

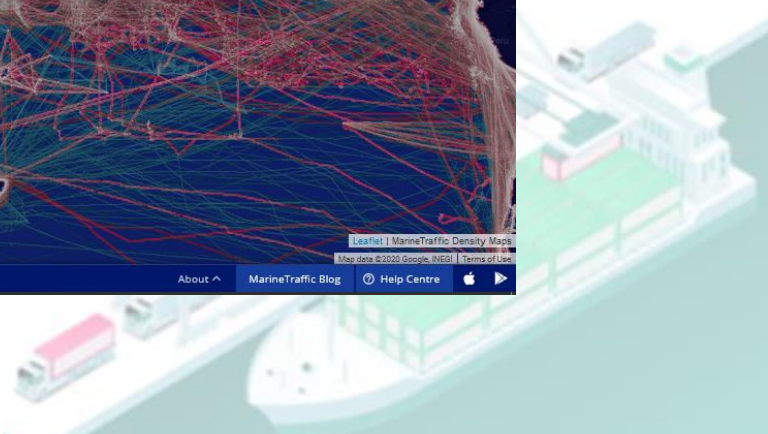
Greening Maritime Transport

Prof. dr Danilo Nikolić

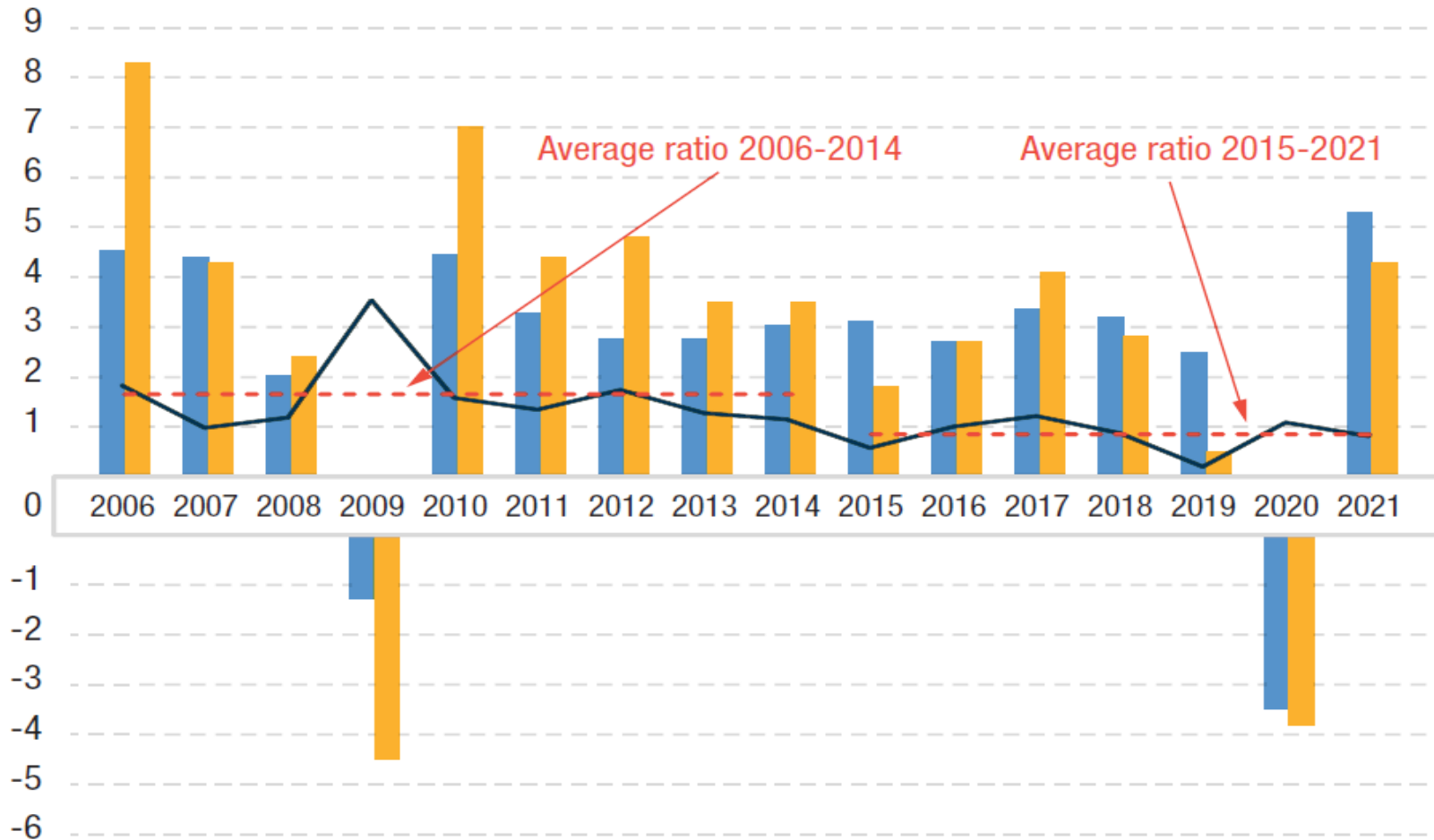
University of Montenegro, Faculty of Maritime studies Kotor



