ASIA AND THE PACIFIC TRANSPORT FORUM 2024

CLEAN TRANSPORT FOR ALL

14–17 May 2024 | ADB Headquarters, Manila, Philippines

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Development of Green Ports and Green Shipping

ADB Consultant - Adrian Sammons; Greening of ports and the shipping industry in the People's Republic of China (PRC) Inland Waterways.

ADB

Hello!

I am Adrian Sammons

My role over the last two years has been Technical Consutant to ADB for the Greening of ports and the shipping industry in the People's Republic of China (PRC) Inland Waterways.

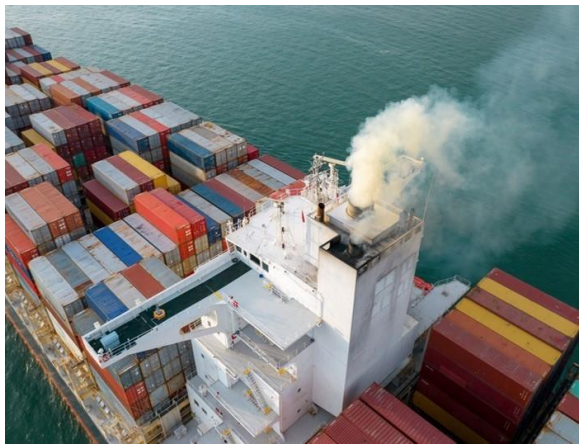
You can find me at adrian@amstec.com.au

Development of Green Ports and Shipping

- The ADB is providing knowledge and technical assistance (TA) to support the greening of ports and the shipping industry in the People's Republic of China (PRC) by providing best practice international case studies, policy recommendations, an investment road map, and knowledge sharing activities.
- Nestra - a global expert on sustainable transport solutions was appointed to lead the research and strategic development options and policy recommendations.
- This is the first TA to study clean energy and new energy applications for the ports and shipping industry in the PRC. It builds on a previous study of air pollution and GHG emissions control in the PRC's transport sector, which focused on urban transport and roads.

ENVIRONMENTAL IMPACTS OF PORTS AND SHIPPING

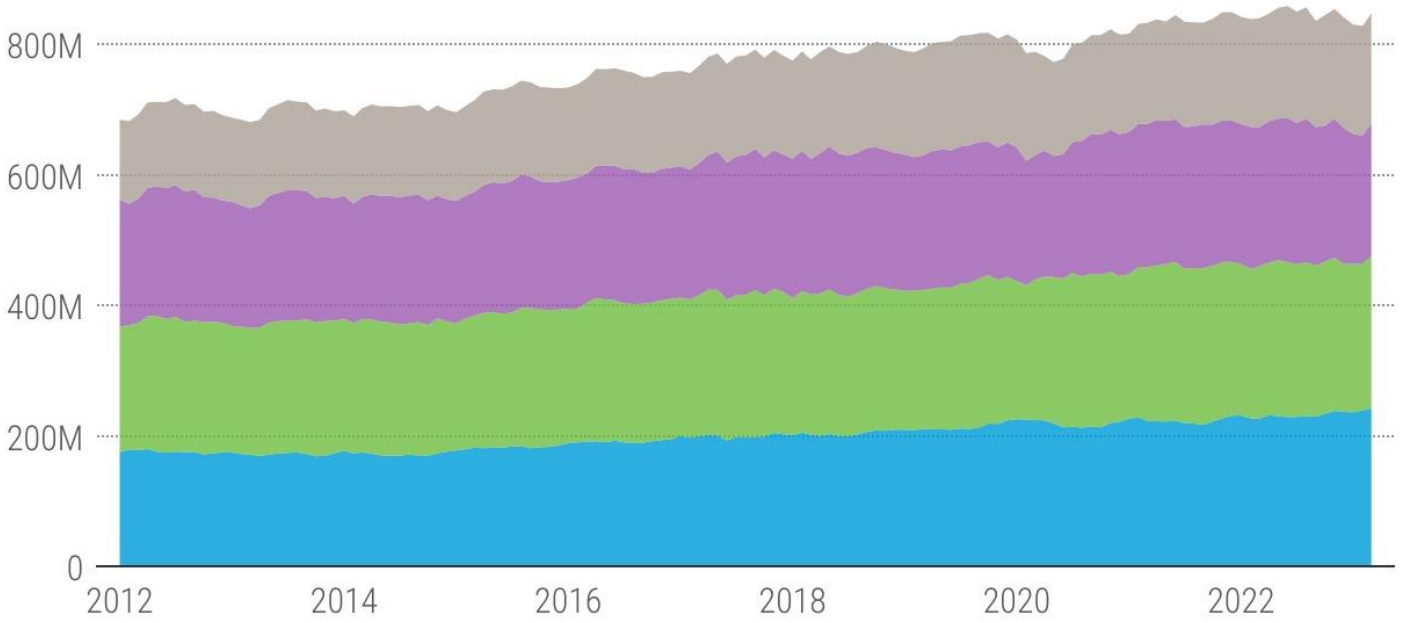
- Maritime transport is responsible for 2-3% of global greenhouse gas emissions
- Predicted to increase to 17% by 2050 if left unchecked
- Solution is to mitigate energy use and greenhouse gas emissions of this industry in the face of climate change.
- Port activities, such as berthing of ships, can have environmental impacts including oil spills, air & water quality, noise, vibration and light pollution.
- Intermodal transport of cargo in containers on trucks, trains or feeder ships to final destinations contributes to carbon dioxide, sulfur dioxide, black carbon and other environmentally harmful greenhouse gases and particulates.



