73*	*141*	*102*	*77*	*26*	*9*	*7,7%*
	1.016	210	220	268	217	76	25	18,2%
	141	11	37	72	20	1	-	2,5%
Ethane (C_2H_6)	**72**	11	17	40	4			1,3%
Nuklear	**4**	-	1	1	1	-	1	0,1%
Sum of Alternativ fuels	***1.620***	***305***	***416***	***483***	***319***	***103***	***35***	***29,0%***
Conventional	*3.958*	*1.258*	*1.418*	*926*	*315*	*30*	*4*	*71,0%*
Total„ Known	***5.578***	***1.563***	***1.834***	***1.409***	***634***	***133***	***39***	***100,0%***
	2.283	*899*	*437*	*142*	*27*	*9*	*3*	
Total	***7.129***	***2.462***	***2.271***	***1.551***	***661***	***142***	***42***	-
	7,7%	4,7%	7,7%	7,2%	12,1%	19,5%	23,1%	-

Container fleet with alternative fuels

Mid of June 2025

Main Fuel	Number of ships	Built 2020+	2010/ 2019	2000/ 2009	Up to 1999	Order book
Ammonia (NH_3)	-	-	-	-	-	1
Methanol (CH_3OH)	28	27	1	-	-	175
H_2	-	-	-	-	-	2
Biofuel	43	3	18	22	1	
Sum of„ Green Fuels“	*72*	*30*	*19*	*22*	*1*	*178*
	193	181	10	1	1	345
	-	-	-	-	-	
Ethane (C_2H_6)	-	-	-	-	-	
Nuklear	-	-	-	-	-	
Sum of Alternative fuels	***265***	***211***	***29***	***23***	***2***	***523***
Conventional	*6,434*	*1,231*	*2,028*	*2,523*	*652*	*344*
Total„ Known	***6,699***	***1,442***	***2,057***	***2,546***	***654***	***867***
	203	*65*	*86*	*412*	*11*	*25*
Total	***6,902***	***1,507***	***2,143***	***2,587***	***665***	***892***
	1.1%	2.1%	0.9%	0.9%	0.2%	20.5%

Where is the journey heading?

Shipowners are facing challenges and important decisions

- Which technological innovations will best help to achieve emission targets?
- Which fuels will prevail?
- How is regulation changing?
- How do I have to decide today for the day after tomorrow?

Result: order decisions are made conservatively

- Order book is dominated by fossil fuels
- LNG bridging technology is gaining in importance despite emissions problems
- Sustainable, alternative fuels are also a niche phenomenon in the short term

5 Availability of alternative fuels

Hydrogen as an energy source of the future (electricity-based synthetic fuels)

- Hydrogen (H_2); Ammonia (NH_3); e-diesel (CnH_2n+2); e-kerosene ($C_{10}H_{22}$ to $C_{16}H_{34}$), … etc.
- Depending on the specific application, only around 16% to 48% of the electrical energy used is converted into useful energy.
- E-fuels, at least insofar as they are currently produced in Germany, still have a clearly negative carbon footprint compared to the fossil reference.
- According to DNV, 44 to 63 million tonnes (oil equivalents) of carbon-neutral fuels will be available worldwide in 2030, of which shipping alone (depending on the reductions in fuel consumption achieved by then) will require 10% to 100% in order to achieve the IMO's target of reducing total CO2 emissions from shipping by 20% by 2030 compared to 2008 levels.

5 Availability of alternative fuels

Hydrogen as the energy carrier of the future (electricity-based synthetic fuels)

- According to an updated target from the **EU Commission's REPowerEU plan**, around 20 million tonnes of green hydrogen (10 million tonnes of own production + 10 million tonnes of imports) are expected in the EU by 2030.
- However, a separate **model calculation by the Commission** from 2023 concludes that hydrogen imports will be relatively modest and below 10 million tonnes by 2040.
- In its own analysis, the **EU Court of Auditors** assumes that the production target of 10 million tonnes, which could require up to 140 GW of electrolyser capacity (input), will probably not be reached by 2030.
- An analysis by **McKinsey** from autumn 2024 according to which just 12-18 million tonnes p.a. (based on the completion rate of renewable energy projects) of the announced demand of 48 million tonnes p.a. by 2030 can be provided for the supply of 'clean' hydrogen worldwide.

Conclusion

- The climate gases produced by shipping are increasingly the focus of public attention.
- The IMO was not directly addressed by the Kyoto Protocol to reduce greenhouse gases until late, but then initially focussed on studies and air pollutants (SOx, NOx, PM).
- Driven by the EU's activities to be climate-neutral by 2050, the IMO is following its climate strategy (without the EU's activities, the IMO's target for climate neutrality in maritime shipping would be 2100).
- The clear majority of ships in maritime transport still operate with conventional fuels. These fuels also dominate in newbuilds, especially when propulsion systems that are not yet powered by climate-neutral LNG are taken into account.
- The majority of available marine fuels are not yet climate-neutral, meaning that overall, there is currently no visible reduction in greenhouse gas emissions from the maritime shipping sector.
- One ray of hope is the emerging trend towards the widespread retrofitting of engines in the existing fleet with alternative fuels such as methanol and ammonia.
- A policy focusing on sustainable alternative fuels requires significant efforts to provide the necessary fuels in order to achieve the climate targets on time.

Many thanks for your attention!

Innovative Models of Investment, Financing and Green Development for Waterway Infrastructure

China Academy of Transportation Sciences

Liu Xiaolei Dr./Director

July 03 2025

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1

1. Policy Requirements for Green Development

- Commitment to Carbon Neutrality
- Policy Framework

1.Policy Requirements for Green Development

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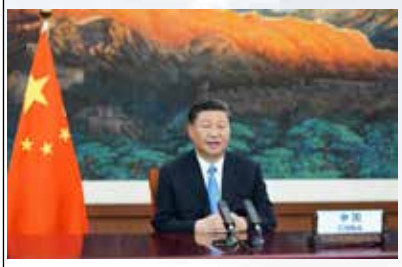

(1) Commitment to Carbon Neutrality

- On September 22, 2020, at the 75th session of the United Nations General Assembly, China solemnly pledged to the world that it will strive to reach **peak carbon dioxide emissions before 2030** and achieve **carbon neutrality before 2060**.
- The report of the 20th National Congress of the Communist Party of China pointed out that China will actively and steadily promote carbon peaking and carbon neutrality, and implement the carbon peaking action in a planned and phased manner.

1.Policy Requirements for Green Development

3

The "1+N" policy framework for carbon peak and carbon neutrality has been established

"1+N" Policy Framework	Task Measures	Target Requirements
Policy documents in the field of transportation • Opinions of the Central Committee of the Communist Party of China and the State Council on Comprehensively Implementing the New Development Philosophy to Achieve Carbon Peaking and Carbon Neutrality • Action plan for peaking carbon emissions before 2030	Promote energy-saving and low-carbon transportation vehicles	By 2025, the carbon dioxide emissions from the transportation turnover of operating ships will decrease by 3.5% compared to 2020, and the total ammonia oxide emissions will decrease by 7%. By 2025, the use of shore power in ports and water service areas along the Yangtze River Economic Belt will increase by 100% compared to 2020. By 2030, the proportion of newly added new energy vehicles will reach about 40%; The carbon emission intensity per unit turnover of operating transportation vehicles has decreased by about 9.5% compared to 2020.
	Optimize and adjust transportation structure	During the 14th Five Year Plan period, the average annual growth rate of container intermodal transportation volume will be over 15%.
	Enhance the level of intelligent development in water transportatio	By 2025, significant achievements will be made in the green, intelligent, and standardized development of inland waterway vessels. By 2030, green and intelligent technologies for inland waterway vessels will be fully promoted and applied.

Yangtze River Protection Law of the People's Republic of China (2020)

- Coordinate the construction of ship **liquefied natural gas refueling stations**, formulate plans for the construction and renovation of **port shore power facilities** and ship power receiving facilities
- Upgrading and renovating **ports, waterways, and ships** in the Yangtze River Basin, and constructing **clean energy or new energy powered** ships such as liquefied natural gas powered ships

4

2. Characteristics of Green Innovative Development of China's Water Transport

- Science and Technology Leading New Reforms in the Shipping Industry
- Low-carbon Transformation Boosts the Sustainable Development of the Shipping Industry

2.Characteristics of Green Innovative Development of China's Water Transport 5

In 2023, China's waterway cargo transportation volume reached **9.367 billion tons**, a year-on-year increase of **9.5%**. The cargo throughput of China's ports was **17 billion tons**, with a year-on-year growth of **8.2%**. Among the world's top 10 ports in terms of cargo throughput, Chinese ports account for eight seats. In the global ranking of top 10 container ports by throughput, Chinese ports occupy seven positions. With a throughput of **49.158 million TEUs**, **Shanghai Port** has remained the **world's top port** for **14 consecutive years**. At present, China's water transport development is focusing on advancing towards intelligence and greenization.

Shanghai Port

Ningbo-Zhoushan Port

(1) Science and Technology Leading New Reforms in the Shipping Industry 6

◻ Automated Terminal Construction

By the end of 2024, China had **built 52 terminals**, including **23 automated container terminals** and **29 automated dry bulk terminals**, and had more than 40 automated terminals under construction. The scale of China's built and under - construction automated terminals **ranks first in the world**. New - generation intelligent horizontal transportation equipment such **as 5G - based automatic guided vehicles** and **driverless container trucks** has been put into use first.

Qingdao Port Automated Terminal

(1) Science and Technology Leading New Reforms in the Shipping Industry 7

◻ Intelligent Inland Waterway Channels

The mileage of China's **built electronic nautical charts** has covered more **than 5,700 kilometers of waterways**. This year, China will further promote the interconnection and interoperability of the electronic nautical charts of the Yangtze River main line and the high - grade waterways in the Yangtze River Delta, and accelerate the formation of a **"unified map" of the electronic nautical charts of the Yangtze River water system**.

Yangtze River Navigation

◻ Construction of Coastal Green Ports

methanol refueling in Shanghai Port

➢ Coastal ports such as Shanghai Port, Shenzhen Port have the ability to refuel liquefied natural gas. The Yangshan Port Area of Shanghai Port has completed the methanol refueling for international container ships for the first time.

➢ China's first river-sea direct pure - battery - powered container ship, which is independently developed and built and can carry **700 TEUs**, has been put into operation.

➢ The coverage rate of **shore - side electricity facilities** at coastal main - line hub ports has **exceeded 90%.**

Three Gorges Hydrogen Boat 1

COSCO Shipping Green Water 01

◻ Development of Inland Green Shipping

✓ The **ecological beach - fixing area** of the Yangtze River waterway exceeds **3 million square meters**, and a complete set of technical application plans for the green waterway of the main line has been formed.

✓ The achievement of "**zero - emission**" ships has been continuously consolidated. New - energy and clean - energy ships such as "**Three - Gorges Hydrogen Boat 1**", "**COSCO - SHIPPING Green Water 01**" and "**Huahang Xinneng 1**" have been put into operation.

3. Cases of Innovative Investment and Financing Models for Promoting Green Water Transport Development

- Case 1: The PPP project for the re - navigation of the Xiaoqing River
- Case 2: REITs Issuance for Port Terminal Operation Projects

(1) The PPP project for the re - navigation of the Xiaoqing River

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Where:
Xiaoqing River Revival PPP Project originates in Jinan, the capital of Shandong province, and passes through the cities of Binzhou, Zibo, Dongying, and Weifang before merging into the Bohai Bay.

Why:
Provincial government did not have enough fiscal funds to undertake construction costs of the project. Through the PPP mode, local government can make use of the funds and financing, construction technologies, and operation innovative advantages of private companies.

What:
Xiaoqing River was excavated from 1130 to 1137 in the Southern Song Dynasty. Due to water scarcity and decreasing cargo volume along the river, it was then suspended in 1997. After 26 years, the waterway has opened again to vessel transport since July, 2023.

Who:
1)Shandong Province government: responsible for the public policy guidelines, project planning, open bidding, gap subsidies payment.
2)SPV partners awarded responsible for: construction, operation, maintenance and services provided.

When:
1)project planning: 2010-2018
2)government approval: 2018
3)procurement: 2019
4)construction: July 2020-June 2023
5)startup of operations: July 2023(one year trial operation)

(1) The PPP project for the re-navigation of the Xiaoqing River

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Economic Effectiveness and Financial Sustainability

- Total CAPEX of the project: 1.87 billion USD
- Funding sources to support the project : stockholders ' equity 0.48 billion USD(government: companies=2:8) ; central government subsidies(Port Construction Fee) during construction period 0.51 billion USD; bank loan 0.88 billion USD
- Style of PPP agreement: government feasibility gap subsidy
- Contract duration: 30years(3 years of construction + 27 years of operation and maintenance)
- Neither public guarantee nor government contingent liabilities involved
- Shareholder IRR: 4.8%

◆ Based on the PPP model, the Shandong provincial government chose private organizations through open bidding to ensure transparency and openness in procurement phase.

◆ The government innovates the project charging system(waterway tolls, lock fees and other revenues such as advertising fee), which effectively reduces the pressure on government expenditures.

◆ The project has created nearly 150,000 full-time and multiple types jobs for women and men at appropriate wages during the construction stage and over 140 full-time jobs during a period of 27 years operation stage, and also a large number of local rural residents have also participated in. So it helps to cultivate a big team of professional technical and management human resources, and helps people to build their careers.

Xiaoqing River

Xiaoqing River

(1) The PPP project for the re-navigation of the Xiaoqing River

13

Economic Effectiveness and Financial Sustainability

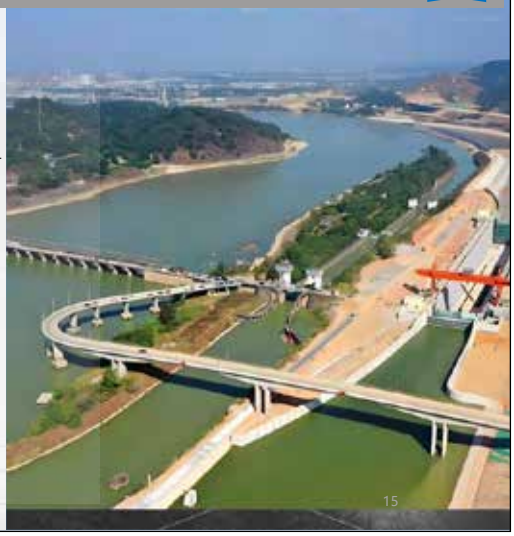
Replicable and scalable of the project

◆ The project is replicable and scalable.

◆ Xiaoqing River Revival Project has created a new financing model for transport projects and other infrastructure with strong public welfare, to meet the development needs of infrastructure projects.

- The Pinglu Canal in Guangxi is a typical project, which links inland rivers directly to seabon trade with ASEAN countries(The Association of Southeast Asian Nations) with the investment cost of nearly over 10 billion USD.

◆ In order to strengthen and innovate the operation and management of the project, the private partner has invited professional research institutions to carry out relevant research and formulated detailed operation and management system specifications, such as digital and intelligent waterway management system, which help to improve operational management efficiency, reduce operating costs, and increase operating revenue.



(2) REITs Issuance for Port Terminal Operation Projects

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REITs, or **Real Estate Investment Trusts**, are a type of **trust fund**. In simple terms, REITs act like a large "pool of capital" that aggregates funds from numerous investors to invest in various income-generating real estate projects, such as office buildings, shopping malls, apartments, and infrastructure like port terminals.

(2) REITs Issuance for Port Terminal Operation Projects

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Application Scenarios in the Port Sector

Port terminal enterprises, especially small ports or poorly managed port assets, can be integrated and acquired by large high-quality port enterprises through REITs. This helps achieve optimal allocation of resources by centralizing fragmented port resources for unified planning and operation, thereby improving the overall resource utilization efficiency of the industry. Meanwhile, for investors, port terminal operation projects typically have stable cash flows, enabling port terminal REITs to provide relatively stable dividend returns.

small port in Hainan Province

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4. Countermeasures and Suggestions

- Suggestions for Smart Development
- Suggestions for Green Development
- Suggestions for Investment and Financing Innovation

(1) Suggestions for Smart Development

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- **Strengthen the construction of information infrastructure and data integration.**
- **Alleviate the financial pressure in smart port construction.**
- **Continuously improve and optimize port cybersecurity measures.**

Carbon Emission Statistics and Accounting for the Ministry of Transport

Effect diagram of inland hydrogen production and refueling integrated station

(2) Suggestions for Green Development

18

- Establish a policy and standard system for carbon peaking and carbon neutrality.
- Promote energy substitution technologies for facilities and equipment.
- Establish an energy consumption and carbon emission statistics and monitoring system as well as a monitoring platform.