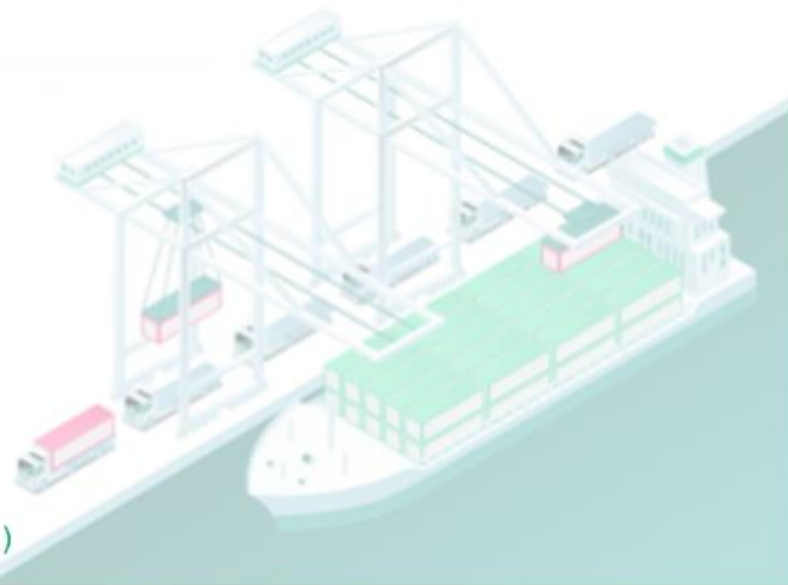
Maritime Traffic Density



Development of International Maritime Trade



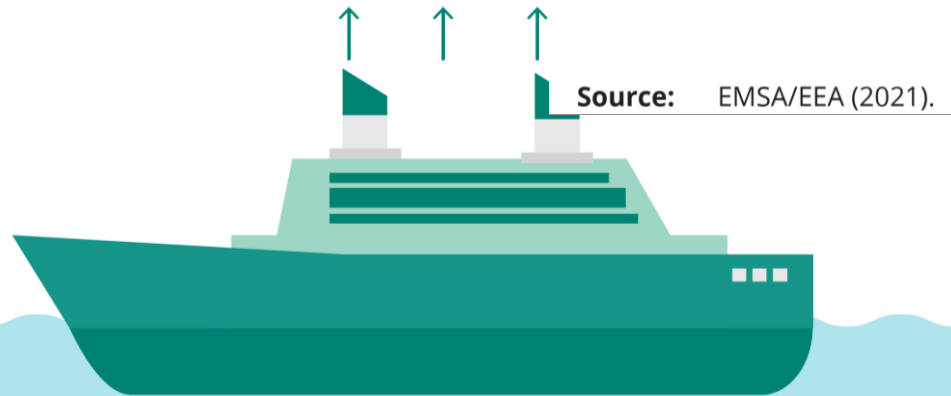
UNCTAD (United Nations Conference on Trade and Development) calculations. International maritime trade and world gross domestic product (GDP) and maritime trade-to-GDP ratio, 2006 to 2021. Figure credits: RMT 2021, UNCTAD, based on various sources



Pollution from Maritime Transport

Emissions to the atmosphere, typically designated air emissions, constituting of greenhouse gases and air pollutants (other relevant substances).

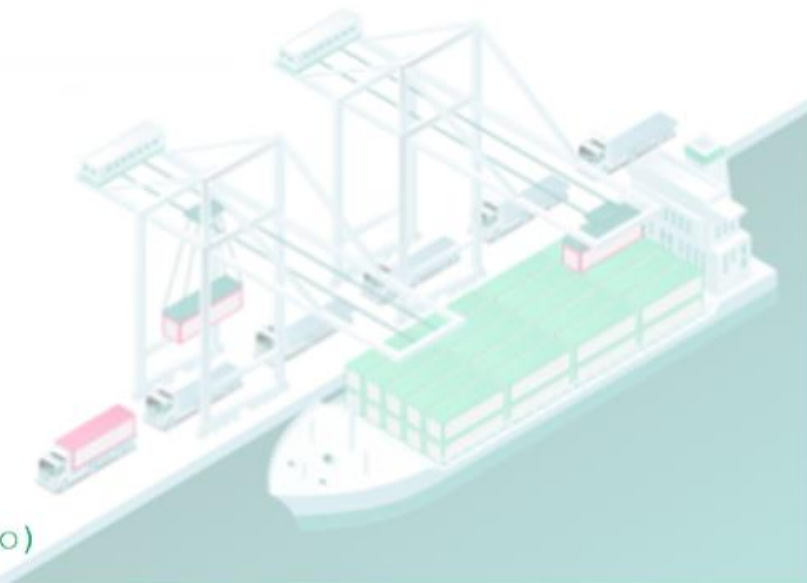
GHG (Greenhouse gases) — CO₂ (Carbon dioxide), CH₄ (Methane), N₂O (Nitrous oxide), HFCs (Hydrofluorocarbons), PFCs (Perfluorocarbons) and SF₆ (Sulphur hexafluoride).
Air pollutants and other relevant substances — NO_x (Nitrogen oxides), SO_x (Sulphur oxides), NMVOC (Non-methane volatile organic compounds), CO (Carbon monoxide) and PM (Particulate matter, including black carbon).