ENVIRONMENTAL IMPACTS OF SHIPPING

UNCTAD

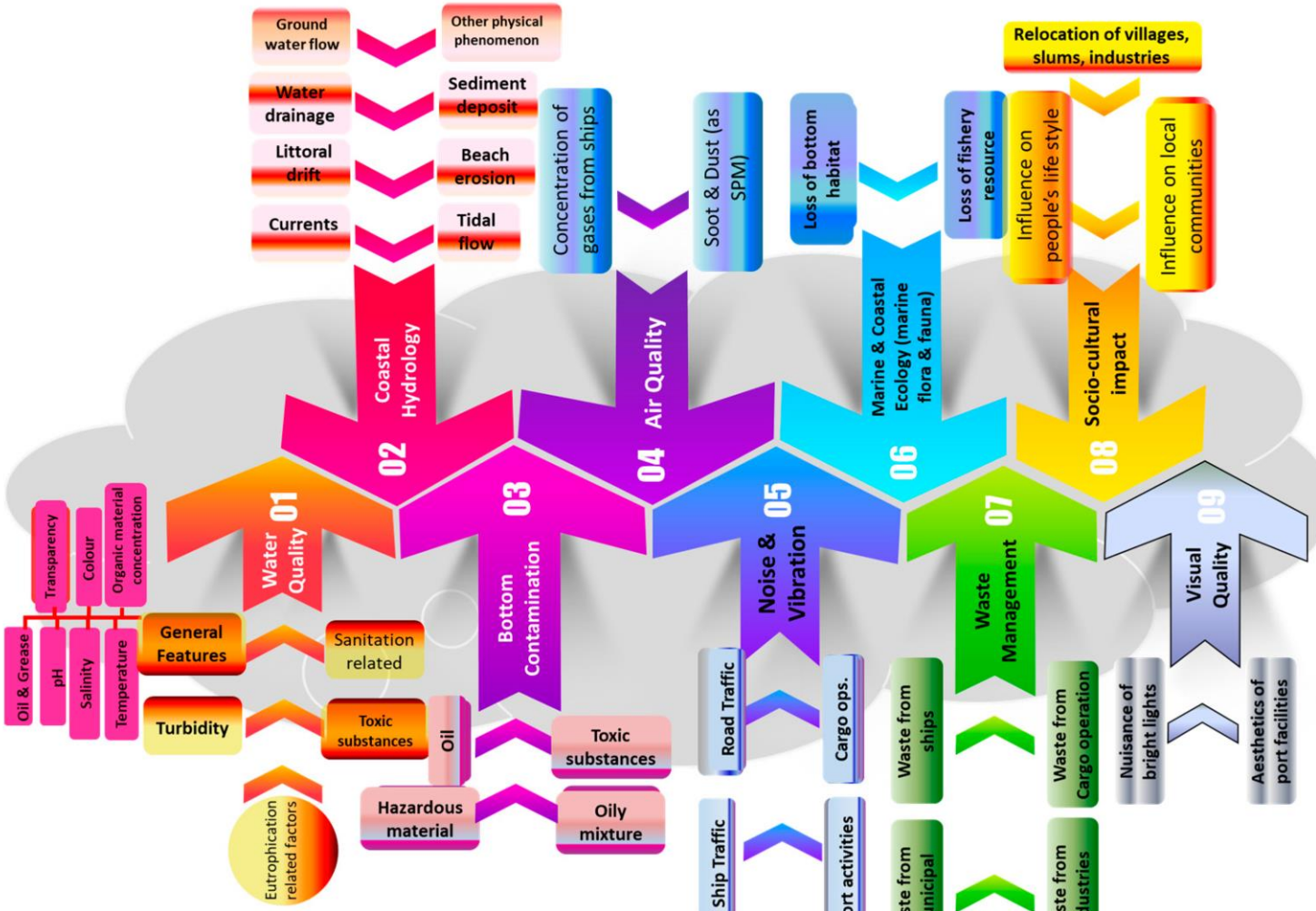
Carbon dioxide emissions by main vessel types, tons, 2012–2023



Note: The group "other" includes vehicles and roll-on/roll-off ships, passenger ships, offshore ships and service and miscellaneous ships.