The LNG refueling station for ships in Hukou Port Area of Jiujiang Jiaofa Group has been officially put into operation.

(3) Suggestions for Investment and Financing Innovation

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- **Build a diversified investment and financing system to reduce project risks.**
- **Strengthen pre-project planning to enhance financing attractiveness.**
- **Strengthen the supervision of safe operations for port terminal infrastructure REITs.**

THANKS!

Green Transition vs. Economic Constraints: The Future of Sustainable Supply Chains

Prof. Alaa Morsy
Dean, Port Training Institute and Maritime Research & Consultation Center, AASTMT

Arab Academy for Science, Technology, and Maritime Transport (AASTMT)

- Artificial Intelligence
- College of Dentistry
- College of Medicine
- College of Pharmacy
- College of Law
- Fisheries & Aquaculture Technology
- Maritime Transport & Technology
- +13 Institutes and 16 Educational Center
- Engineering & Technology
- Management & Technology
- Computing & Information Technology
- International Transport & Logistics
- Language & Communication
- Archaeology and Cultural Heritage

Port Training Institute

40 Years of Success

Port training institute (PTI) was established on 26th of July 1982 as an affiliated institute to the Arab Academy for Science, technology & Maritime Transport (AASTMT).

PTI Services

- Training Programs
- Training for Crane Operator and truck driver
- Qualifying for Employment and Employment Assessments
- Conferences and Workshops
- Basic Studies for Seamen

Maritime Research and Consultation Center (MRCC)

Content

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2. **Economic Constraints: The Challenges Ahead**
   - High Capital Investments
   - Unclear ROI & Standardization Gaps
   - Fragmented Value Chains
3. **Strategic Solutions: Innovative Finance Models**
   - Blended Finance & PPPs
   - Sustainability-Linked Finance
   - Carbon Pricing & Green Funds
4. **Recommendations & Conclusion**

The Horizon Awaits !!

The current challenges facing organizations towards green innovation and complex economic constraints is A Strategic Dilemma

01

“Why Sustainability is not a luxury.”

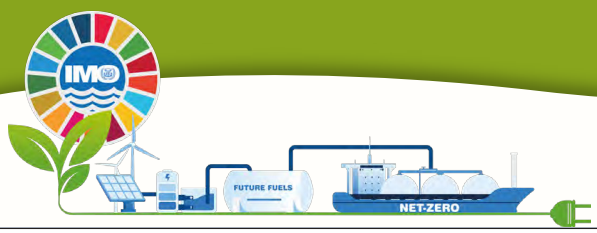
“Why Sustainability is not a luxury.”

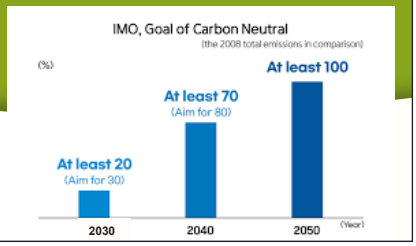
Economic	• Cost Savings & Efficiency • New Markets & Competitiveness
Regulatory	• Avoiding Penalties & Legal Risks • Gaining Regulatory Advantage
Environmental	• Earth's ecological limits • Climate Crisis
Social Responsibility	• Future Generations

Regulation Mandate

The International Maritime Organization (IMO) has established targets to reduce greenhouse gas (GHG) emissions from international shipping, aiming for net-zero emissions by or around 2050.

- **Reducing emissions by at least 20% (striving for 30%) by 2030 and at least 70% (striving for 80%) by 2040**





The Scale of the Transition: Expected Vs. Actual Investment

- **Expected:**
  - Maritime decarbonization only: Estimated **$1.6 - $1.9 trillion by 2050**
  - Broad sustainable supply chain investments require additional substantial capital.
- **Actual:**
  - Global sustainable debt market exceeded **$1 trillion in 2023**

The Scale of the Transition: Expected Vs. Actual Investment

Investor appetite is growing, but Constraints Persist:

Over **90% of institutional investors** consider ESG factors
BUT.. This capital needs clear pathways for utilization

02

Economic Constraints: The Challenges Ahead

Economic Constraint 1: High Capital Investments

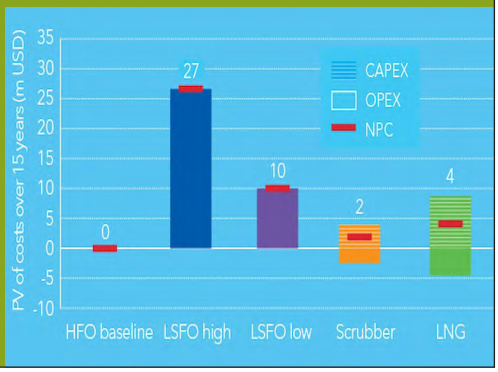
- Transforming fleets and infrastructure for green shipping demands **High initial costs** and uncertain, **long payback periods**.

Feasibility Study Spotlight: The Cost of LNG (DNV)

DNV GL feasibility study examined the Total Cost of Ownership (TCO) for LNG-fueled vs. conventional vessels over a 15-year lifetime, operating between Europe and North America.

Key Findings:

- **Higher CAPEX:** higher initial costs due to specialized tanks, engines, and safety systems.
- **Operational Cost (OPEX) Savings:** lower fuel consumption and maintenance
- **Net Present Cost (NPC):** refers to the present value of all the costs a system incurs over its lifetime, minus the present value of any revenue it earns



Feasibility Study Spotlight: The Cost of LNG (DNV)

Key Findings:

PV: refers to present value of costs
LNG offers additional benefits: low emissions, low taxation

So, It isn't just about initial cost , there are complex lifecycle cost assessments affected by external market factors

Scenario	16 knots		18 knots	
	CO_2 emissions (ton/year)	Tax (m USD/year)	CO_2 emissions (ton/year)	Tax (m USD/year)
Fuel oil (HFO, MGO, LSFO)	23,700	0.7-3.6	38,100	1.1-5.7
Scrubber	24,200	0.7-3.6	38,900	1.2-5.8
LNG	17,800	0.5-2.7	28,600	0.9-4.3
LNG savings vs scrubber	6,400	0.2-1.0	10,300	0.3-1.5
NPV savings for LNG 2025-2035		1.1-5.3		1.7-8.5

High Capital Investments

- **The SME Investment Dilemma**

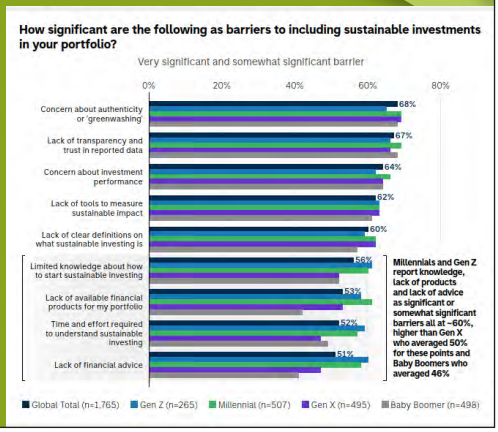
SMEs often lack the financial access to capital to absorb these High initial costs for retrofits or green new builds.

Economic Constraint 2:
The Challenge of Quantifying Green ROI
(The Transparency & Trust Gap)

A lack of standardized metrics and clear definitions hinders confident investment and fosters "greenwashing" concerns

Economic Constraint 2:
The Challenge of Quantifying Green ROI
(The Transparency & Trust Gap)

- Unclear definitions of "green finance" make it difficult for investors to confidently identify and fund truly sustainable projects.
- Concerns about "greenwashing" and trust in reported data are significant barriers for nearly 70% of investors when considering sustainable investments.

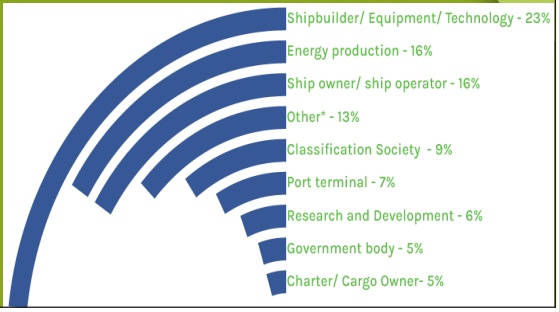


Economic Constraint 3: Overcoming Value Chain Fragmentation

The "Chicken and Egg" Dilemma

Lack of Coordinated Investment: A prime example is the "chicken and egg" situation for alternative fuels: ship-owners hesitate to invest in fuel-ready vessels without infrastructure, while fuel producers wait for vessel demand.

Missing Links in the Investment Chain: Analysis of zero-emission pilots shows significantly lower engagement from critical demand-side actors like cargo owners, fuel producers, and financial institutions (only 5% involvement from financial institutions). This fragmentation creates bottlenecks.

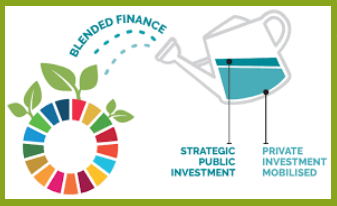


03

Strategic Solutions: Innovative Finance Models

Solution 1: Blended Finance & Public-Private Partnerships PPPs

Concept:
Combining public funds (grants, development bank loans) with private capital to de-risk projects and attract commercial investment.



Benefits:
Reduces risk for private investors, bridges initial funding gaps, leverages public expertise for large-scale projects, and **overcomes economic viability constraints**.

Solution 1: Blended Finance & Public-Private Partnerships PPPs (Cont.)

Example

European Investment Bank (EIB) & CMA CGM (Europe)

- EIB has partnered with commercial banks to finance green shipping projects.
- Supported CMA CGM's investment in LNG-fueled vessels.
- EIB's role as an anchor investor provides confidence for broader private sector participation.

CMA CGM takes delivery of LNG-powered Greenland
By LNG Prime Staff
September 15, 2022

Solution 2: Sustainability-Linked Loans and Bonds

Concept:

Financial instruments where the interest rate or coupon (the cost of borrowing) are tied to the achievement of pre-defined sustainability performance targets (e.g., emissions reduction, energy efficiency).

Benefits:

Directly incentivizes environmental performance, offers financial rewards for sustainability, aligns financial and ESG goals, thus making green initiatives economically more attractive.

Solution 2: Sustainability-Linked Loans and Bonds (Cont.)

Example

Star Bulk Carriers (Greece, Europe)

- Secured a **$500 million sustainability-linked loan** in 2022.
- Interest rate linked to the company's annual carbon emissions intensity.
- Demonstrates how financial benefits can be directly tied to operational improvements for decarbonization.

Solution 3: Carbon Pricing Mechanisms & Green Funds

Concept:
Implementing market-based measures (e.g., Carbon Border Adjustment Mechanism **"CBAM"**, Emissions Trading Systems"ETS") to assign a cost to emissions generates cash for the green transition. This revenue can be set aside in designated **"Green Funds."**

Benefits:
Creates a strong economic incentive for decarbonization by internalizing environmental costs, generates dedicated funding for R&D and infrastructure, and promotes equitable transition.

Solution 3: Carbon Pricing Mechanisms & Green Funds (Cont.)

Example:

- **Norway's NOx Fund:** An established, successful model where businesses pay a NOx tax, and funds are used to support projects that reduce NOx emissions in various sectors, including maritime.

Recommendations & Conclusion

Enabling Progress: The Role of Policy & Collaboration

Key Enablers for Sustainable Transition

- **Predictable Policy & Regulation:** Clear, consistent, and global frameworks reduce investment risk and enable long-term financial planning.
- **Transparent Data & Standardization**: Robust reporting and consistent metrics build confidence and aid ROI assessment.
- **Technological Advancement**: Continued R&D and scaling of alternative fuels and energy-efficient solutions drive down costs.

Enabling Progress: The Role of Policy & Collaboration

Key Enablers for Sustainable Transition

- **Skilled Human Capital**: Investment in workforce training for new technologies ensures operational efficiency and growth.
- **Innovative financing models** are the critical bridge to unlock the trillion-dollar investment opportunity.
- **Value Chain Collaboration:** Partnerships across stakeholders (e.g., ship-owners, ports, fuel producers) de-risk investments and share economic burdens.

Thanks

Prof. Alaa Morsy
Dean, Port Training Institute and Maritime Research & Consultation Center, AASTMT

Port Generations

Sergio Prete
Former President of Port Authority
Professor of Port Management
Expert Committee SISI

Naples
07/03/2025

The 9th Plenary Meeting of the Global Shipping Think Thank Alliance

2

UNCTAD and Port literature

- The services offered by ports change over time with the development of their capacity to handle different types of ships and the related cargo transported, of land transport means, as well as with the development of technological innovation and process automation.
- The sector literature and UNCTAD use to differentiate ports based on their capacity and production results.
- To these criteria must be added other parameters such as the management system, the effectiveness of the port as a logistics center for the creation of added value, innovation and sustainability.

3

Fifth generation port

- M. Flynn, P. Lee, J. Lam and T. Notteboom proposed to integrate the classification of port generations adopted by UNCTAD with a fifth level of port development.
- The fifth generation port is characterized by greater complexity and better possibilities for added value creation compared to ports of previous generations. They are customer and community focused ports that offer deep IT integration with stakeholders.
- Fifth generation seaports must fully cooperate with municipal, regional and national authorities in order to eliminate conflicts and collaborate to identify priorities, allowing a smooth exchange of goods between the port and its hinterland, ensuring a high level of safety, reasonable costs and the reduction of external effects on the environment.

Sixth Generatione Ports

4

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- T. Notteboom and J. Rodrigue offer a look at current and future trends in port development. They take into account the trends in the containerized freight transport market, the limits of the effectiveness of the logistics system and those of global logistics chains.
- A key issue is the conflict between increasingly efficient sea transport of containers via mega ships and atomized land transport that in many cases is not able to handle the volume of cargo without external costs such as congestion in ports, on the roads leading to them, and inefficient rail transport.
- T. Notteboom focuses on the possible nature of containerized freight transport in 2056 (the hundredth anniversary of containerization) and proceeds to analyze the influence of the bargaining power of three groups of factors: economic, technological and logistical.

5

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- The new sixth generation ports (6GP) should have the following three characteristics:
- 1. ability to handle container ships with a capacity of 50,000 TEUs, with a maximum draft of 20 meters. The handling of megaships at the quay will necessarily require that the quay has the appropriate length and large storage spaces;
- 2. full automation of the container terminal thanks to the significant volume of loading/unloading operations in a short time and the significant progress of information technology in the last 50 years. The constant pace of development of new technologies such as the Internet of Things or big data analytic provides a basis for maintaining the rate of development of IT and information technology in the next 50 years;
- 3. management of intermodal connections with the hinterland allowing the transport of containerized goods with low external costs (e.g. congestion-free connections).

Green Ports

6

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- Ports are nodal points or hubs in the transport network.
- Their industrial and commercial areas add value to the transported goods and increasingly become energy production (and consumption) centers.
- Growing environmental awareness creates new challenges for development.
- In addition to economic activities, environmental issues and the impact of port activities on public health, climate change adaptation and mitigation measures are also important in port policies today.
- All these different elements come together in the concept of green ports as a response to new challenges.
- As with the concept of sustainability, there is no clear and comprehensive description of what a green port actually is.
- However, there is a general agreement that a sustainable or green port strategy should focus on realizing the port development in harmony with the local community and the natural system.