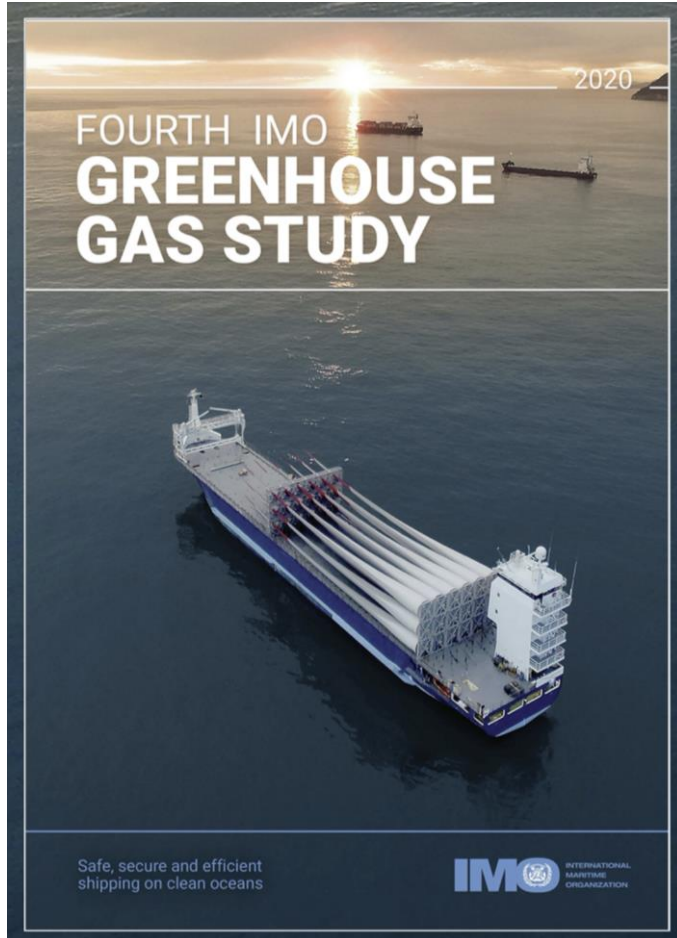
Emissions to the surrounding water body, in the shape of discharges, biocide effect of persistent anti-fouling components, invasive species.

- Oil and oily waters
- Sewage and other
- Ballast water (invasive species with impact over the ecosystems)
- Antifouling compounds (influence of TBT/heavy metals from AFS in ecosystems)
- Solid residues (waste and other solid residues)
- Operational residue waters (such as Scrubber washwater)
- Dangerous substances/goods
- Underwater radiated noise

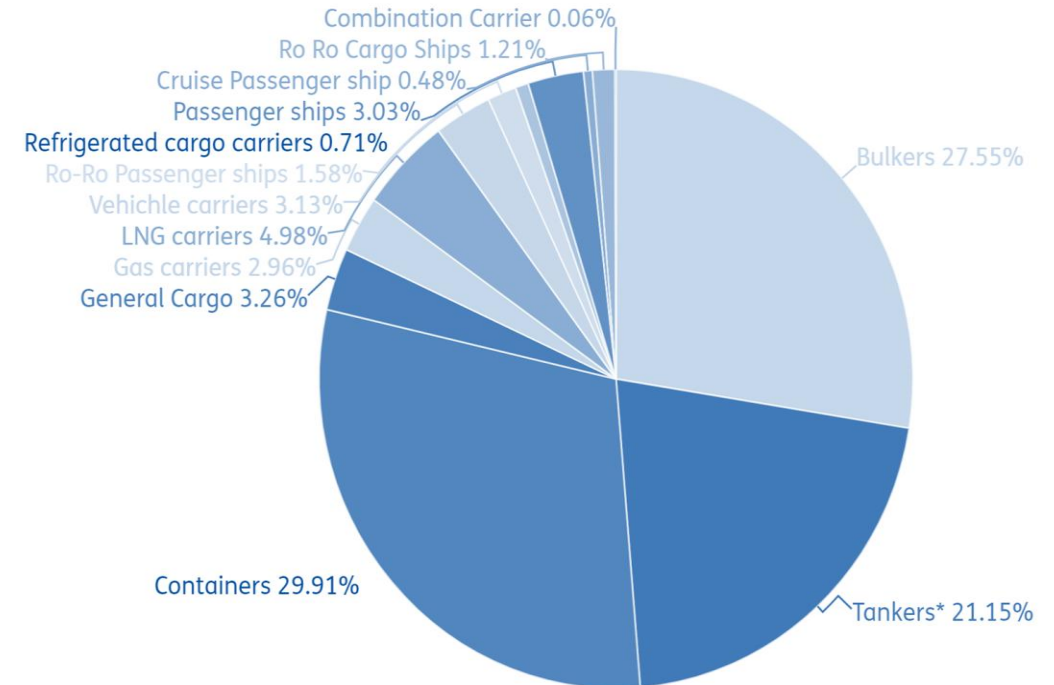
Substance	Consequences
CO ₂	Climate Change
SO _x	Acidification Air quality (smog - health problems)
NO _x	Acidification Air quality (smog - health problems)
PM	Air quality (health problems)