Source: UNCTAD based on data provided by Marine Benchmark, June 2023.

ENVIRONMENTAL IMPACTS OF PORTS



Source: Oceans 2023, 4, 360–380. https://doi.org/10.3390/oceans4040025

Impact and Outcomes of Study

- The objective of the Technical Study is to provide policy and implementation guidelines for the development of new green energy applications in ports and inland river shipping in the PRC.
- The study outcomes are to serve as a tangible demonstration of a focused effort to create a sustainable and more manageable environment, not just for the PRC, but as a possible model for global emulation.

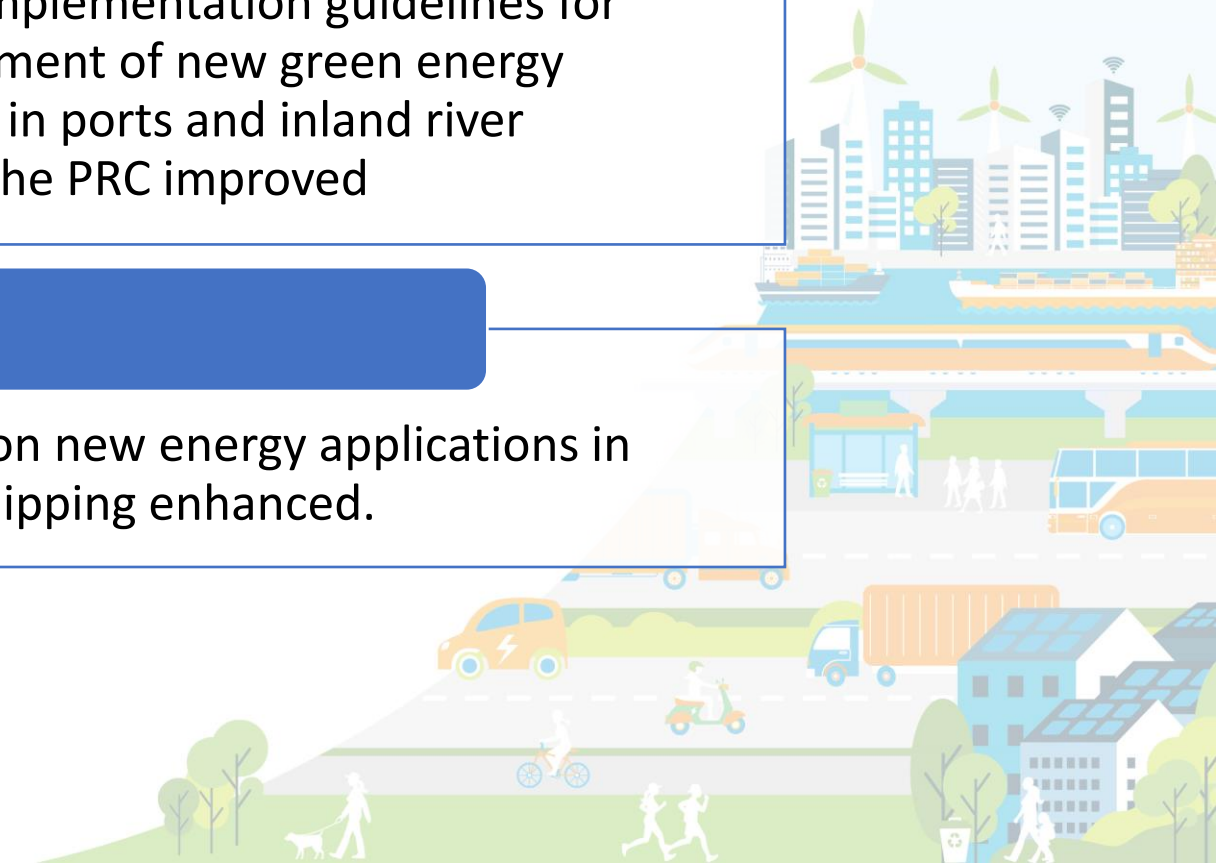
Project Deliverables – Two Key outputs

OUTPUT 1

- Policy and implementation guidelines for the development of new green energy applications in ports and inland river shipping in the PRC improved

OUTPUT 2

- Knowledge on new energy applications in ports and shipping enhanced.