7

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- The topic of sustainability is at the top of the Agenda developed in 2018 by the International Association of Cities and Ports (AIVP - Association Internationale des Villes et Ports).
- This Agenda has identified ten objectives to be achieved by 2030 that specifically focus on port-city relations and are closely aligned with the 17 sustainable development goals approved by the UN Assembly.
- The AIVP Agenda 2030 thus translates the SDGs of global governance into the context of port cities, helping stakeholders to prepare projects and plans that contribute to sustainable development and city-port relations

8

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World Ports Climate Action Programme

9

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- Some major maritime ports worldwide, as major economic and social drivers of global and local development, have declared their intention to take a leading role in addressing climate action.
- They have signed an agreement, called the World Ports Climate Action Programme, and have committed to join forces to achieve certain objectives, conducting collaborative projects, including:
- 1) increasing the efficiency of supply chains through the development and harmonization of digital tools that increase transparency and optimize performance;
- 2) promoting common and ambitious (public) policy approaches on emissions reduction within broader geographical areas, through the setting of limits and the provision of tariffs to facilitate environmental sustainability;
- 3) accelerating the development of concrete renewable energy supply solutions to eliminate emissions at berth for ships using conventional fossil fuels;
- 4) accelerate the development of the low-carbon fuel supply chain, with economic sustainability actions, and the deployment of infrastructure to facilitate the electrification of ship propulsion systems such as battery charging and/or replacement;
- 5) support the role of LNG as a transition fuel;
- 6) accelerate actions to fully decarbonise cargo handling facilities in ports.

The World Ports Sustainability Program

10

- A further action agreed by the above ports is to invite governments and regulators to collaborate on i) the implementation of global and regional policies that include pricing of greenhouse gas emissions and/or other initiatives, ii) minimizing competitive distortion, iii) providing financial support for research and development, iv) implementing the World Ports Sustainability Program.

- The World Ports Sustainability Program, initiated by the International Association of Ports and Harbors (iaph), aims to demonstrate the global leadership of ports in contributing to the United Nations Sustainable Development Goals. The program aims to enable actors from port communities around the world to engage with corporate, government and societal stakeholders in creating sustainable added value for local communities and the wider regions in which their ports are integrated.

CETMO&CENIT

Framing ports and shipping in Western Mediterranean within global trends

July 2025

THE SUM OF TWO SPECIALIZED ORGANIZATIONS

With the mission of facing new global challenges…

The Center for Innovation in Transport (**CENIT**) is an Innovation Unit of the International Centre for Numerical Methods for Engineering (**CIMNE**), a consortium between the Catalan Government and the Polytechnic University of Catalonia (UPC-BarcelonaTech), in collaboration with UNESCO and the Severo Ochoa Centre of Excellence.

It brings together research, knowledge and experience **in the field of innovation in transport and mobility management**. It has more than 20 years of activity in competitive research and transfer projects to Administrations.

Created in 1985, under the auspices of the United Nations, the Centre for Transport Studies for the Western Mediterranean (**CETMO**) is a private nonprofit foundation with the vocation of **a think tank specialized in cooperation in the field of logistics and transport**, at an institutional and technical level, with the aim of facilitating transport conditions in the Mediterranean. Since 1997, CETMO acts as Technical Secretariat of the Group of Transport Ministers for the Western Mediterranean (**GTMO 5+5**), holding regular meetings with senior officials of its member countries in order to develop priority actions at regional level in the field of transport.

The sum of both organizations, based in Barcelona, provides a team made up of a diverse and experienced group of researchers and technicians, including civil engineers, economists, mathematicians, computer engineers, and naval architects, among other professionals.

2

EXPERTISE IN THE FIELD OF PORTS AND MARITIME TRANSPORT

Within the wide range of experience concentrated in the CETMO-CENIT alliance, ports and maritime transport represent one of the main fields of interest and analysis, both for its relevance in understanding the Mediterranean transport system and for its constant adaptation to global political, commercial and environmental trends.

Some References

Study on Governance Models of Mediterranean Ports (ongoing study). Union for Mediterranean and MEDports Association

Mediterranean Intermodality Observatory (May 2024). Union for Mediterranean, MEDports Association and CETMO.

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Diagnosis on Maritime Connectivity in the Western Mediterranean (December 2022). GTMO5+5

Port of the Future. Vision 2040 of the Port of Barcelona (September 2021). Port of Barcelona

National Maritime Policy and Strategy in Trinidad and Tobago (September 2021). Government of The Republic of Trinidad and Tobago Ministry of Trade and Industry

Infrastructure Investments Assessment in Caribbean Ports (April 2021). BID Invest

3

Other References on Ports and Maritime Transport Articles, Scientific Papers and Dissemination

In addition to the studies and projects detailed above, the alliance between CETMO and CENIT is also characterized by the dissemination of knowledge relating to the port and maritime sector. Some of the most relevant recent articles and collaborations are listed below:

- Selfa, J., & Saurí, S. (2024). Maritime flows of general cargo in Western Mediterranean: understanding regional flows into global trends, *SRM. 11º Rapporto annual, Le nuove sfide dei porti dell'area mediterranea*. Giannini editore. Napoli. https://www.sr-m.it/it/cat/prod/322820/italian-maritime-economy-report-2024.htm
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- Majoral, G., Reyes, A., & Saurí, S. (2023). Lessons from Reality on Automated Container Terminals: What Can Be Expected from Future Technological Developments? *Transportation Research Record*, 0(0). https://doi.org/10.1177/03611981231174422
- Selfa, J., & Palacios, A (2022). New transport challenges in the Western Mediterranean in the wake of Covid-19: policies uncertainties and tools. *IEMed Mediterranean Yearbook 2021*. Institut Europeu de la Mediterrània. Barcelona. https://www.iemed.org/publication/new-transport-challenges-in-the-western-mediterranean-in-the-wake-of-covid-19-policies-uncertainties-and-tools/
- Garrido, J., S. Saurí, E. Raventós, C. Rúa and J. Torrent (2021) Emerging Trends Defining the Future Role of Ports: Application of the Delphi Method. *Transportation Research Record*, pp. 1-15, https://doi.org/10.1177/03611981211052962.
- Selfa, J., & Santandreu, P., (2020). Perspectives of Container Shipping in the Western Mediterranean. *IEMed. Mediterranean Yearbook 2019*. Institut Europeu de la Mediterrània. Barcelona. https://www.iemed.org/publication/perspectives-of-container-shipping-in-the-western-mediterranean/?lang=es

4

KNOWLEDGE CONTRIBUTION

To frame Western Mediterranean Ports and shipping into global trends

- Cooperation between the two shores of Western Mediterranean is based on understanding current conditions of transport between the Maghreb and Southern Europe
- The understanding of transport of Western Mediterranean can not be understood without framing local and regional realities and tendencies into global trends.
    - Regional maritime flows of goods and passengers of Western Mediterranean are inserted in multimodal global transport networks.
    - Shipping and ports role and development are determined by local and national regulations and policies, but also by regional and international ones.
    - Technical and technological innovation is diffused globally networks of knowledge at a very rapid pace, but its adoption is constrained by local conditions.

In conclusion, CETMO CENIT aim to provide knowledge about the way as global trends materialize and take shape in a specific regional space, especially the Western Mediterranean

5

CETMO

cenit Science for Transport

An Innovation Unit of CIMNE

Centre d'Études des Transports pour la Méditerranée Occidentale (CETMO)

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08005 Barcelona
www.cetmo.org

Centre d'Innovació el Transport (CENIT)
Av. Arquitecte Sert, 1
08005 Barcelona
www.cenit.cat

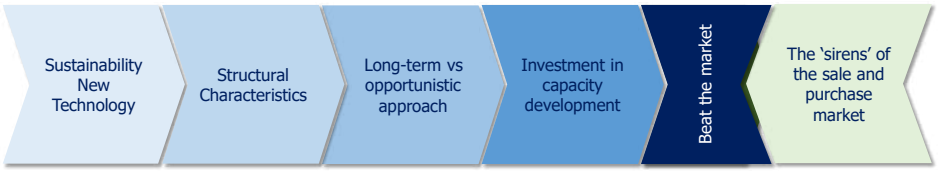
6

Investments in bulk shipping: Approaches to profitability and sustainability

Prof. Ioannis Theotokas
Department Chair,
Department of Maritime Studies, University of Piraeus

MORE THAN 30 YEARS OF MARITIME STUDIES EXCELLENCE
UNIVERSITY OF PIRAEUS DEPT. OF MARITIME STUDIES

Investments in Bulk Shipping



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Sustainability and adoption of new technologies in bulk shipping

- Social expectations - Regulations
- Technologies evolve at a fast pace
- Dilemma: the kind of advantage
  - First mover
  - Late mover
- Adoption of evolving technology:
  - Additional cost
  - Propensity to risk
  - Business strategy
- Need for a synergistic approach
- Do the freight markets reward the implementation of green investments?

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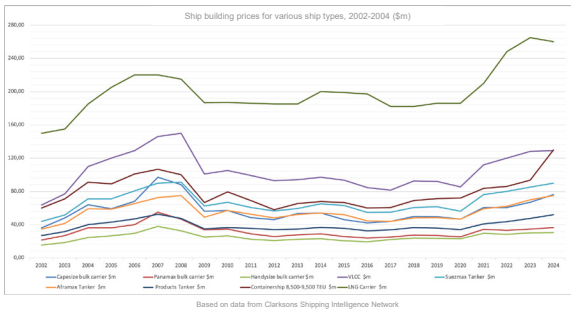
Structural characteristics of bulk shipping

- Volatility
- Timing of investment
- Delivery date
- Unforeseen factors – disruptions
- Define profitability
- Long-term approach vs Opportunistic approach



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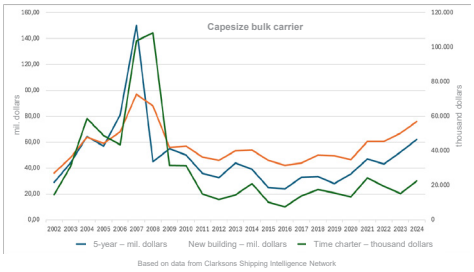
Long-term approach vs Opportunistic approach

- Long-run selling of shipping services
  - Investment for the development of transport capacity
- The 'sirens' of the sale and purchase market
  - For second-hand ships
  - For shipbuilding contracts
- Beat the market
  - Counter-cyclical strategy and asset play



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Balancing Profitability and Sustainability

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Thank you

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Decarbonizing Ports through Green Corridors: Harnessing New Energy for Low NET-Carbon Shipping

綠色走廊視角下的港口減碳：新能源賦能低碳航運

Dong Yang (PolyU)， Jing Wang (NTU)
Department of Logistics and Maritime Studies
The Hong Kong Polytechnic University
Nanyang Technological University

Outline

- Introduction
  - · Global Shipping Emissions and IMO Strategies
  - · Net Zero and its Impact on Shipping
  - · Concept and Development of Green Shipping Corridors
- A Case Study of Green Fuel Solutions for GSCs
  - · Background of Rotterdam-Singapore Corridor
  - · Methodology
  - · Findings and Insights
- Discussion on Current Progress and Future Challenges
  - · Fuels
  - · Ships
  - · Ports
- Implications for Hong Kong

Introduction

Global Shipping Emissions and IMO Strategies

Background:

Global Emissions: Shipping sector accounts for approximately **2.9%** of global emissions, with vessels contributing **65%** by using heavy fuel oil.

Member States of IMO, meeting at the Marine Environment Protection Committee (MEPC 80), adopted the 2023 IMO Strategy on Reduction of GHG Emissions from Ships.

Timeline of Revised IMO Strategies on Reduction of GHG Emissions from Ships:

By 2030

- **GHG Emissions:** Reduce by at least 20%, aiming for 30%
- **CO2 Emissions:** 40% reduction in CO2 emissions (per transport work) by 2030
- **Alternative Fuels:** Zero or near-zero GHG emission fuels of 5%, aiming for 10% energy used

By 2040

GHG Emissions: Reduced by at least 70%, aiming for 80%.

By 2050

GHG Emissions: net-zero GHG emissions from international shipping

Introduction

Net Zero and its Impact on Shipping

What is Net Zero?

Achieving net zero is a balancing act. That is, the volume of greenhouse gas (GHG) emissions released into the atmosphere by a given entity must match the volume of GHG emissions removed from the atmosphere by that entity. *This ensures total emissions are equal to zero.*

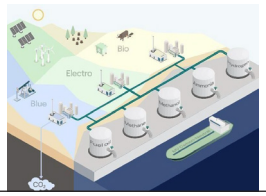
Upgrade Fleet Using Green Technology

- Wind propulsion system
- Air lubrication systems
- Advance hull coatings
- And more...

Achieving net-zero emissions will largely rely on the effective adoption of alternative green fuels.

Switch to Alternative Green Fuels

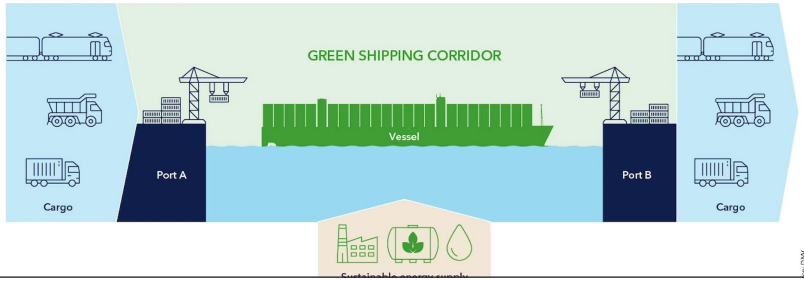
- Renewable Hydrogen
- Renewable Methanol
- Renewable Ammonia
- And more...



Introduction

Green Shipping Corridors as Pathways to Decarbonization

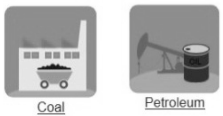
- From IMO's decarbonization target, 5% of shipping will need to be operating on zero-emission fuels by 2030 to help reach the 2050 target.
- Initiated in Clydebank Declaration at 2021 United Nations Climate Change Conference (COP26)
- Route(s) connecting two ports
- Aiming to facilitate the use of green alternative fuels



Introduction-Green Shipping Corridor

Green

Gray



Fossil-based

Blue

.....

Green

Renewable sources

Alternative Fuels

Reports from DNV indicate that initiatives promoting shipping corridors doubled last year, totaling **57** by February of 2024.

Questions: What renewable fuels are most suitable for long-distance shipping corridors?

- Renewable Methanol (MeOH)
- Renewable Ammonia (NH_3)
- Renewable Hydrogen (Compressed)
- Renewable Hydrogen (Liquefaction)

Introduction

Components of a Green Shipping Corridor

Fuel: Zero-Emission Options
- **Renewable Energy**: Solar and wind energy
- **Alternative Fuels**: biofuels, hydrogen, ammonia, and methanol

Ports: Supporting Infrastructure
- **Fuel Storage**: Facilities for new types of fuels
- **Bunkering Services**: for handling and supplying zero-emission fuels

Ships: Technological Advancements
- **Design Innovations**: such as efficient hull designs and air lubrication systems
- **Energy Systems**: Integration of battery storage and fuel cell technology

Voyage Optimization: Efficiency on the Move
- **Just in Time Arrivals**: Synchronizing vessel speed with port availability to minimize waiting times
- **Port Optimization**: Streamlining port operations to reduce turnaround times
- **Advanced Vessel Dynamics**: Utilizing real-time data for optimal routing and speed adjustments

Source: UK Hydrographic Office

Introduction

- Since the Clydebank Declaration at COP 26, the concept of green corridors has gained significant momentum. Reports from DNV indicate that initiatives promoting environmentally friendly shipping corridors doubled last year, totaling 57 by February of 2024.