Global CO₂ Emission from Maritime Transport



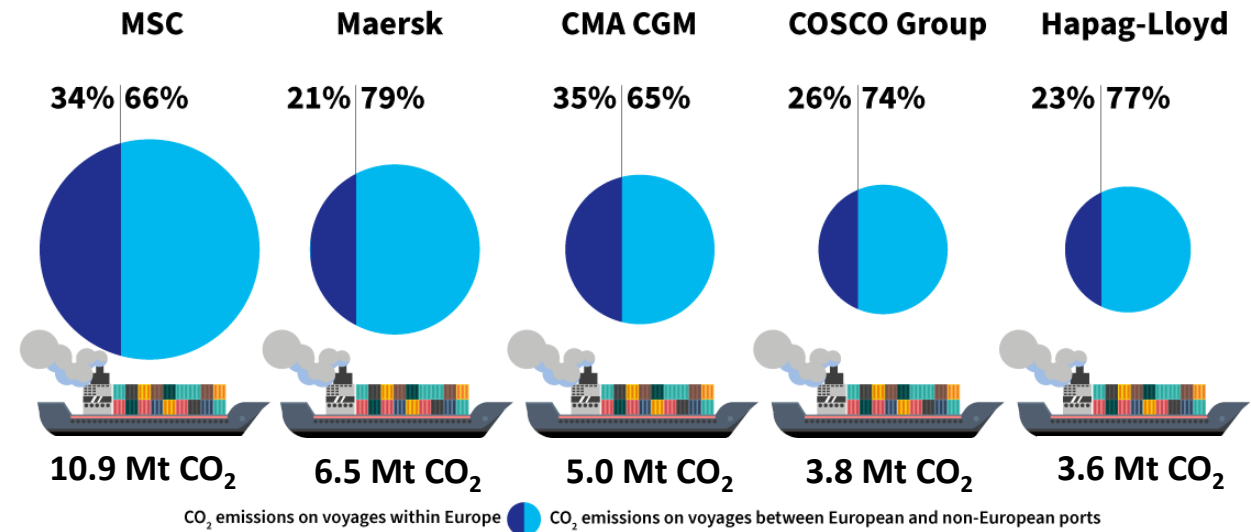
- ✓ Total amount of GHG emissions from shipping have increased from 977 million tonnes in 2012 to 1,076 million tonnes in 2018 (9.6% increase).
- ✓ The share of shipping emissions has increased from 2.76% in 2012 to 2.89% in 2018.



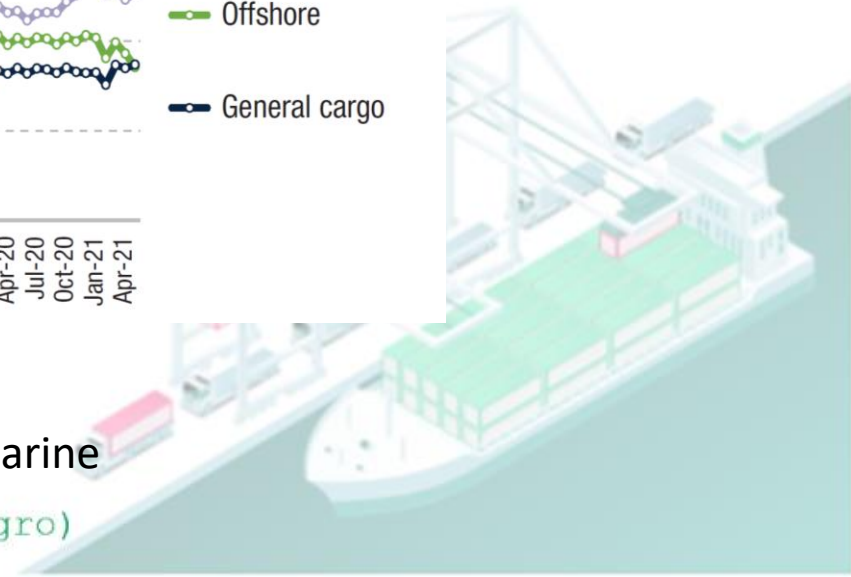
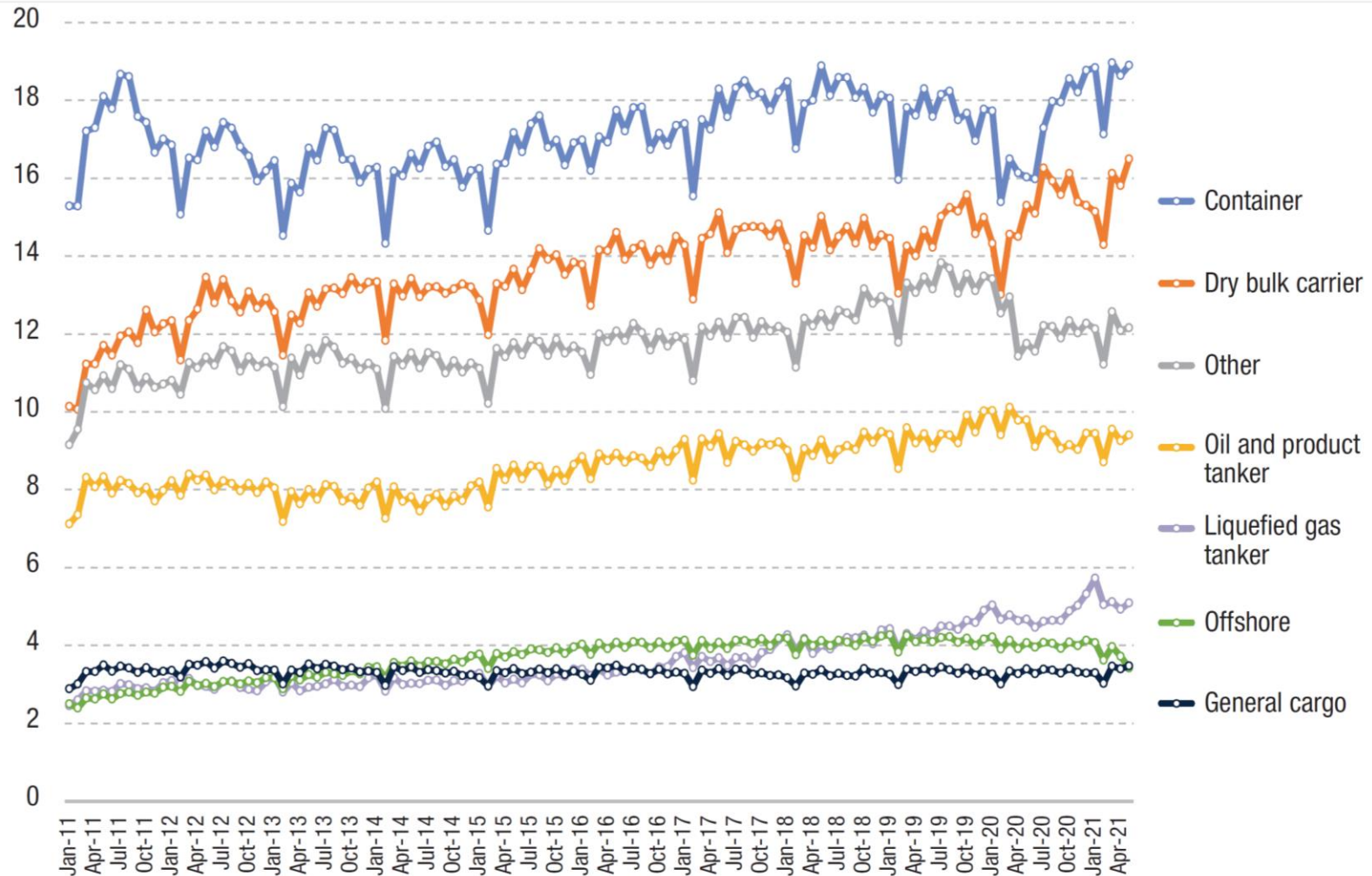
Share of CO₂ emission by ship type (2019)