Project - Key output Details

OUTPUT 1 Review international best practices for the development of green ports and shipping

- Gap assessment will be completed for (i) the greening of Qingdao Port
- Develop recommendations for green hydrogen or other clean energy applications
- Address the barriers to adoption of new technologies
- Road map that will identify (i) short-, medium-, and long-term investment priorities; and (ii) policy recommendations for the phased development of clean energy applications in ports and new energy technologies for inland waterway ships in the PRC.

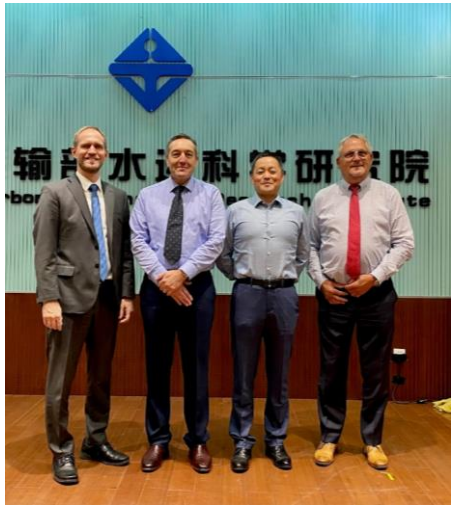
OUTPUT 2 Knowledge on new energy applications in ports and shipping enhanced

- Develop knowledge products and dissemination activities.
- Knowledge products will be published
- support innovations in port operations and inland waterway shipping by promoting the introduction of new technologies

Project Stakeholders – PRC

Ministry of Transport	• China Waterborne Transport Research Institute of the Ministry of Transportation and Communications • Executing Agency - Water Transportation Bureau Ministry of Transportation and Communications
Wuhan University	• Project partner - School of Transportation and Logistics Engineering, Wuhan University of Technology
Nestra	• Project leader and Principal Consultant

Project Stakeholder Meetings



Field Work Missions Undertaken – PRC

MISSION 1

- Workshop in Wuhan
  Development of Green Ports and Shipping an overview was provided of greening practices in P.R.C.'s port and inland shipping sector

MISSION 2

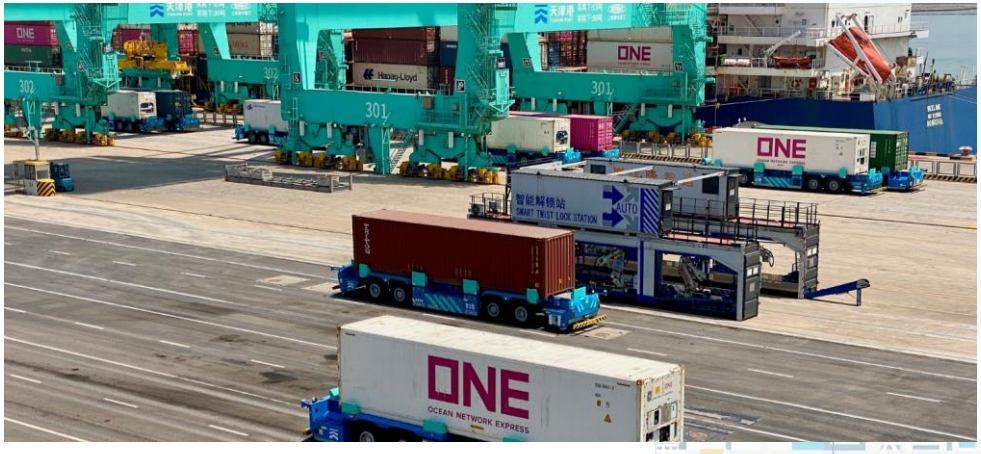
- Study Tour
  workshop of intelligent shipping alliance in Beijing
  Visit Qingdao – Green hydrogen energy project
- Visit Huzhou – green shipping demonstration zone

MISSION 3

- Academic Symposium on Green Hydrogen and other Clean Energy in Ports
- Seminar on New Energy Applications in Ports and Shipping

Project Field Missions

Project Field Missions



Project Field Missions

Project – Key Reports Delivered

Report Task 1

- Overview of greening practices in P.R.C.'s port and inland shipping sector. An analysis of potential future developments and expectations is conducted as a basis for a roadmap to introduce greening technologies in short, medium and long term, including recommendations for implementation