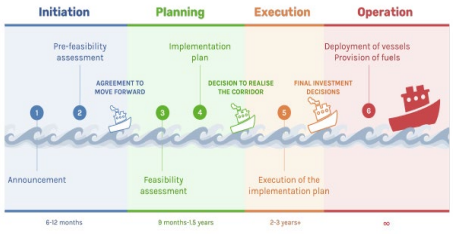
Sourced by DNV, Key considerations for establishing a green shipping corridor

- Government leadership: 18.52%
  US-UK Corridor
- Industry leadership: 37.04%
  Western Australia-North Asia Iron Ore Corridor
- Port leadership: 22.22%
  LA-Long Beach-Shanghai Corridor
- Public-private leadership: 22.22%
  Rotterdam-Singapore Corridor

Sourced from: https://mission-innovation.net/missions/shipping/green-shipping-corridors/route-tracker/

Introduction

Development of Green Shipping Corridors



Source: Global Maritime Forum

- Announcement and initiation
  LA-Nagoya Corridor, US-UK Corridor
- Pre-feasibility assessment
  Singapore-Australia corridor, European Green Corridor Network
- Feasibility assessment
  Rotterdam-Singapore Corridor, LA-Long Beach-Singapore Corridor
- Implementation Plan
  Ongoing : LA-Long Beach-Shanghai, Western Australia-North Asia Iron Ore
  Developed: Gothenburg – North Sea Port Corridor, SILK Alliance Corridor Network

Comparative Analysis of Green Fuel Solutions

Rotterdam-Singapore Corridor

- **Announced:** August 2022
- **Countries:** Netherlands, Singapore
- **Status:** Conducting feasibility assessment
- **Vessel Type:** Container
- **Participants:**

Port Authority: MPA Singapore, Port of Rotterdam

Public Sector: The Centre for Maritime Studies of the National University of Singapore, Digital Container Shipping Association, The Global Centre for Maritime Decarbonisation, GMF, MMMCZCS, Methanol Institute, Nanyang Technological University Maritime Energy and Sustainable Development Centre of Excellence, RMI, University of Oxford

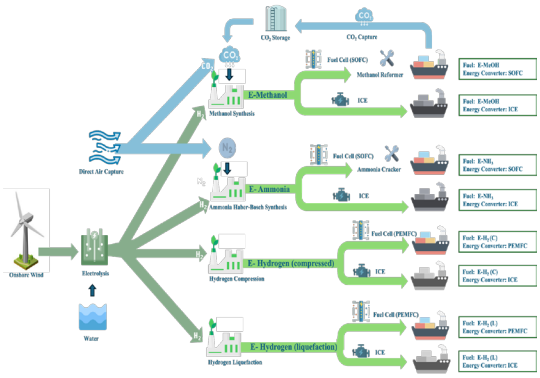
Private Sector: A.P. Moller Maersk A/S, BP, Citi, Clifford Capital, CMA CGM, Hapag-Lloyd, MSC, Ocean Network Express, PSA International, SEA LNG, Shell, Yara Clean Ammonia

- **Target Timeline:** First sustainable vessels on route latest by 2027

- **Fuel Options:** Methanol, Hydrogen, Ammonia
- **Alternative Routes:** Suez Canal Route, Cape of Good Hope Route

Comparative Analysis of Green Fuel Solutions

Potential solutions based on fuel and propulsion system options

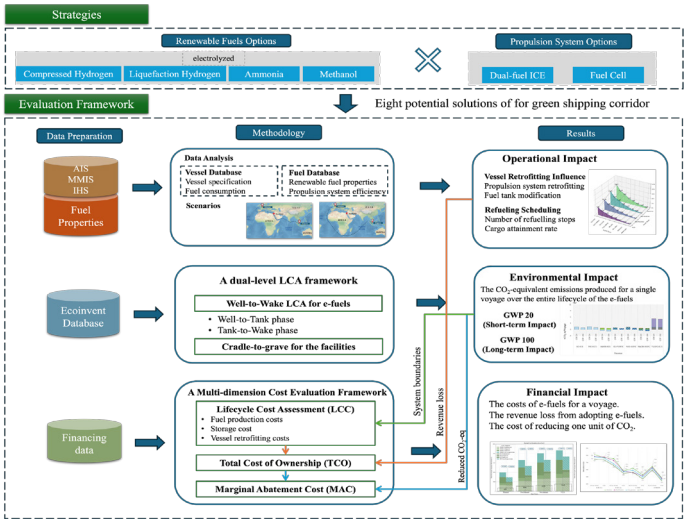


Route options

Analytical Aspects

- Operational Impact
- Lifecycle Environmental Impact
- Economic Impact

Methodology



Methodology-Green Shipping Corridor

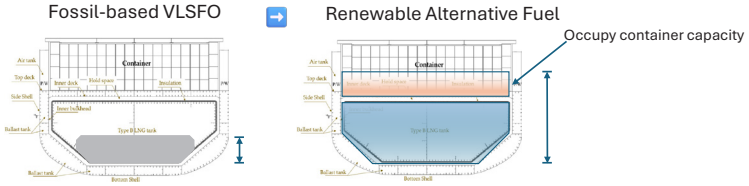
Analytical Aspects

Operational Impact

Lifecycle Environmental Impact

Economic Impact

Fossil-based VLSFO ➡ Renewable Alternative Fuel



For vessels' operations powered by renewable fuels in the designed propulsion system, we consider three scenarios.

1. **Space requirements for non-refueling voyages:** What are the spatial demands onboard for e-fuels by direct voyage?
2. **Refueling frequency without modifying fuel tank space:** How many refueling stops are required if a vessel's fuel tank space remains unchanged?
3. **Retrofitting requirements with limited refueling stops:** What onboard space is required if only one or two refueling stops are available throughout a vessel's voyage?

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Methodology-Green Shipping Corridor

Analytical Aspects

Operational Impact

Lifecycle Environmental Impact

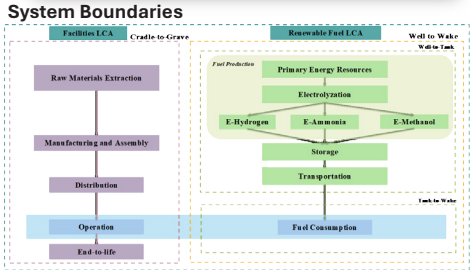
Economic Impact

ANNEX 10

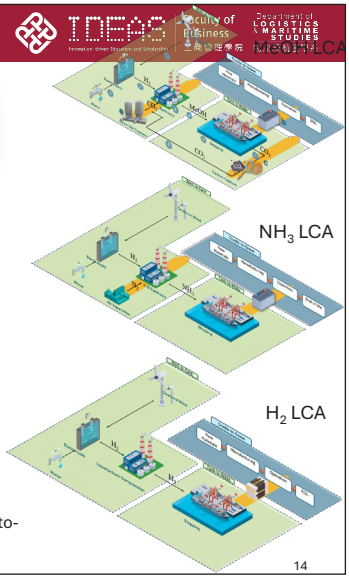
RESOLUTION MEPC.391(81)
(adopted on 22 March 2024)

2024 GUIDELINES ON LIFE CYCLE GHG INTENSITY OF MARINE FUELS
(2024 LCA GUIDELINES)

System Boundaries



- **Cradle-to-Grave** approach for newly installed propulsion systems and relative facilities.
- **Well-to-Wake (WtW)** for renewable fuels. It includes Well-to-Tank (WtT) and Tank-to-Wake (TtW).



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Methodology-Green Shipping Corridor

Analytical Aspects

Operational Impact

Lifecycle Environmental Impact

Economic Impact

Lifecycle Cost Assessment (LCC)

Fuel Production Cost | Storage Cost | Vessel Retrofitting Cost

Unit: EUR/voyage

Total Cost of Ownership (TCO)

LCC + Revenue Loss

Marginal Abatement Cost (MAC)

$$MAC_{CO_2} = \frac{\Delta TCO}{\Delta GWP_{20/100}}$$

Unit: EUR/t CO_2 eq

Assess the fuel cost from the life cycle

Assess the total cost including fuel cost and operational cost

Assess the cost of reducing one unit of CO_2

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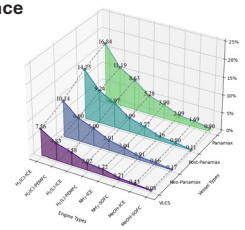
Comparative Analysis of Green Fuel Solutions

Operational Impact Analysis – Retrofitting Influence

1. Larger vessel, with less cargo attainment rate, leads to less revenue loss.

2. Attainment rate
   - For Suez route
     Lowest: methanol 1.7%, followed by ammonia 4%.
   - For cape route
     Lowest: methanol 4%, followed by ammonia 7%.



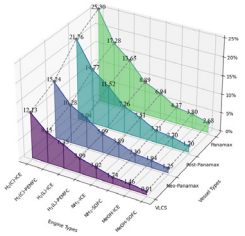


Table 6: Replaced number of TEUs by renewable fuels through Suez Canal

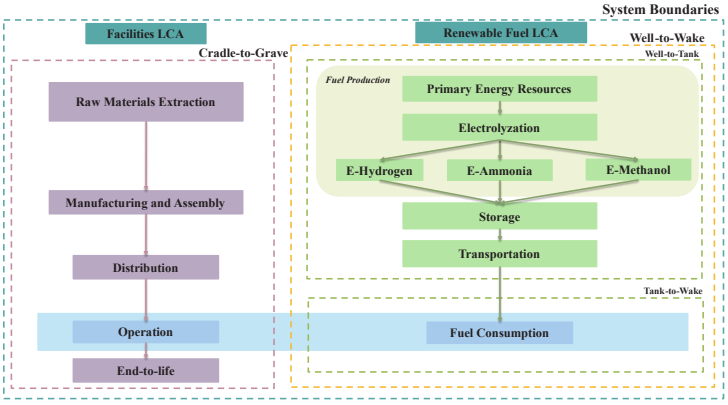
Types of vessels	H_2(C) ICE	H_2(C) PEMFC	H_2(L) ICE	H_2(L) PEMFC	NH_3 ICE	NH_3 SOFC	MeOH ICE	MeOH SOFC
Panamax	673	446	343	209	154	81	73	44
Post-panamax	1073	693	520	295	202	93	61	26
Neo-panamax	1319	859	650	377	264	117	84	30
VLCS	1413	913	686	390	268	108	74	24

Table 7: Replaced number of TEUs by renewable fuels through Cape of Good Hope

Types of vessels	H_2(C) ICE	H_2(C) PEMFC	H_2(L) ICE	H_2(L) PEMFC	NH_3 ICE	NH_3 SOFC	MeOH ICE	MeOH SOFC
Panamax	979	691	545	354	276	172	150	105
Post-panamax	1644	1102	858	538	407	234	196	120
Neo-panamax	1997	1355	1059	671	512	302	256	165
VLCS	2134	1452	1130	709	537	309	259	160

Comparative Analysis of Green Fuel Options

Environmental Impact Analysis



A dual-level Lifecycle Assessment (LCA) framework

Database-Vessel & Fuel Datasets

A total of 357 container vessels operating liner services on the Rotterdam-to-Singapore route were identified using a port-call recognition algorithm.

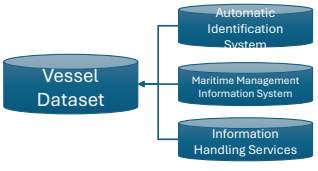


Table 2: Container vessel classification by TEU capacity on the Rotterdam-to-Singapore route

Types of container vessels	TEU Capacity	Number
Panamax	3,000–5,000 TEU	37
Post-Panamax	5,000–10,000 TEU	157
Neo-Panamax	10,000–15,000 TEU	101
VLCS	more than 15,000 TEU	62

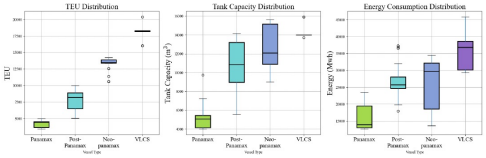


Figure 4: Vessels profiles along the Rotterdam-Singapore shipping corridor

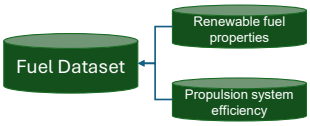


Table 3: Energy density of renewable fuels

Energy type	Volumetric energy density (MWh/m³)	Mass energy density (MWh/tonnes)
H_2(C)	1.4	33.3
H_2(L)	2.36	33.3
NH_3	3.9	5.2
MeOH	4.99	5.5
VLSFO	10.6	11.6

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Results-Operational Impact_1

Operational Impact Analysis – Refuel Frequency

Table 5: The traveling range and refueling stops by various e-fuel solutions across different vessels

Type of vessel	Type of engine	Type of fuel	Through Suez Canal		Through Cape of Good Hope	
			Traveling range (%)	Refueling stops	Traveling range (%)	Refueling stops
Panamax	Dual-fuel ICE	e-H_2(C)	18.93%	5	13.04%	7
		e-H_2(L)	31.92%	3	21.98%	4
		e-NH_3	52.74%	1	36.33%	2
		e-MeOH	74.55%	1	51.34%	1
	Fuel cell	e-H_2(C)	26.30%	3	18.11%	5
		e-H_2(L)	44.33%	2	30.53%	3
		e-NH_3	70.33%	1	48.43%	1
		e-MeOH	88.36%	1	60.85%	1
Post-panama	Dual-fuel ICE	e-H_2(C)	20.62%	4	14.29%	6
		e-H_2(L)	34.76%	2	24.09%	3
		e-NH_3	57.45%	1	39.81%	2
		e-MeOH	81.20%	1	56.27%	1
	Fuel cell	e-H_2(C)	28.64%	3	19.85%	4
		e-H_2(L)	48.28%	1	33.46%	2
		e-NH_3	76.60%	1	53.08%	1
		e-MeOH	96.24%	1	66.69%	1
Neo-panamax	Dual-fuel ICE	e-H_2(C)	21.26%	4	14.96%	6
		e-H_2(L)	35.83%	2	25.21%	3
		e-NH_3	59.21%	1	41.67%	1
		e-MeOH	83.69%	1	58.89%	1
	Fuel cell	e-H_2(C)	29.52%	3	20.77%	4
		e-H_2(L)	49.77%	1	35.02%	2
		e-NH_3	78.95%	1	55.55%	1
		e-MeOH	99.19%	1	69.80%	1
VLCS	Dual-fuel ICE	e-H_2(C)	21.80%	4	15.03%	5
		e-H_2(L)	36.74%	2	25.34%	3
		e-NH_3	60.72%	1	41.88%	1
		e-MeOH	85.82%	1	59.20%	1
	Fuel cell	e-H_2(C)	30.27%	3	20.88%	4
		e-H_2(L)	51.03%	1	35.20%	2
		e-NH_3	80.96%	1	55.84%	1
		e-MeOH	99.37%	1	70.16%	1

1. Operational efficiencies
   - Fuel cell outperforms dual-fuel ICE
2. Refuel frequency
   - Highest: compressed (e-H_2(C)) and liquified (e-H_2(L)) hydrogen
   - Lowest: methanol (e-MeOH)

Methanol is the ideal option for the existing operation in the near future.

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Results-Operational Impact_2

Operational Impact Analysis – Retrofitting Influence

1. Larger vessel, with less cargo attainment rate, leads to less revenue loss.
2. Attainment rate
   - For Suez route
     Lowest: methanol 1.7%, followed by ammonia 4%.
     Highest: compressed hydrogen 16.54%
   - For Cape of Good Hope route
     Lowest: methanol 4%, followed by ammonia 7%.
     Highest: compressed hydrogen 25.3%

Table 6: Replaced number of TEUs by renewable fuels through Suez Canal

Types of vessels	H_2(C) ICE	H_2(C) PEMFC	H_2(L) ICE	H_2(L) PEMFC	NH_3 ICE	NH_3 SOFC	MeOH ICE	MeOH SOFC
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Table 7: Replaced number of TEUs by renewable fuels through Cape of Good Hope

Types of vessels	H_2(C) ICE	H_2(C) PEMFC	H_2(L) ICE	H_2(L) PEMFC	NH_3 ICE	NH_3 SOFC	MeOH ICE	MeOH SOFC
Panamax	979	691	545	354	276	172	150	105
Post-panamax	1644	1102	858	538	407	234	196	120
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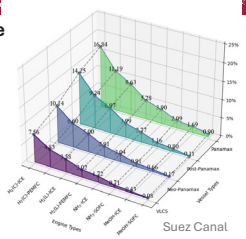
Suez Canal

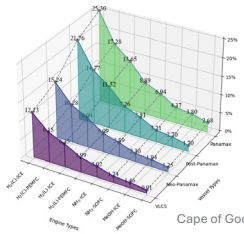
Cape of Good Hope

Figure attainment rate of onboard containers without refueling stops

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Results-Environmental Impact

Environmental Impact Analysis- Global Warming Potential (GWP) 20 & 100

Emission Reduction:
1. 74.79% to 93.15% of GHG emissions reduction by renewable fuels
2. **Best**: MeOH (CH_3OH) with over 92% emissions reduction
   Second: H_2 with 78.81% to 84.18%

The reason for methanol:
Methanol absorbs CO_2 during generation and captures CO_2 after combustion.