Shipping Company Climbs to EU top 10 CO₂ Emitters



Carbon dioxide emissions by vessel type, monthly, million tons, 2011–2021

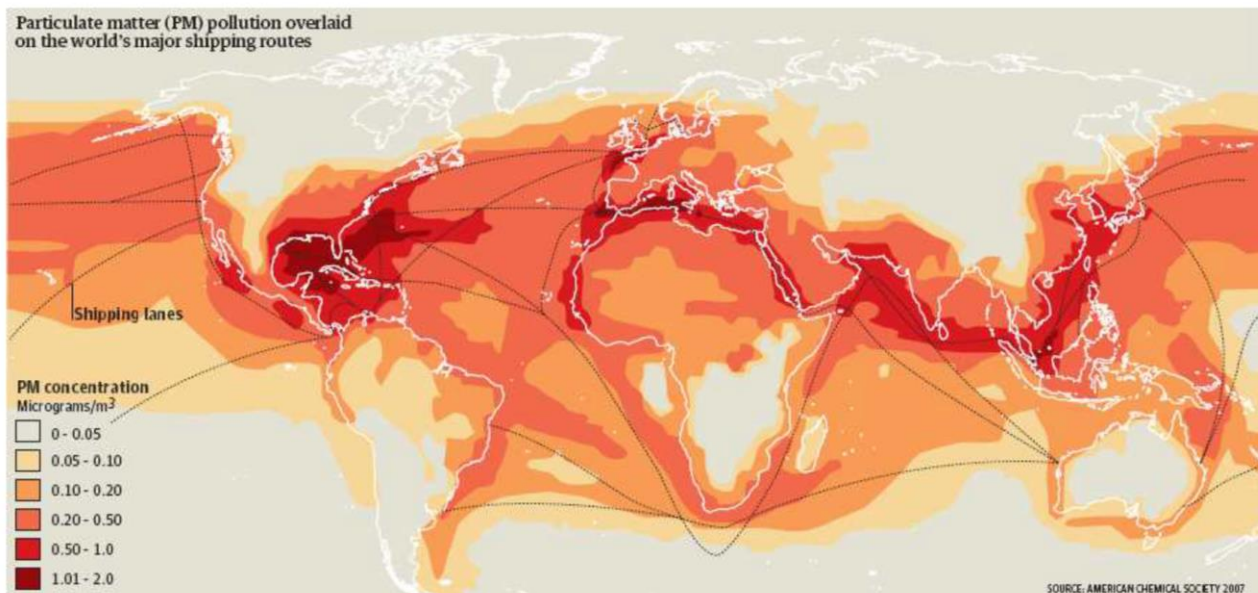


Emission of Pollutants from Maritime Transport

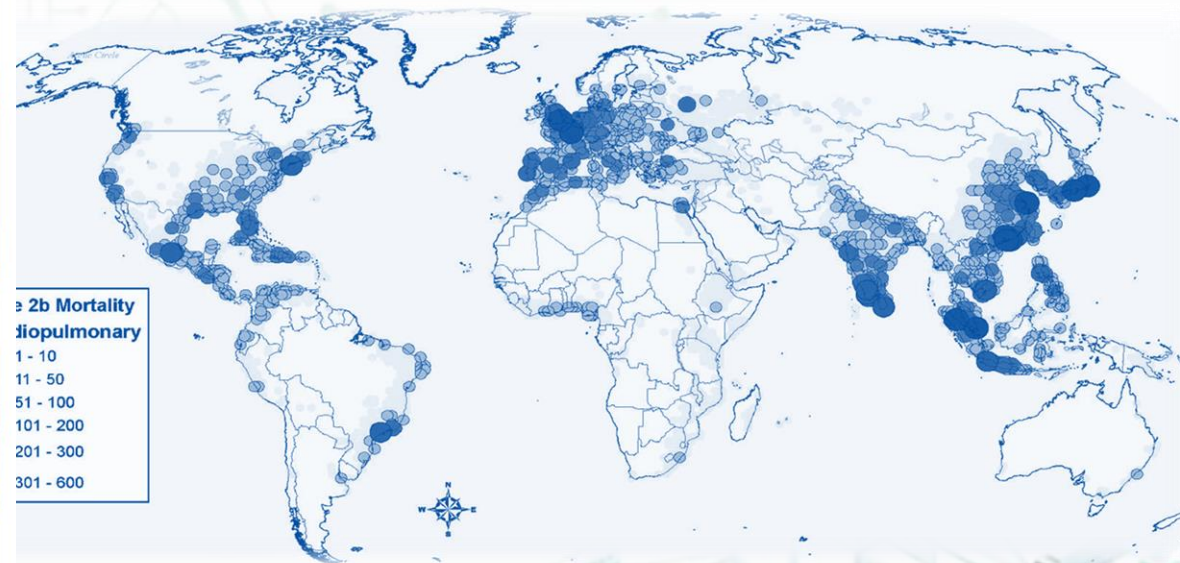


Emission of Pollutants from Maritime Transport

Particulate Matter pollution overlaid on the world's major shipping routes



Mortality associated with PM emissions from marine diesel engines