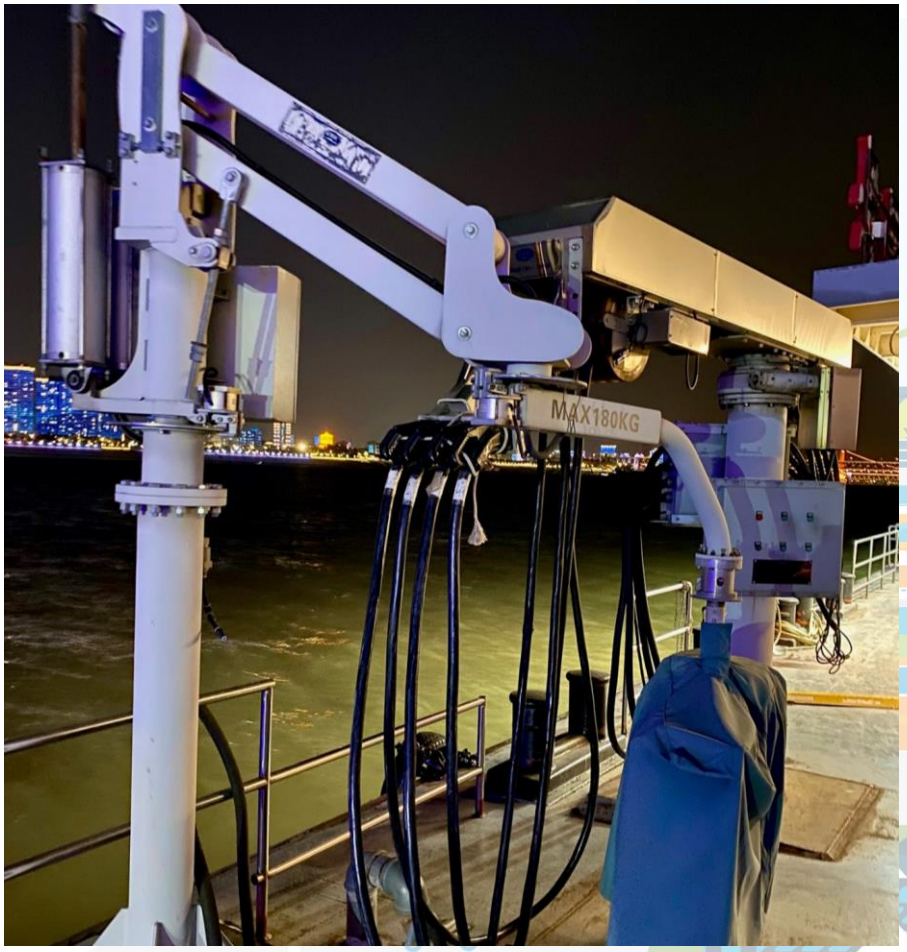
Report Task 2

- Knowledge product on new energy applications in ports and shipping
- Analysis of key influencing factors for the promotion of green technology in port and shipping
- Experience and bottlenecks in the promotion of green technology regulation
- Port Greening Technology Promotion Policy Recommendations

Policy Brief

- policy recommendations to accelerate the adoption of new energy technologies in ports and inland waterway shipping facilities in the People's Republic of China (PRC)
- Align with the country's ambitions to reach peak carbon emissions by 2030 and achieve carbon neutrality by 2060