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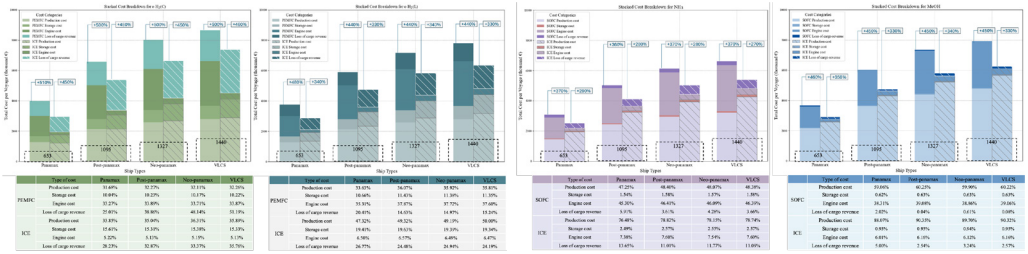
Results-Economic Impact_1

Economic Impact Analysis – Total Cost of Ownership

Total Cost of Ownership (TCO) increased compared to VLSFO

- e-H_2 (C) by 5.5 to 6 times
- e-H_2(L) 4.3 to 5.8 times
- **e-NH_3 3.7 to 4.7 times**
- e-MeOH 4.3 to 5.6 times

making immediate large-scale adoption financially challenging.



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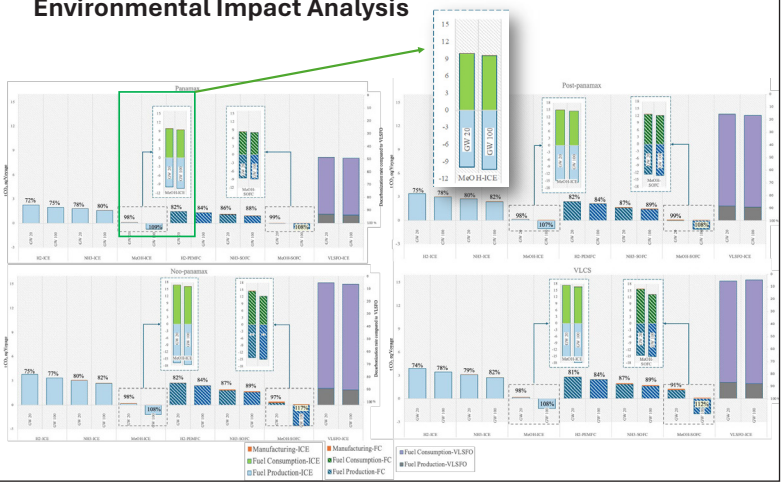
Comparative Analysis of Green Fuel Solutions

Environmental Impact Analysis

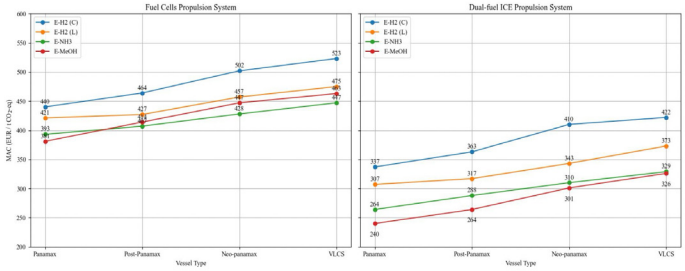
Emission Reduction:

1. 73% to 91% of reduction by renewable fuels (H_2 and NH_3)
2. **Best**: MeOH with over 117% emissions reduction



Comparative Analysis of Green Fuel Solutions

Economic Impact Analysis – Marginal Abatement Cost



Substantial reduction in **the abatement cost per tonnage of CO_2**

- 307–523 EUR for e-H_2,
- 264–447 EUR for e-NH_3,
- 240–447 EUR for e-MeOH.

as calculated by

$$MAC_{CO_2} = \frac{\Delta TCO}{\Delta GWP_{20/100}}$$

Comparative Analysis of Green Fuel Solutions

Summary of the Analysis

Impact Category	Evaluation Indicator	Types of Renewable Fuels			
		e-H_2(C)	e-H_2(L)	e-NH_3	e-MeOH
Operational impact	Traveling distance (%)				
	Cargo attainment rate (%)				
Environmental impact	Production phase (t CO_2-eq)				
	Manufacturing phase (t CO_2-eq)				
	Operation phase (t CO_2-eq)				
	Total emissions (t CO_2-eq) (GWP 20 & GWP 100)				
Economical impact	Lifecycle cost assessment (m EUR)				
	Total cost of ownership (m EUR)				
	Marginal abatement cost (EUR/t CO_2) (Fuel cell)				
	Marginal abatement cost (EUR/t CO_2) (Dual-fuel ICE)				

Best Performance | Better Performance | Good Performance | To be considered

E-MeOH performs best among the potential alternatives.

---though higher investments, **lowest** marginal abatement cost due to its **strongest** decarbonization ability.

Discussion

- Fuels
  - Current fuel options chosen by initiatives (Green Corridors)[1]

    e-MeOH - 16%, e-NH_3 - 16% , Biofuel - 9%, e-H_2 - 9% , green electricity - 9%

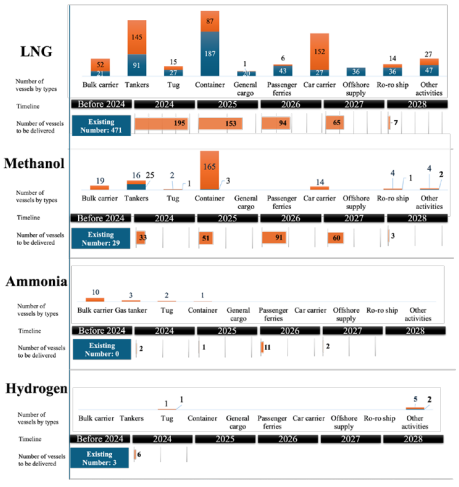
  - Challenges for Implementation[2]:
    - **Undecided Fuel Pathways**: Significant uncertainty in choosing the optimal fuel pathway.
    - **Supply Issues**: Current production potentially covers less than half the fuel needed by 2030.
    - **Demand Issues**: Current Scalable Zero Emission Fuel (SZEF)-capable vessel orders are insufficient to meet targets.
    - **Finance Off Track**: Funding for SZEF activities has slowed, jeopardizing progress.
    - **Policy and Regulation**: Positive movements at the IMO level but national actions lag.
    - **Civil Society:** Awareness improving but needs concrete action for impactful change

[1] Sourced from: https://mission-innovation.net/missions/shipping/green-shipping-corridors/route-tracker/

[2] Sourced from: Report by Pole Star. Carbon Neutral Shipping: Drive Results With The 4-C Approach. August 2024.

Discussion

- Ships
  - Existing vessel retrofitting techniques
    - Dual-fuel engines
    - Fuel cell (PEMFC, SOFC)
  - New-built
    - the current order book of SZEF-capable vessels would only deliver around 25% of required SZEF demand by 2030 target.
    - Methanol orders have surged significantly, now ranking just behind LNG as the preferred alternative fuel choice



Sourced from: Alternative Fuels Insight (AFI), DNV, 2024. https://www.dnv.com/services/alternative-fuels-insights-afi--128171/

Discussion

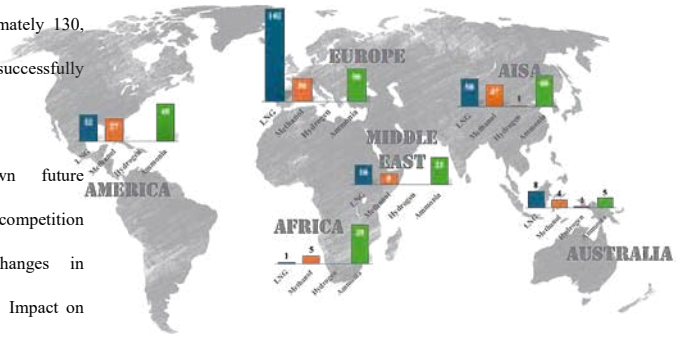
- Ports

  - Current Progress

    - **Ammonia Terminals**: Approximately 210 with existing storage
    - **Methanol Terminals**: Approximately 130, widely distributed
    - **Bunkering**: Methanol successfully bunkered ship-to-ship

  - Challenges

    - **Fuel Uncertainty**: Unknown future standard fuel
    - **Fuel Availability:** Potential competition with other economic sectors
    - **Regulatory Uncertainty:** Changes in international/national laws
    - **Economic and Political Risks:** Impact on funding for infrastructure
    - **Safety Concerns:** Especially with hydrogen and ammonia



Sourced from: Alternative Fuels Insight (AFI), DNV, 2024. https://www.dnv.com/services/alternative-fuels-insights-afi--128171/

Discussion

- Challenges for the development of green shipping corridors

  - Uncertainty surrounding the choice of fuel pathways
  - Navigating a complex stakeholder landscape
  - High investment costs to support the green transition
  - Identifying priority shipping segments for intervention

RESOLUTION MEPC.377(80)
(adopted on 7 July 2023)

2023 IMO STRATEGY ON REDUCTION OF GHG EMISSIONS FROM SHIPS

A series of zero-emission projects are being implemented with IMO support, but Hong Kong is not included.

An overview of relevant IMO initiatives supporting the reduction of GHG emissions from ships is provided below:

Project Name	Collaborators	Timeframe	Funding	Decarbonization Aspect	Objectives
Integrated Technical Cooperation Programme (ITCP)	IMO	2022-2023	N/A	Port, fuel	Assist Member States in implementing IMO's Initial Strategy, focusing on energy efficiency and reducing atmospheric pollution in ships and ports.
GHG TC-Trust Fund	IMO, Member States, UN agencies, others	Established 2019	N/A	Fuel	Provide financial support for technical cooperation and capacity development activities for IMO's GHG Strategy implementation.
Global Maritime Technologies Cooperation Centres (MTCC) Network (GMN) Network	IMO, European Union	2016-2022	$11 million	Port, fuel, voyage	Establish MTCCs in various regions to support maritime decarbonization and small-scale pilot projects for developing countries.
Green Voyage 2050	IMO, Norway	2019-2023	$7.1 million	Voyage, fuel	Support maritime emissions assessments, policy frameworks, National Action Plans, and pilot projects for low/zero-carbon solutions in developing nations.
GHG-SMART Programme	IMO, Republic of Korea	2020-2025	$2.5 million	Fuel	Develop capacity in LDCs through training to support the Initial IMO GHG Strategy, including scholarships for further maritime study.
GloFouling Partnerships	IMO, UNDP, GEF	2018-2025	$7 million	Fuel	Improve biofouling management to protect ecosystems and improve energy efficiency, reducing GHG emissions.
Transfer of Environmentally Sound Technologies (TES)T Biofouling	IMO, Norway	2022-2025	$4 million	Fuel	Assist developing countries in biofouling management through technology testing, helping reduce GHG emissions.
IMO Coordinated Actions to Reduce Emissions from Shipping Foundation Project (CARES)	IMO, Saudi Arabia	2022-2024	$1.5 million	Technology transfer	Link global North and South for tech transfer, pilot demonstration projects, and financing initiatives for low-carbon shipping.
Future Fuels and Technology (FFT)	IMO, Republic of Korea	2022-2024	$1.2 million	Fuel, technology	Support GHG reduction policy discussions in MEPC through technical analysis.
IMO-UNEP-Norway Innovation Forum	IMO, UNEP, Norway	2020-2023	$650,000	Fuel, voyage	Champion innovation to accelerate zero- and low-emission transition, gather international ideas, and share best practices for the maritime sector.
NextGEN (Green and Efficient Navigation) Portal	IMO, MPA (Singapore)	2021-present	N/A	Voyage, fuel	Facilitate online collaboration on decarbonization initiatives in the maritime sector, with a focus on emissions reduction in the Asia-Pacific.
Financing Sustainable Maritime Transport (FIN-SMART) Initiative	IMO, EBRD, World Bank	Ongoing	N/A	Finance, port, fuel	Identify investment risks and financial solutions for maritime decarbonization in developing countries, focusing on renewable energy sources like wind and solar.

Implications for Hong Kong

- Define a Clear Fuel Pathway
- Engage Key Stakeholders Early

  Collaborate with major players in the shipping and logistics industry, including shipping lines, port authorities, government agencies, and technology providers. Establish a task force involving local and international stakeholders.
- Leverage Existing Infrastructure and Technology Development

  Use current advancements in green port infrastructure, electrification, and clean energy storage to gradually retrofit Hong Kong's port. Invest in renewable energy sources for port operations and explore partnerships for shared infrastructure.
- Integrate Digital technologies for decarbonization

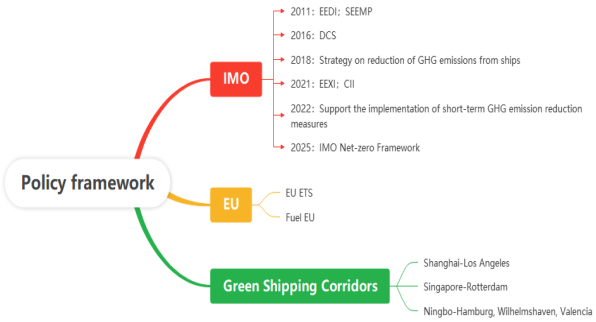
  Invest in AI-driven software and digital tools that optimize voyage planning and reduce fuel consumption, contributing to lower emissions across the corridor
- Develop a Green Finance Strategy

  Engage with financial institutions and international organizations to secure funding for green corridor initiatives.
- Implement Monitoring and Reporting Standards

  Establish clear emission monitoring and reporting protocols within the corridor. Transparent data collection will allow for better assessment of the corridor's impact
- Promote Public Awareness

Thank you !

Policy framework: Establish a three-tier system of "Global Mandatory Framework (IMO)+Regional Deepening (EU)+Industry Pilot (Green Shipping Corridor)"



- mandatory emission combined with carbon pricing for the first time
- Applicable to all vessels
- Pushing for Fuel Substitution and Technological Innovation

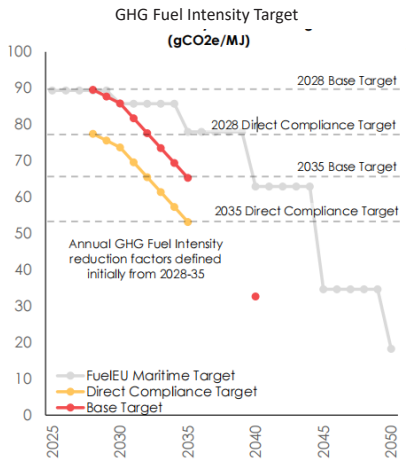
- Take the lead in strictly controlling emissions throughout the entire lifecycle

- Provide large-scale validation scenarios to accelerate the commercialization of zero carbon ships

Source: Public information

http://sisi.shmtu.edu.cn/

Significant costs associated with purchasing remedial units



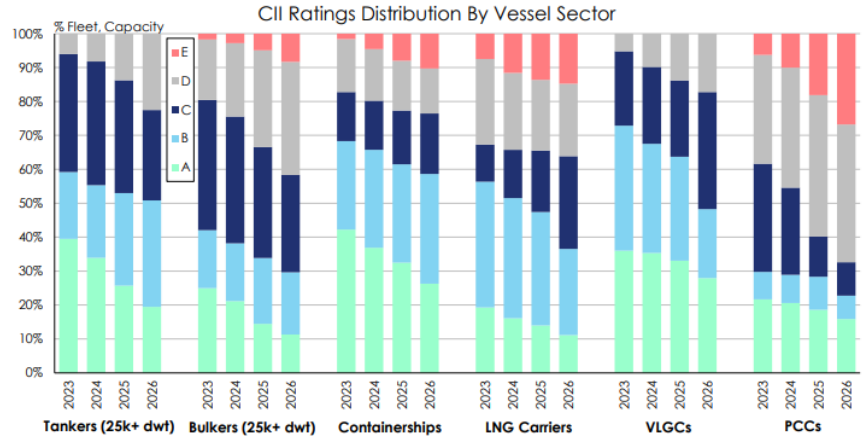
Example Compliance Costs Using VLSFO & Purchasing Remedial Units