Source: J. Corbett et al 2007

PM 2,5

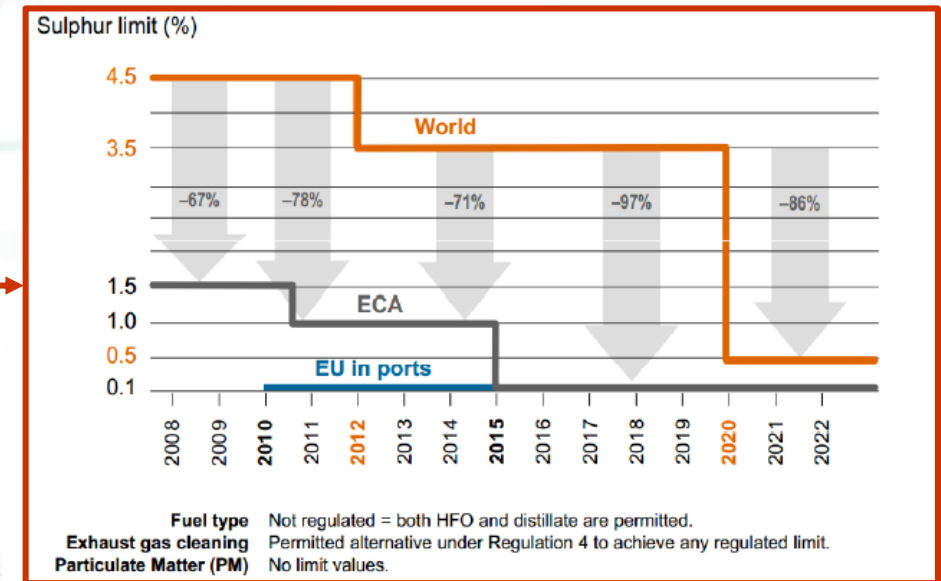
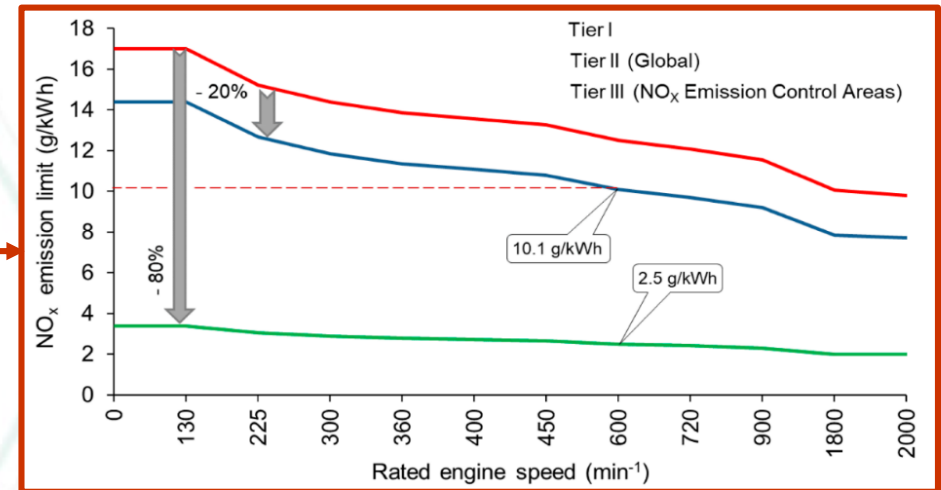


IMO Legislation – MARPOL Annex VI

Chapter 3 - Requirements for Control of Emissions

- Ozone depleting substances
- Nitrogen oxides (NO_x)**
- Sulphur oxides (SO_x) and PM**
- Volatile organic compounds (VOC)
- Shipboard incineration
- Reception facilities
- Fuel oil availability and quality