Project Field Missions



How 'Green' is Being Defined at Ports

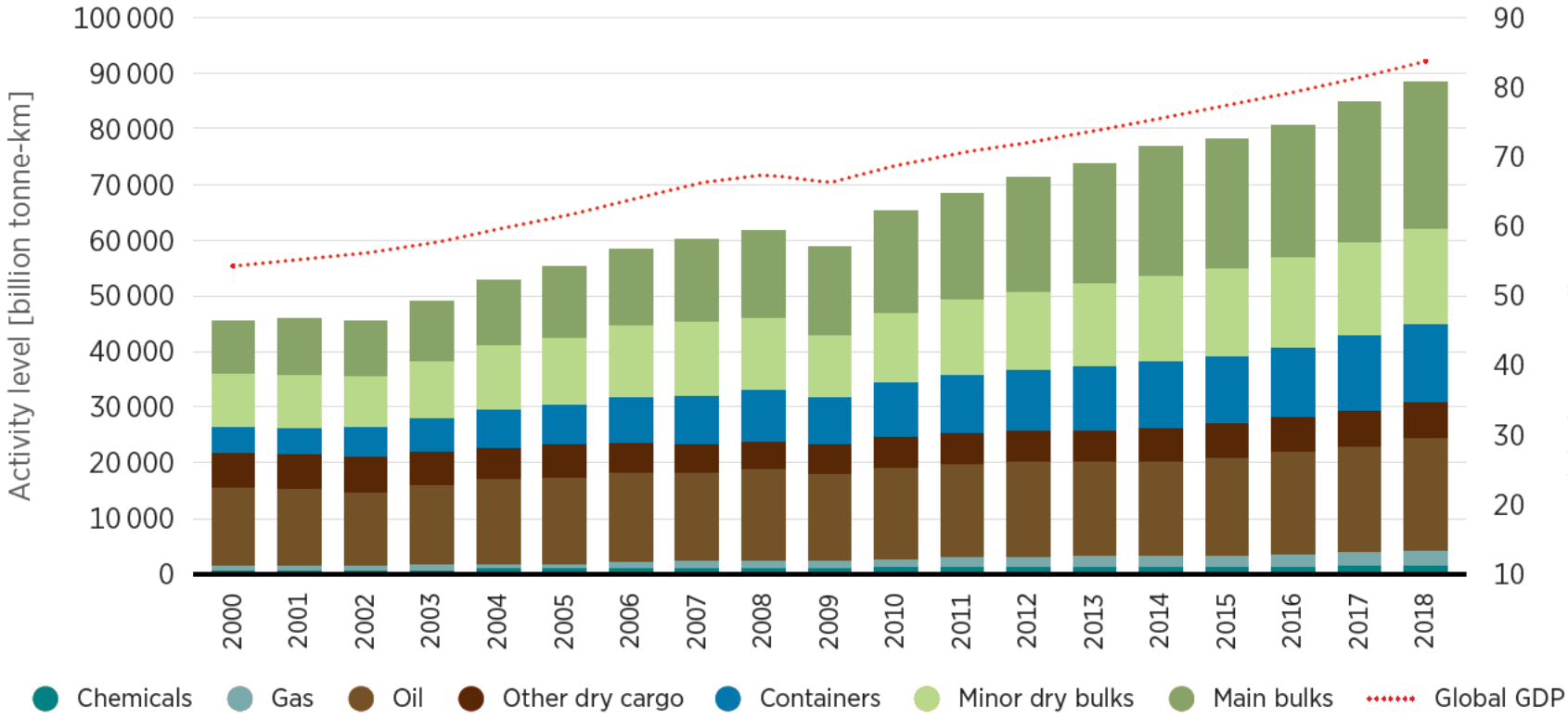
• Green Vs Sustainability

- Green typically focuses directly on environmental performance whereas sustainability is balance between economic, social and environmental.
- Port sustainability is defined as strategies and activities that meet current and future needs of port stakeholders while protecting and sustaining human and natural resources (AAPA, 2007).

• Greening in Ports

- A green port is one that balances environmental challenges with economic demands (European Commission, 2017).
- Green ports are defined as those engaged in the proactive development, execution, and monitoring practices targeted at reducing environmental effects beyond compliance (Acciaro, 2015).