Voyage $/day*	2028	2035
Capesize	$2,537	$14,840
Panamax	$1,509	$8,805
VLCC	$4,581	$26,732
MR	$1,806	$10,725
15k TEU Boxship	$5,460	$32,122
2.7k TEU Boxship	$1,485	$8,667

Source: Clarksons

http://sisi.shmtu.edu.cn/

More than 20% of container ships facing ratings below C

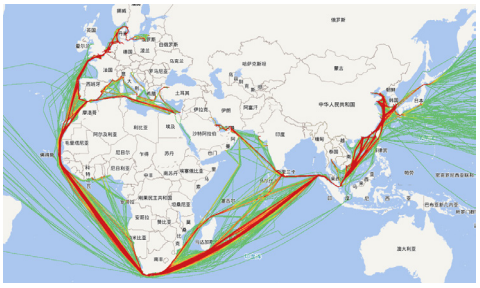


Source: Clarksons

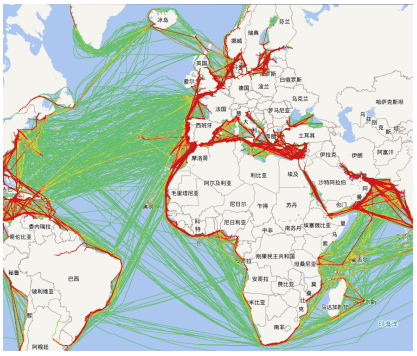
http://sisi.shmtu.edu.cn/

The European region mainly focuses on long-distance shipping routes for ships over 15000 TEU and regional shipping routes for ships below 3000 TEU

shipping routes for ships over 15000 TEU



shipping routes for ships below 3000 TEU



Source: myvessel

http://sisi.shmtu.edu.cn/

The cost of carbon emissions from ships on relevant routes in the European region is increasing year by year

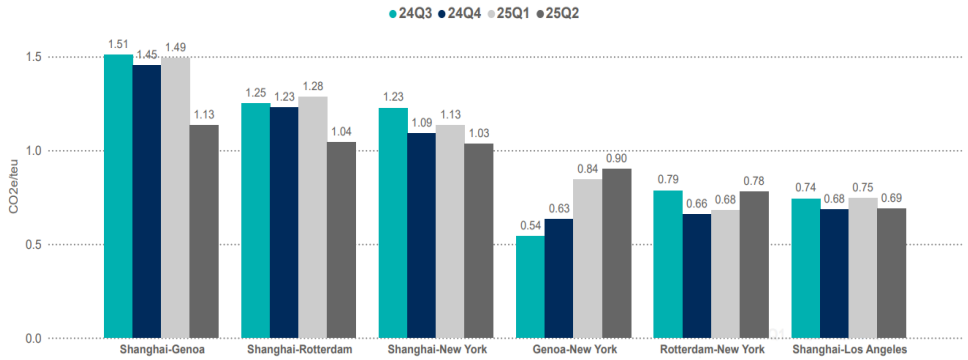
Large Containership Voyage	$/day EU ETS Cost at EUA CO2 price of $86.5/tonne												$/day TC Rate^	
	40% Liability (2024)				70% Liability (2025)				100% Liability (2026)				13-Jun	
	c.2010-blt	c.2010-blt w/$	c.2015-blt eco	c.2015-blt eco w/$	c.2010-blt	c.2010-blt w/$	c.2015-blt eco	c.2015-blt eco w/$	c.2010-blt	c.2010-blt w/$	c.2015-blt eco	c.2015-blt eco w/$	Non-Eco	Eco
Far East - Europe [7]														
20/24,000 TEU*			4,710	4,919			8,242	8,608			11,774	12,296		
Alternative Port Calls [2]			5,452	5,707			9,541	9,987			13,631	14,268		
Alternative Port Calls [3]			3,605	3,782			6,309	6,619			9,012	9,455		
Via Cape of Good Hope [4]			4,815	5,098			8,427	8,922			12,038	12,745		
17/20,000 TEU*			4,855	5,051			8,497	8,839			12,138	12,627		
14/16,000 TEU			3,336	3,505			5,837	6,135			8,339	8,764		
13/14,000 TEU	4,513	4,679			7,898	8,189			11,282	11,698				
Transatlantic [5]														
8/9,000 TEU	934	953			1,634	1,667			2,334	2,382			83,500	104,000
Alternative Port Calls [6]	3,654	3,782			6,394	6,618			9,135	9,455			83,500	104,000

Feeder Containership Voyage	$/day EU ETS Cost at EUA CO2 price of $86.5/tonne												$/day TC Rate^	
	40% Liability (2024)				70% Liability (2025)				100% Liability (2026)				13-Jun	
	c.2010-blt	c.2010-blt w/$	c.2015-blt eco	c.2015-blt eco w/$	c.2010-blt	c.2010-blt w/$	c.2015-blt eco	c.2015-blt eco w/$	c.2010-blt	c.2010-blt w/$	c.2015-blt eco	c.2015-blt eco w/$	Non-Eco	Eco
N.Eur - W.Med [8]														
2,750 TEU	2,696	2,835	1,973	2,112	4,719	4,962	3,453	3,697	6,741	7,089	4,932	5,281	38,500	44,000
Alternative Port Calls [9]	1,877	1,967	1,374	1,466	3,285	3,441	2,405	2,566	4,693	4,916	3,436	3,665	38,500	44,000
1,700 TEU	2,303	2,421	1,663	1,782	4,030	4,236	2,911	3,118	5,757	6,052	4,158	4,454	28,000	28,500
1,000 TEU	1,946	2,043	1,266	1,363	3,406	3,575	2,215	2,385	4,865	5,106	3,165	3,407	16,500	
500 TEU (c.2000 built)	1,360	1,435			2,379	2,512			3,399	3,588				

Source: Clarksons

http://sisi.shmtu.edu.cn/

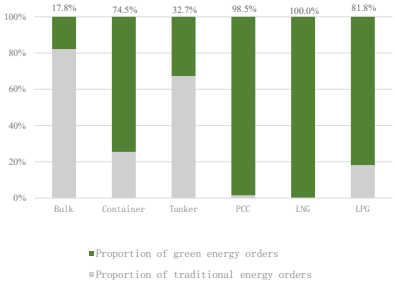
The carbon emissions of the Shanghai-Los Angeles route are significantly lower than those of other routes



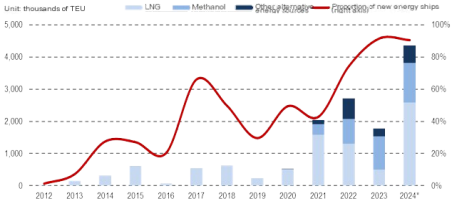
Source: Drewry

Green fleet construction is at the forefront, but alternative energy solutions are wavering

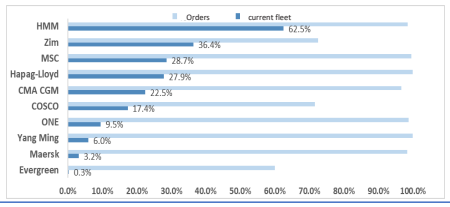
Energy structure of orders for the global commercial fleet



Scale and proportion of green energy ship orders



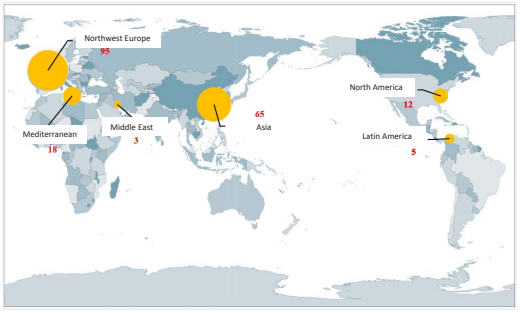
The proportion of green energy in the current fleet and orders of top shipping companies



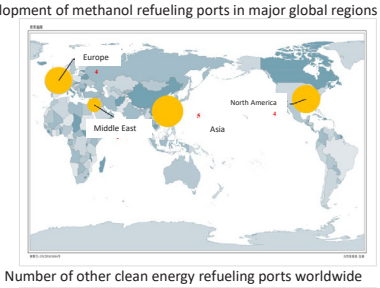
Source: Clarksons

Except for LNG, other infrastructure supporting facilities are still incomplete

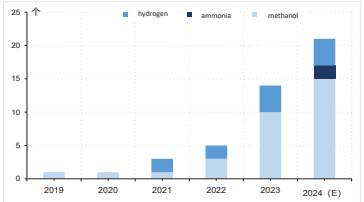
Development of LNG refueling ports in major global regions



Development of methanol refueling ports in major global regions



Number of other clean energy refueling ports worldwide



Source: Clarksons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Thank you

9th Plenary Meeting of Global Shipping Think Tank Alliance

July 3-4, 2025
Naples, Italy

Guest Speaker Presentations

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Energy and Wars: How Infrastructure and Logistics Influence the New Global (Dis)Order

Daniela Corsini, CFA
Rates, FX & Commodities Research
3 July 2025

Based on information available up to 26.06.2025
Please read carefully the important disclosures at the end of this publication

Agenda

1

1 EU Natural Gas and the War in Ukraine

2 Brent Crude and Wars in the Middle East

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New infrastructure point to shifting alliances and a quest for diversification and optionality. Russia looks east and north. Maritime trade rises

2

Source: the Bruegel Institute https://www.bruegel.org/analysis/europe-urgently-needs-common-strategy-russian-gas and Global Gas Infrastructure Tracker, Global Energy Monitor, https://globalenergymonitor.org/projects/global-gas-infrastructure-tracker/tracker/

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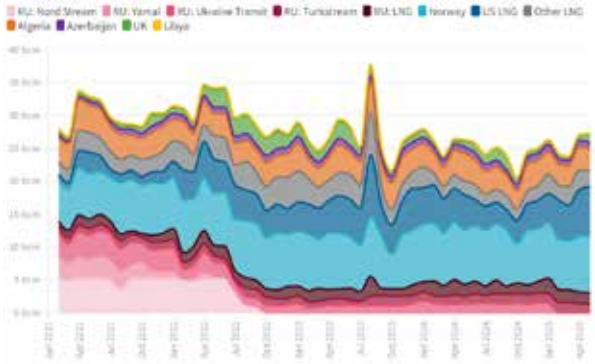
3

The collapse of Russia's gas sales to Europe is only partially offset by higher US LNG and Norwegian imports

Monthly EU gas imports by source, billion cubic meters, 01.2021-04.2025



	Jan-Apr 2021		Jan-Apr 2025		Δ	
	in bcm	%	in bcm	%	in bcm	%
RU NordStream	20.5	17	0.0	0	-20.5	-100
RU Yamal	12.9	11	0.0	0	-12.9	-100
RU Ukraine	13.3	11	0.0	0	-13.3	-100
RU TurkStream	3.8	3	5.8	6	2.0	52
RU LNG	4.8	4	7.3	7	2.5	51
Russia Total	**55.3**	**46**	**13.1**	**13**	**-42.2**	**-76**
Norway	26.9	22	32.3	32	5.3	20
US LNG	**7.2**	**6**	**25.8**	**25**	**18.5**	**256**
Other LNG	10.1	8	10.6	10	0.5	5
Algeria	16.4	14	13.1	13	-3.3	-20
Azerbaijan	1.9	2	3.8	4	1.9	99
UK	2.1	2	3.2	3	1.1	51
Libya	1.1	1	0.3	0	-0.8	-70
Total	**121.1**	**100**	**102.3**	**100**	**-18.9**	**-16**

Source: the Bruegel Institute and Intesa Sanpaolo elaborations on Bruegel Institute data, https://www.bruegel.org/analysis/europe-urgently-needs-common-strategy-russian-gas

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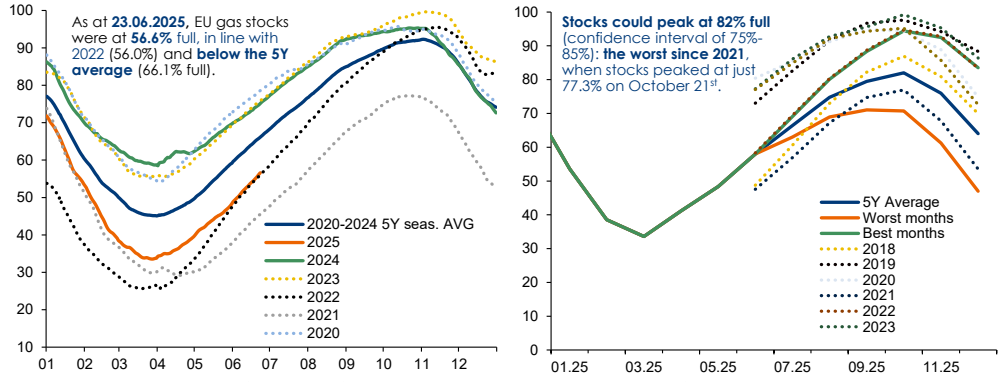
EU's net import loss led to lower than usual inventories: summer restocking could be challenging…

EU28 gas inventories, % full: historic data (left hand graph) and forecasts (right hand graph)



Source: Intesa Sanpaolo elaboration on Gas Infrastructure Europe (GIE) data, Intesa Sanpaolo forecasts

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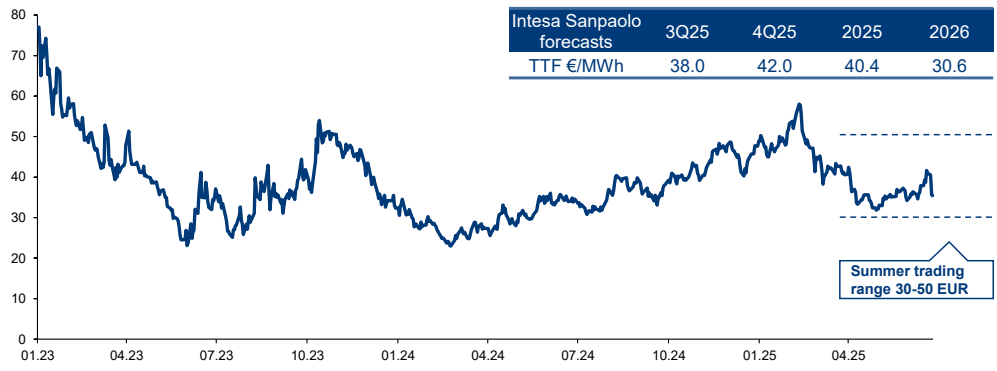
…and gas prices are set to remain high, fuelling upside risks on energy prices and inflation

TTF natural gas price in EUR/MWh



Intesa Sanpaolo forecasts	3Q25	4Q25	2025	2026
TTF €/MWh	38.0	42.0	40.4	30.6

Source: Intesa Sanpaolo elaboration on Bloomberg data, Intesa Sanpaolo forecasts

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Agenda

1 EU Natural Gas and the War in Ukraine

2 Brent Crude and Wars in the Middle East

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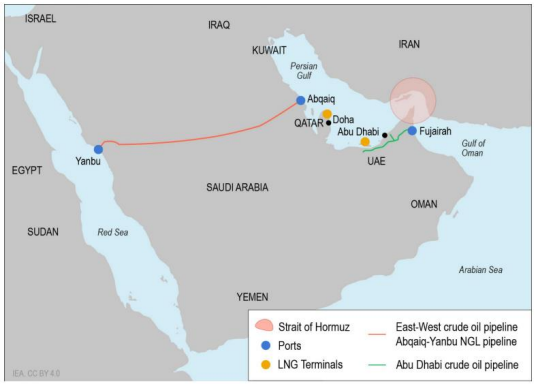
A regional conflict could put at risk about 30% of world supply. A blockade of the Hormuz Strait could disrupt flows worth 25% of crude, 20% of LNG demand



in mb/g	May-25 Production	May-25 Sustainable Capacity	Δ
Algeria	0.9	1.0	0.1
Iraq	4.2	4.9	0.7
Kuwait	2.6	2.9	0.3
Nigeria	1.5	1.4	-0.1
Saudi Arabia	**9.1**	**12.1**	**3.0**
UAE	**3.4**	**4.3**	**1.0**
Iran	**3.5**	**3.8**	**0.3**
Libya	1.3	1.2	-0.1
Venezuela	0.8	0.9	0.1
Others	0.5	0.6	0.1
Total OPEC	**27.8**	**33.0**	**5.2**
Azerbaijan	0.5	0.5	0.0
Kazakhstan	1.8	1.8	0.0
Mexico	1.5	1.6	0.1
Oman	0.8	0.9	0.1
Russia	9.2	9.8	0.6
Others	0.7	0.9	0.2
Total OPEC+	**42.2**	**48.4**	**6.2**

Source: the International Energy Agency (IEA), World Energy Outlook, https://www.iea.org/reports/world-energy-outlook-2024, License: CC BY 4.0. Intesa Sanpaolo elaborations on IEA data, Oil Market Report June 2025

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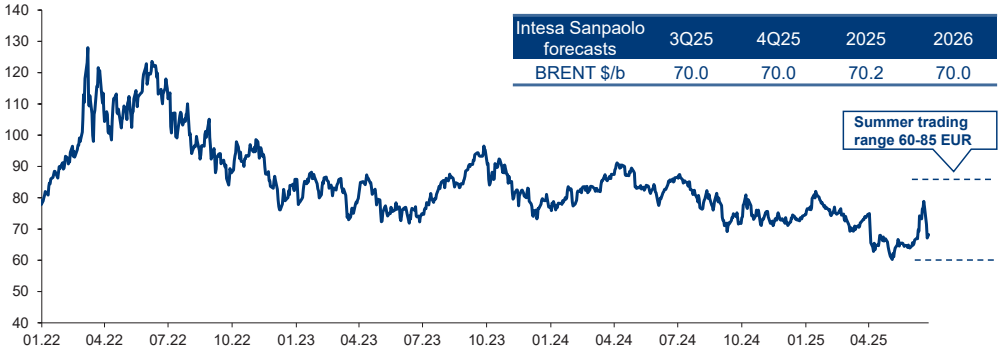
Absent unexpected supply disruptions and unpredictable escalations, Brent could trade near a 70 USD average

Brent oil price in USD/barrel



Intesa Sanpaolo forecasts	3Q25	4Q25	2025	2026
BRENT $/b	70.0	70.0	70.2	70.0

Source: Intesa Sanpaolo - Research Department elaborations on Bloomberg data. Estimates Intesa Sanpaolo - Research Department

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Thank you!