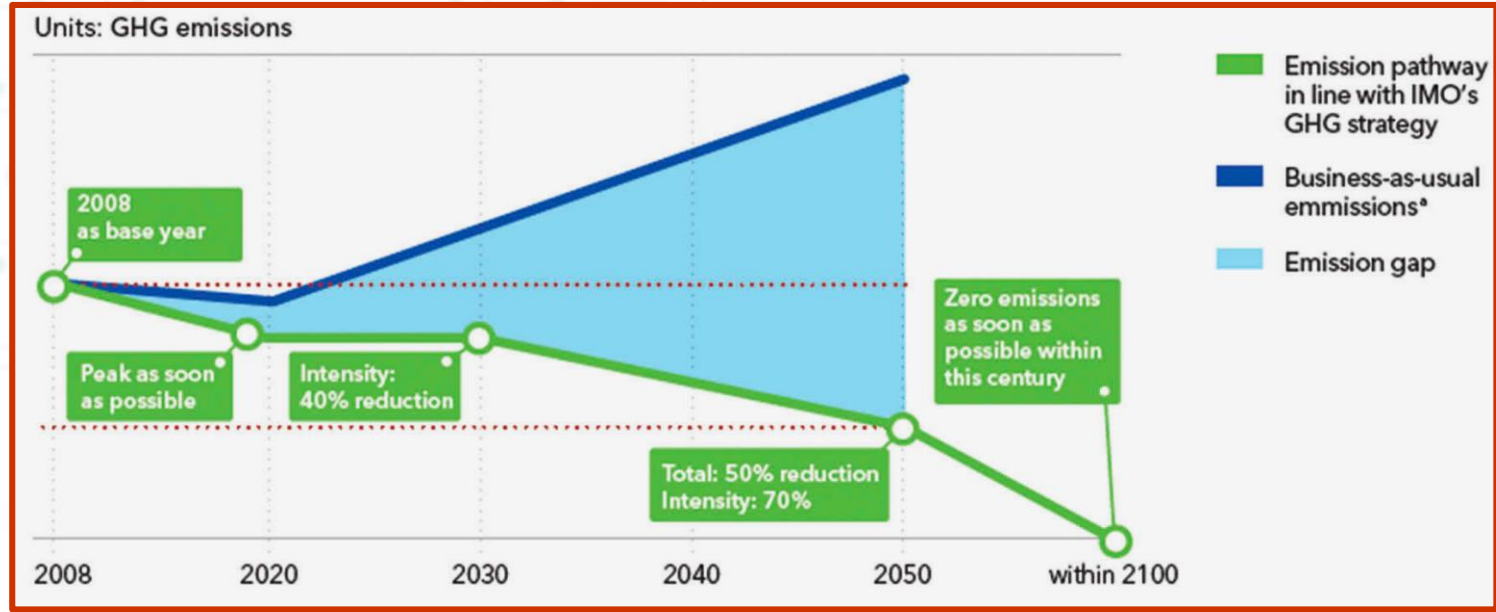
- Reg.12
- Reg.13**
- Reg.14**
- Reg.15
- Reg.16
- Reg.17
- Reg.18



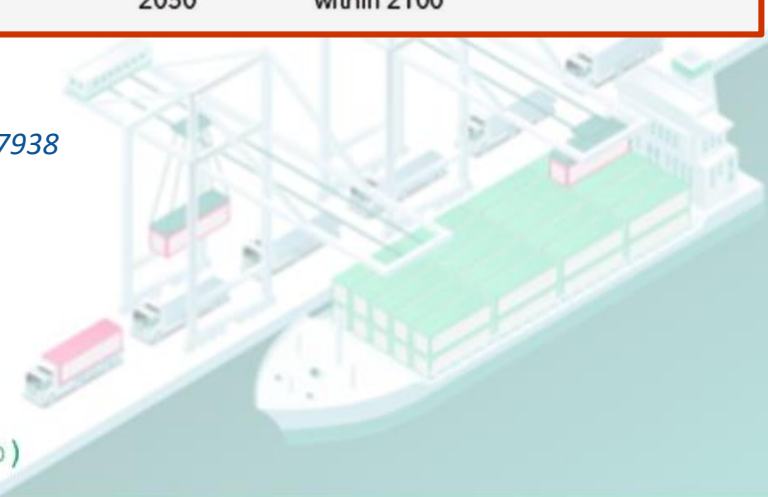
IMO Legislation – MARPOL Annex VI

Chapter 4 - Energy Efficiency Regulations

Application	Reg.19
Attained EEDI	Reg.20
Required EEDI	Reg.21
SEEMP	Reg.22
DCS (Data Collection System)	Reg.22A
Technical coop. and techn. Transfer	Reg.23



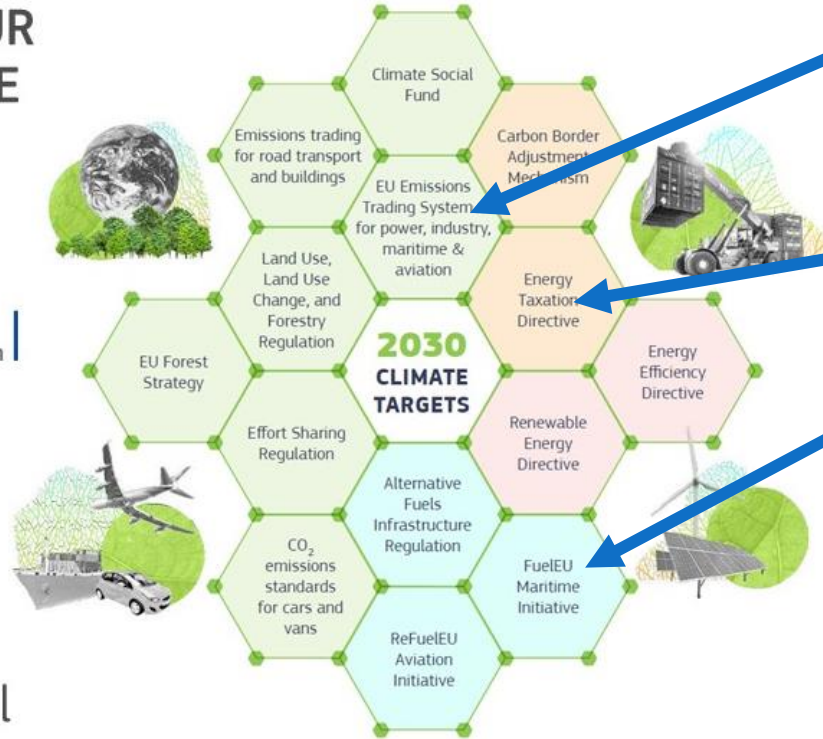
Source: <https://doi.org/10.1080/25725084.2019.1707938>