Global Shipping Demand Increases Port Activity



Source: IRENA, 2020d

How 'Green' is Being Defined in Shipping

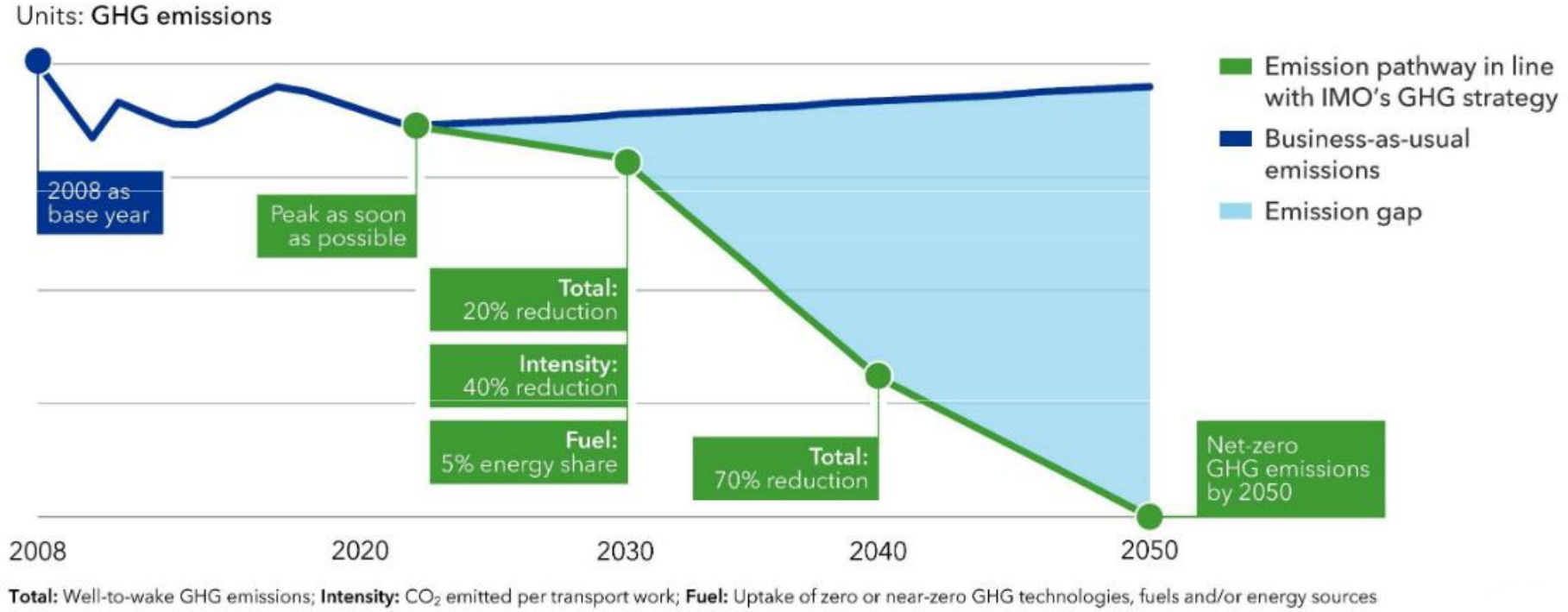
• Green Vs Sustainability

- World trade is expanding which in turn increases the demand for shipping – and fuel demands.
- In 2022 Green Shipping Corridors (GSCs) were defined at COP26 as port-to-port decarbonization by incorporating strategies to reduce maritime fuel emissions (GHG) there were 22 signatories to the COP26 - Clydebank Declaration.

• Greening in Shipping

- In 1997 the International Maritime Organization (IMO) established limits on international maritime ship emissions, effective from 2005.
- Greening of Shipping is led by the decarbonization agenda. In July 2023 IMO agreed 'indicative checkpoints' and targets for GHG emissions;
  - 2030 = 20% target / 30% striving
  - 2040 = 70% target / 80% striving
  - 2050 = net zero emissions for shipping

World Shipping Sustainability Program (WPSP)



Total: Well-to-wake GHG emissions; **Intensity:** CO_2 emitted per transport work; **Fuel:** Uptake of zero or near-zero GHG technologies, fuels and/or energy sources

Source: DNV2023

How Global Shipping is Responding

MAERSK HAS MADE AN ORDER OF SIX MID-SIZED CONTAINER VESSELS – ALL HAVING DUAL-FUEL ENGINES ABLE TO OPERATE ON GREEN1 METHANOL. YANGZIJIANG SHIPBUILDING GROUP WILL BUILD THE SIX 9,000 TEU VESSELS WHICH WILL BE DELIVERED IN 2026 AND 2027.

TARGET OF BECOMING NET-ZERO IN 2040. THESE SHIPS WILL BE ABLE TO RUN ON GREEN METHANOL. (RABAB BOULOS CHIEF INFRASTRUCTURE OFFICER AT MAERSK.

IN 2021, MAERSK ORDERED THE WORLD'S FIRST METHANOL-ENABLED CONTAINER VESSEL FOLLOWING A COMMITMENT TO THE PRINCIPLE OF ONLY ORDERING NEWBUILT VESSELS THAT CAN SAIL ON GREEN FUELS. THE GLOBAL ORDERBOOK STANDS AT MORE THAN 100 METHANOL-ENABLED VESSELS.

BY ORDERING ADDITIONAL SIX VESSELS, MAERSK NOW HAS 25 METHANOL-ENABLED VESSELS ON ORDER.

MAERSK HAS PARTNERED WITH EQUINOR AS A SUPPLIER OF METHANOL THROUGH ITS PRODUCTION PLANTS

How Global Shipping is Responding

World Ports Sustainability Program (WPSP)

AAPA
American Association of Port Authorities
Alliance of the Ports of Canada, the Caribbean, Latin America and the United States

PIANC A.D. 1885 AIPCN NAVIGARE NECESSE

ESPO

IAPH
International Association of Ports and Harbors

aiVP
The worldwide network of port cities

IADC
INTERNATIONAL ASSOCIATION OF DREDGING COMPANIES

ICHCA
INTERNATIONAL

International Harbour Masters Association

BPO
BALTIC PORTS ORGANIZATION

Evolving Priorities For Greening Ports And Shipping

Priority	2016	2017	2018	2019	2020
1	Air quality	Air quality	Air quality	Air quality	Air quality
2	Energy consumption	Energy consumption	Energy consumption	Energy consumption	Climate change
3	Noise	Noise	Noise	Climate Change	Energy efficiency
4	Relationship with the local community	Water quality	Relationship with the local community	Noise	Noise
5	Garbage /Port waste	Dredging operations	Ship waste	Relationship with the local community	Relationship with the local community
6	Ship waste	Garbage /Port waste	Port development (land related)	Ship waste	Ship waste
7	Port development (land related)	Port development (land related)	Climate Change	Garbage /Port waste	Water quality
8	Water quality	Relationship with the local community	Water quality	Port development (land related)	Garbage /Port waste
9	Dust	Ship waste	Dredging operations	Dredging operations	Dredging operations
10	Dredging operations	Climate change	Garbage /Port waste	Water quality	Port development (land related)