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Appendix

Analyst Certification
The financial analysts who prepared this report, and whose names and roles appear on the first page, certify that:
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(2) No direct or indirect compensation has been or will be received in exchange for any views expressed.

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.Valuation Methodology
This document has been prepared in accordance with the following method.

Macroeconomic Data
Comments on macroeconomic data are prepared based on macroeconomic and market news and data available via information providers such as Bloomberg and Refinitiv-Datastream. Macroeconomic and interest rate forecasts are prepared by the Intesa Sanpaolo Research Department, using dedicated econometric models. Forecasts are obtained using analyses of historical-statistical data series made available by the leading data providers and also on the basis of consensus data, taking account of appropriate connections between them.

Forecasts in the Energy Sector
Comments on the Energy Sector are prepared based on macroeconomic and market news and data available via information providers such as Bloomberg and Refinitiv-Datastream. Unless otherwise stated, consensus estimates come from the leading international energy Agencies, primarily the IEA (International Energy Agency – which deals with this sector on a global scale), the EIA (Energy Information Administration – an institute that deals specifically with the US energy sector) and OPEC. Forecasts are prepared by the Intesa Sanpaolo Research Department, using dedicated models..

Forecasts in the Metals Sector
Comments on the Metals Sector are prepared based on macroeconomic and market news and data available via information providers such as Bloomberg and Refinitiv-Datastream.

Unless otherwise specified consensus estimates on precious metals come mainly from GFMS, the long-established forecasting agency based in London. The forecasts cover gold, silver, platinum and palladium. Forecasts are prepared by the Intesa Sanpaolo Research Department, using dedicated models.

Unless otherwise stated, consensus estimates for industrial metals come mainly from Brook Hunt, an independent forecasting agency which has prepared statistics and predictions on metals and minerals since 1975, and from the World Bureau of Metal Statistics (WBMS), an independent research body on the global market of industrial metals which publishes a series of monthly, quarterly and annual statistical analyses. Forecasts are prepared by the Intesa Sanpaolo Research Department, using dedicated models.

Forecasts in the Agricultural Sector
Comments on the Agricultural Sector are prepared based on macroeconomic and market news and data available via information providers such as Bloomberg and Refinitiv-Datastream.

There are several consensus estimates on agricultural products. Each individual country has its own internal statistics agency that estimates and forecasts crops, production capacity, the product supply quantities and, above all, the amount of land available for cultivating a particular product, in both absolute and percentage terms.

At an international level, the main agencies are: the USDA (United States Department of Agriculture) which, in addition to providing data on the US territory, also deals in general with the grain industry worldwide through the FAS (Foreign Agricultural Service); the Economist Intelligence Unit of the Economist Group which deals with all agricultural products on a global scale; and CONAB (Companhia Nacional de Abastecimento), the Brazilian Government agency that deals with agriculture (with a particular focus on coffee) and which also provides some insight into the entire South America.

Forecasts are prepared by the Intesa Sanpaolo Research Department, using dedicated models.

Technical levels
Comments on technical levels are based on market news and data available via information providers such as Bloomberg and Refinitiv-Datastream. Interest rate technical level forecasts are prepared by the Intesa Sanpaolo Research Department, using dedicated technical models. Forecasts are obtained using analyses of historical-statistical data series made available by the leading data providers and also on the basis of consensus data, taking account of appropriate connections between them. There is also a further in-depth study linked to the choice of appropriate derivatives that best represent the sector or the specific commodities on which one intends to invest.

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Recommendations

Negative Outlook: a Negative Outlook recommendation for a sector is a wide-ranging indication. It not only indicates deteriorating price conditions of the indices or futures that best represent the commodity in question (thus the reduction of a price performance), but it also implies the deterioration in the forecasts on production, weather and input supplies (like water or energy) that characterize these sectors more than other financial instruments.

Neutral Outlook: a Neutral Outlook recommendation for a sector is an indication that includes a multitude of aspects. It indicates that the combination of price forecasts of indices and futures and all the conditions of production, weather and input supplies (like water or energy) will lead to a sideways movement in prices or inventories or production capacity, recording, therefore, void or minimum performances for the sector under examination.

Positive Outlook: a Positive Outlook recommendation for a sector is an indication covering a wide range of areas. It not only indicates net improvements in price conditions of the indices or futures that best represent the commodity in question (thus a positive price performance), but it also implies the improvement in the forecasts on production, weather and input supplies (like water or energy) that characterize these sectors more than other financial instruments.

Frequency and validity of forecasts

Market indications refer to a short period of time (the same day or the following days, unless stated otherwise in the text). Forecasts are developed over a time span of between one week and 5 years (unless specified otherwise in the text) and have a maximum validity of three months.

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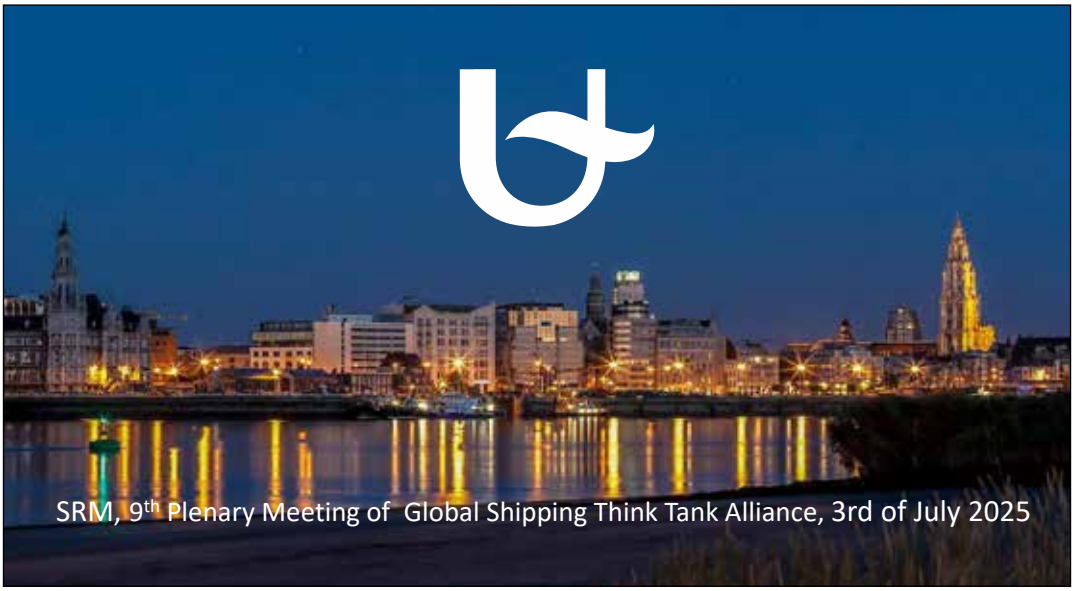
Report prepared by:
Daniela Corsini, Rates FX & Commodities Research, Intesa Sanpaolo



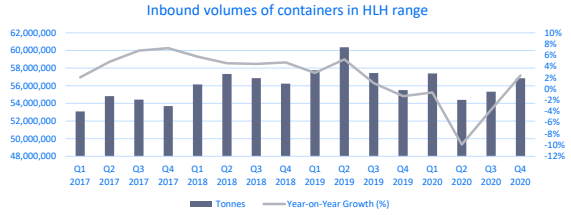
University of Antwerp
TPR | Department of Transport and Regional Economics

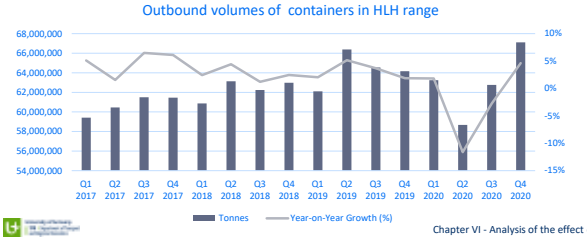
Volatility in container shipping prices

Lessons from COVID-19

Dr. Joost Hintjens
University of Antwerp
Department of Transport and Regional Economics
(with support from Prof. dr. Vanelslander)

Demand for container transport during COVID-19



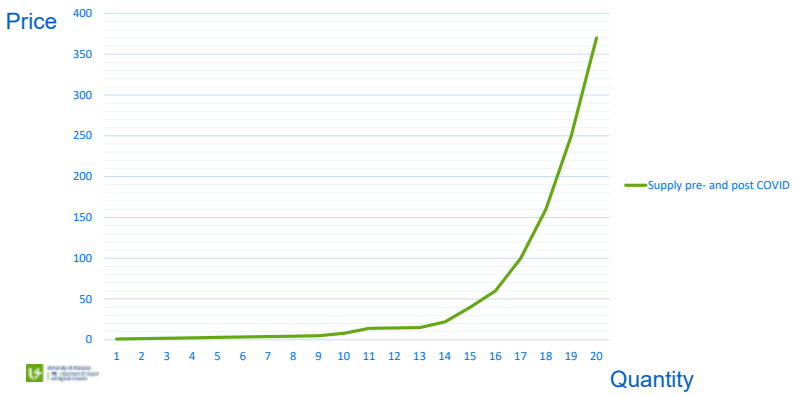


Chapter VI - Analysis of the effect of Covid-19 on the throughput of seaports in the Hamburg – Le Havre range - SRM 2021

Pricing for container transport during COVID-19

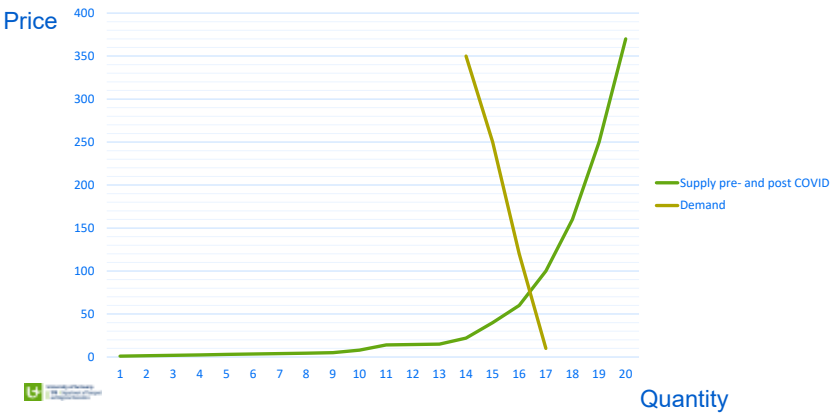
Supply curve

'hockey stick'

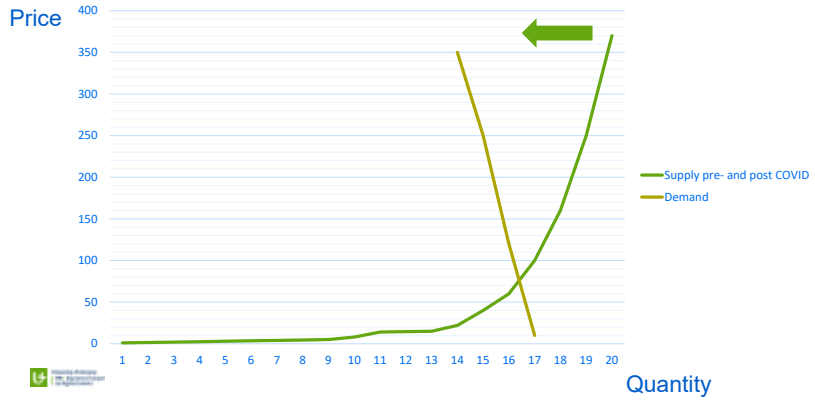


Supply and demand curve

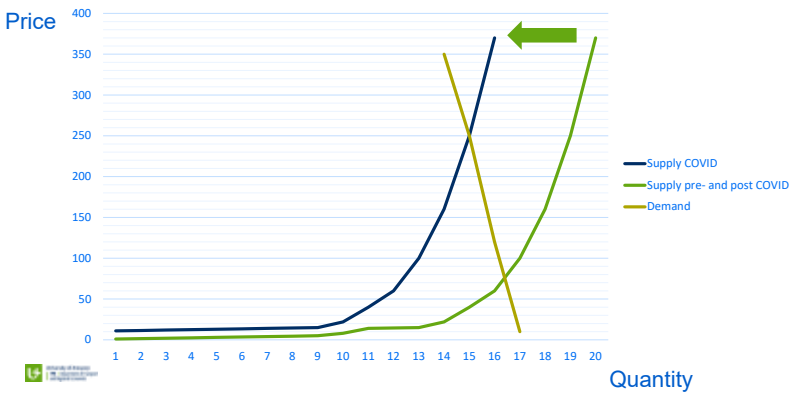
Inelastic demand



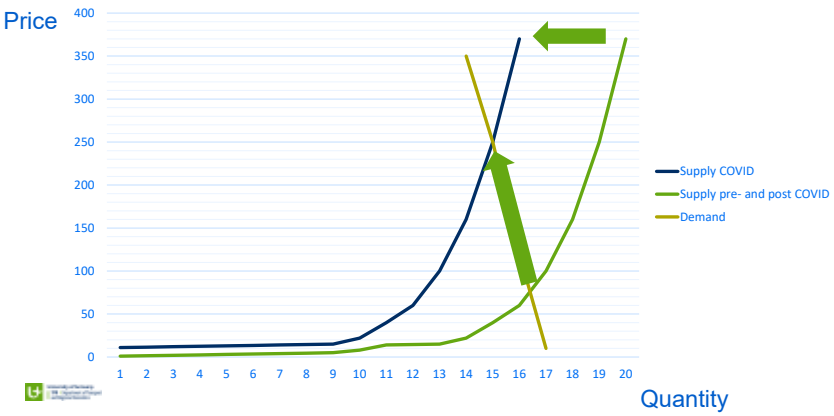
Supply shift due to COVID-19 congestion



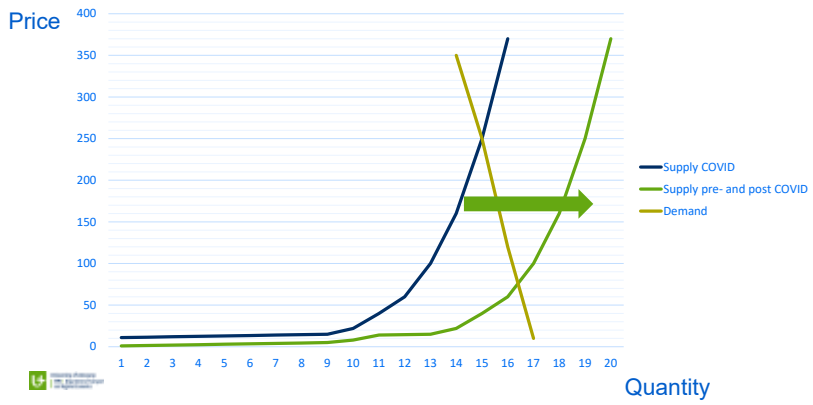
Supply shift due to COVID-19 congestion



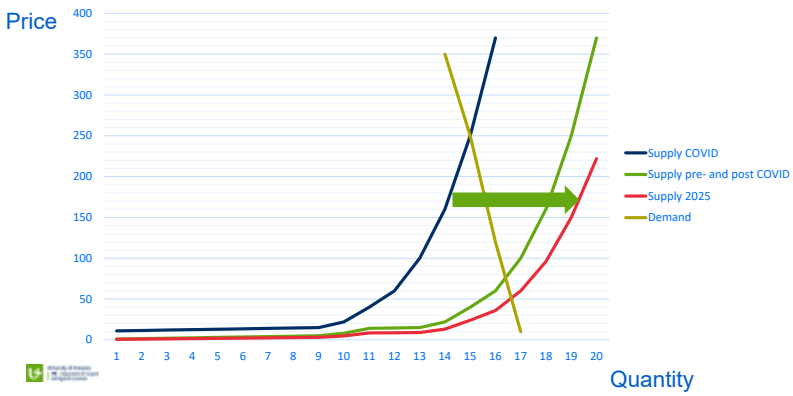
Price shift due to a drop in supply



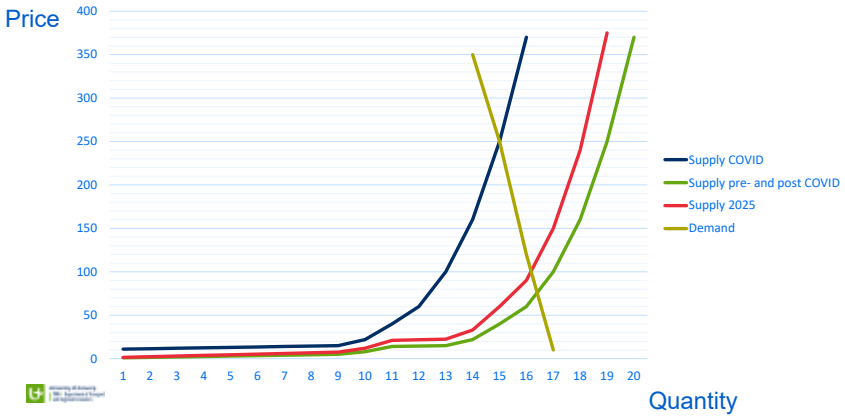
Two years later



Two years later

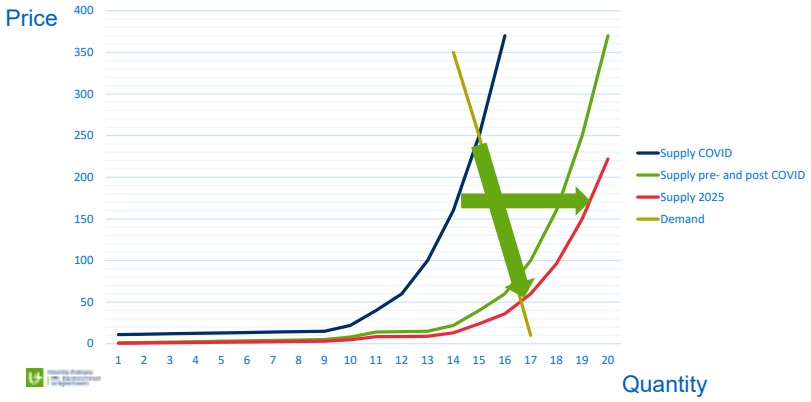


And then the Houthi's attacked ships in the Red sea



Price shift due to oversupply

Endgame?



Thank you for your attention

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THE ALIS CLUSTER INTERMODAL SYSTEM
INVESTMENTS AND RESULTS
9th Plenary Meeting of Global Shipping Think Tank Alliance
July 3 2025 Naples


CENTRO STUDI
ALIS
ITALIA
IN MOVIMENTO
Anna Tedesco


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ALIS is the leading association for the entire logistics, transport, and business services sector in Italy and Europe.
ESG

ALIS

- logistics companies
- road haulage firms
- shipping and railway companies
- service providers
- terminal operators
- freight forwarders
- inland ports
- seaports
- airports
- ITS Academies
- universities
- advanced training and research centers

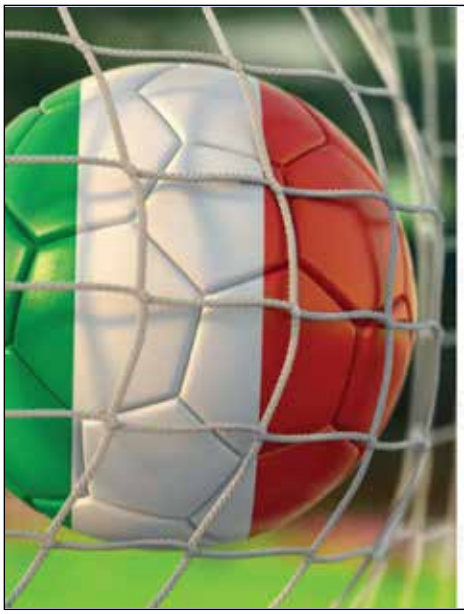
ALIS

*men and women who **work** every day **with passion and dedication** are our **added value***

2,400
association members

117 bn €
aggregate turnover

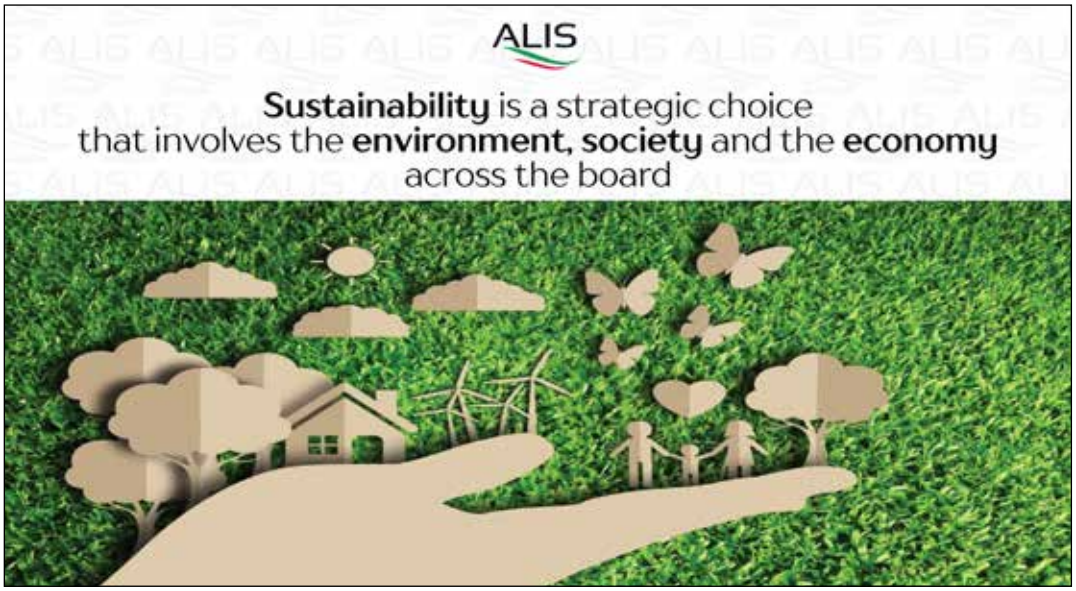
425,000
workers



ALIS

OUR GOALS:

- environmental, social and economic sustainability
- internationalization of companies
- simplification and digitalization
- training and employment growth
- strengthening cohesion and territorial continuity including the major islands


ALIS
Sustainability is a strategic choice
that involves the environment, society and the economy
across the board


ALIS
Investments
• new ships
• fleet refitting
• acquisitions
• new company incorporations
• cybersecurity
• human capital
• value distribution
CYBER SECURITY


ALIS
NEW SHIPS AND FLEET REFITTING
over 50 new green ships
over 5 billion €


ALIS
ACQUISITIONS
AND NEW COMPANY INCORPORATIONS


ALIS
PORTS
new concessions
photovoltaic installations
shore power
hydrogen-powered vehicles


ALIS
HUMAN CAPITAL
training
bonuses, benefits and welfare
professional growth

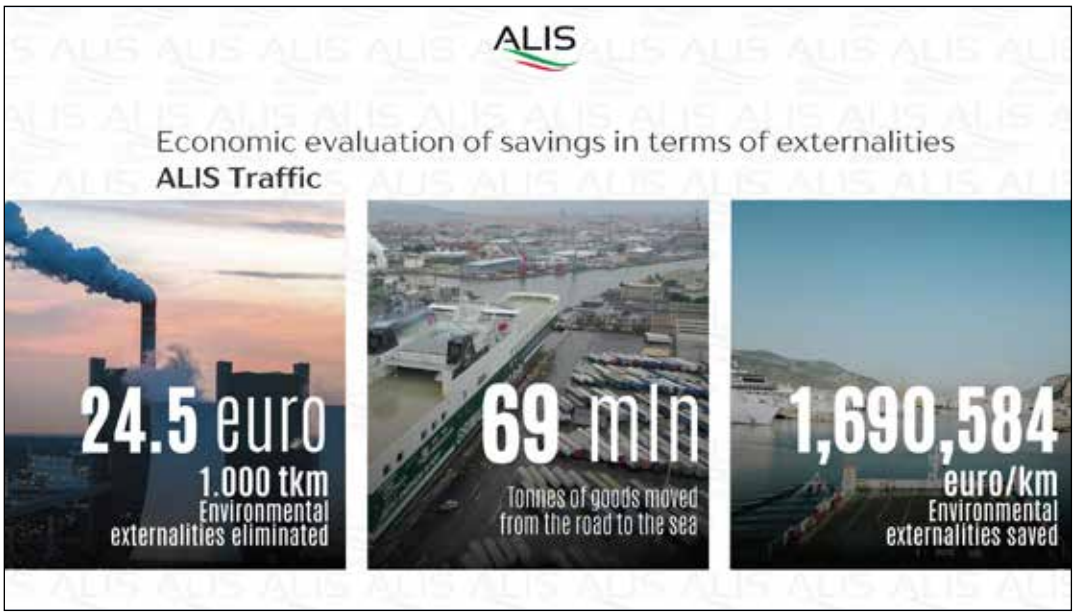

ALIS
VALUE DISTRIBUTION
professional opportunities
growth of local economies
charity and volunteer activities


ALIS
CYBERSECURITY
CYBER SECURITY


ALIS
Our members are focused on the excellence of their services and respect for individuals and laws, as well as the enhancement of their employees following the principles of legitimacy, loyalty, fairness and transparency
ETHICS


ALIS
ALIS members play an **active role in the main trade associations** to which they belong, both in Italy and abroad, in order to **define the strategic directions** of shipping and logistics.
International Chamber of Shipping
European Shipowners
INTERFERRY
GIA
Global Industry Alliance
ECG
CLEANSHIPPINGALLIANCE2020
Getting to Zero Coalition
CLÚSTER
SVENSK SJÖFART
MAREVIVO
ANAVE
MiSa
THE MALTA CHAMBER OF COMMERCE, ENTERPRISE AND INDUSTRY
CAMERA DI COMMERCIO ITALO - ELLENICA DI SALONICCO
Hellenic Chamber of Shipping
Suomen Satamaliitto
Finlands Hamnförbund
Finnish Port Association


In collaborazione con
ALIS
srm
Road-Sea environmental impact
ALIS Traffic
2,6 mln
trucks and heavy goods vehicles removed from the road
69 mln
Tonnes of goods moved from the road to the sea
2,9 mln
Tonnes of CO2 emissions fewer pollutants


ALIS
Economic evaluation of savings in terms of externalities
ALIS Traffic
24.5 euro
1.000 tkm
Environmental externalities eliminated
69 mln
Tonnes of goods moved from the road to the sea
1,690,584
euro/km
Environmental externalities saved

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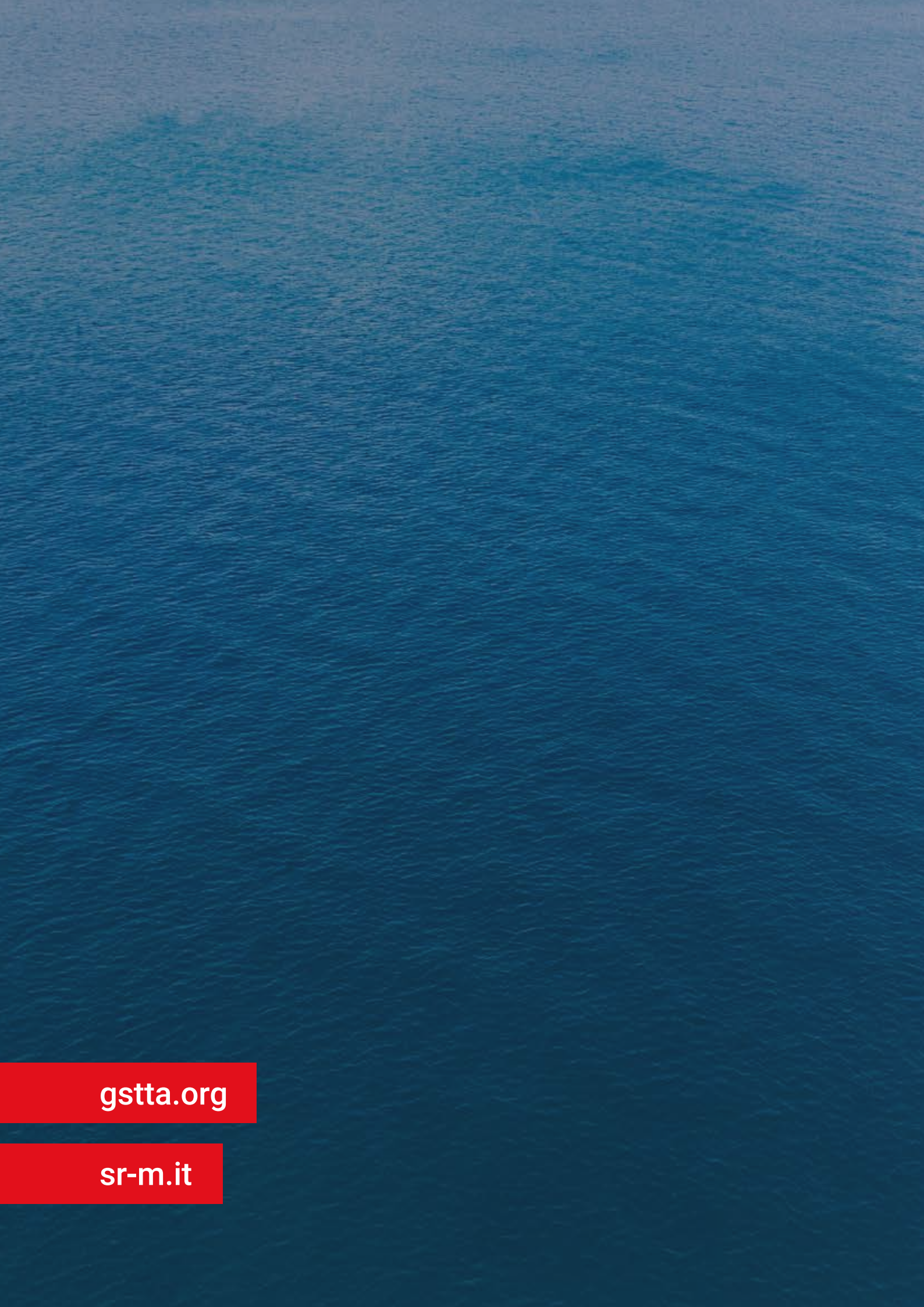
SISI



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