The Dilemma for the Port Authority

- It may not necessarily be directly or legally responsible for the activities, products and services of the logistic chain,
- But its overarching administrative role, Ownership of the estate (land and water) Permanency of operational presence,
- means that the Port is the obvious point of contact and the readily identifiable player for any environment related issues in the whole port area – including per se its hinterland

Measuring Success for Greening ports

- Green ports concept is the result of blending economic benefits with the implementation of environmental policies and development of green guides and codes of conduct for port authorities.

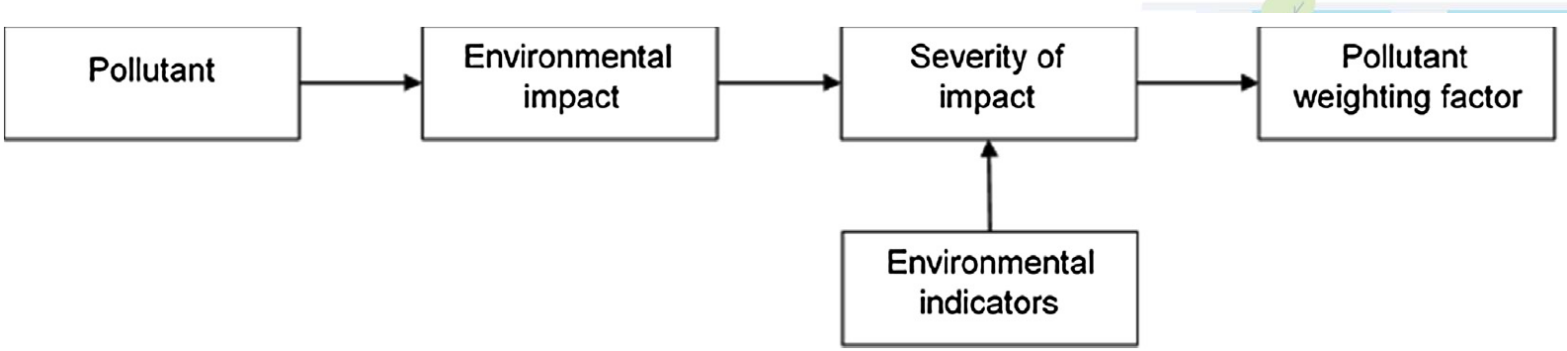
Priority Issue	Sum	Importance according to ports					
Water Quality	27	5	5	5	5	4	3
Soil Contamination	14	4	4	3	2	1	
Port Waste	13	5	3	2	2	1	
Dredging (Operations & Disposal)	13	4	4	3	2		
Air Quality	12	5	4	2	1		
Noise	11	5	3	3			
Energy Consumption	10	5	4	1			
Ship Waste	9	4	3	2			
Port Development (Land)	6	3	2	1			
Ship Unloading	5	5					
Relationship With Local Communities	3	2	1				
Port development (Water)	3	2	1				
Hazardous Cargo	2	1	1				
Ship Discharges To Water	1	1					

At least 90 different environmental initiatives to measure Greenports sector have been identified;

- European Maritime Ports Organization (ESPO)
- Green Marine Environmental Program (GMEP)
- European Commission PORTOPIA project
- Int'l Association of Navigation Congresses)
- Int'l Association of Ports and Harbours and (IAPH)
- Multitude of private sector organisations

Measuring Success for Greening Shipping

- An objective, quantifiable approach to assess pollutants from ships is by assigning weighting factors, by following a series of steps.
- 1st identify the pollutant then the impacts on the environment, quantify in terms of severity using objective environmental indicators – using established indicators such as Global Warming Potential (GWP)
- Results of the severity assessment are then used to determine pollutant indicator weightings factors. Pollutants can be assessed objectively, and weightings assigned based on their environmental impacts..



THANK YOU!

- Development of Port environmental management systems
- Institutional strengthening - environmental management strategy
- Technology opportunities to reduce carbon footprint - investment in clean energy solutions, electrification and de-dieselization
- Infrastructure upgrades, enhanced environmental controls, greater efficiencies, environmental monitoring infrastructure/software
- Support with development of Regional Association of ports – green standards, monitoring, ISO accreditation, shared learnings, awards for greening success


SOUTHERN LILY