EU Legislation

EUROPEAN GREEN DEAL

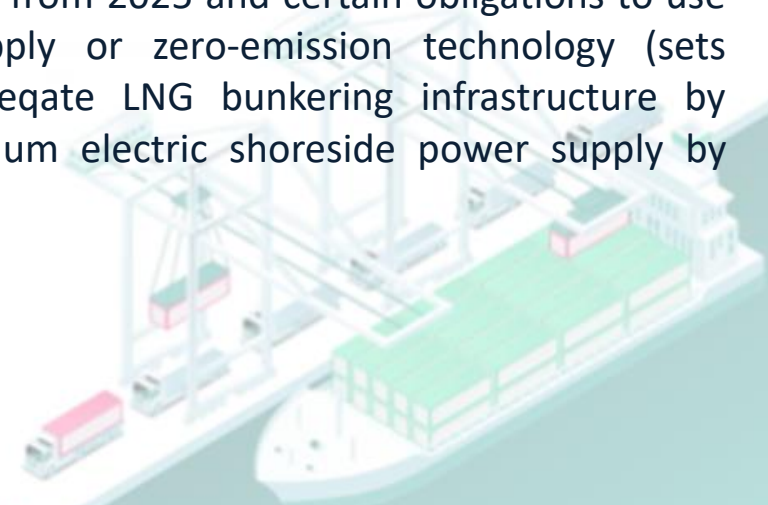
REACHING OUR 2030 CLIMATE TARGETS



#EUGreenDeal

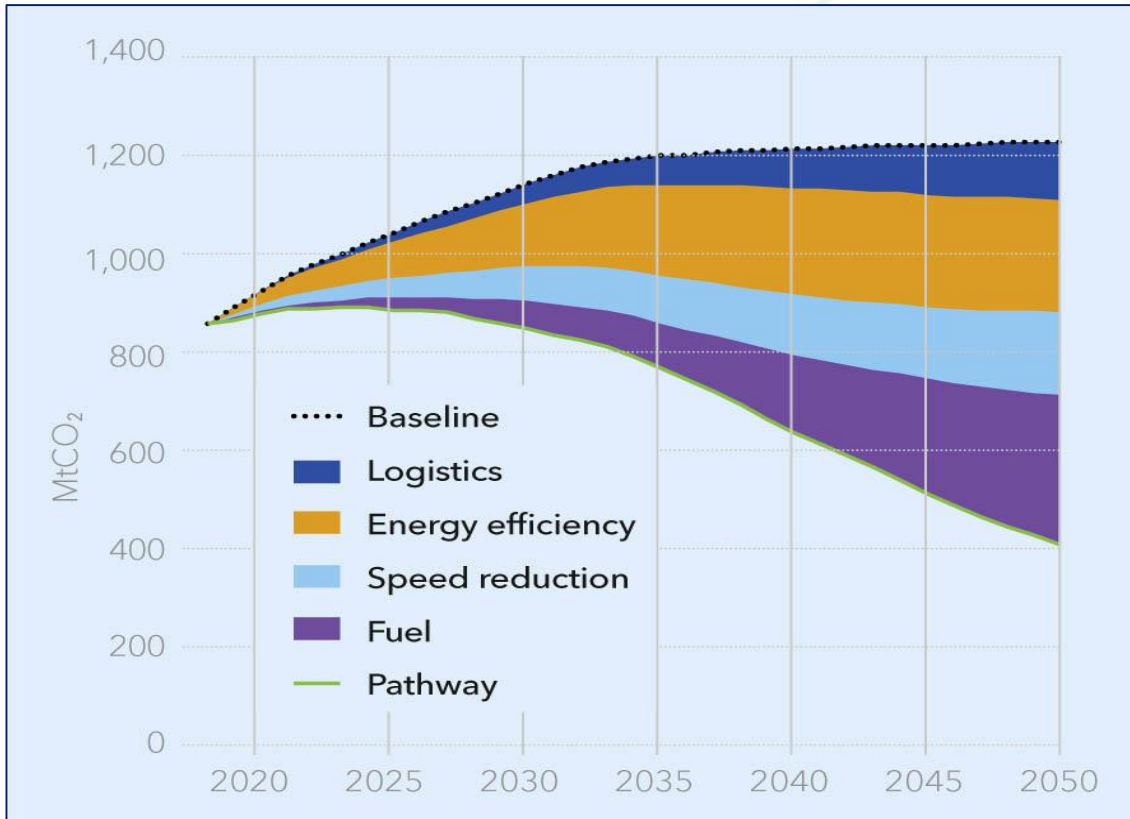
EU “Fit for 55 Package” in Maritime sector

- **The EU Emissions Trading System (ETS):** Extended to include maritime transport. Ships of 5.000 GT and above to be included in the EU ETS from 2023. Applicable to all intra-EEA voyages to/from countries outside the EEA.
- **The Energy Taxation Directive (ETD):** Introduction of a minimum tax rate on certain fuels / vessels from 2023.
- **The FuelEU Maritime Initiative:** A maximum limit on the greenhouse gas intensity of energy used on-board (renewable and low-carbon fuels) from 2025 and certain obligations to use on-shore power supply or zero-emission technology (sets requirements for adequate LNG bunkering infrastructure by 2025, and for minimum electric shoreside power supply by 2030).



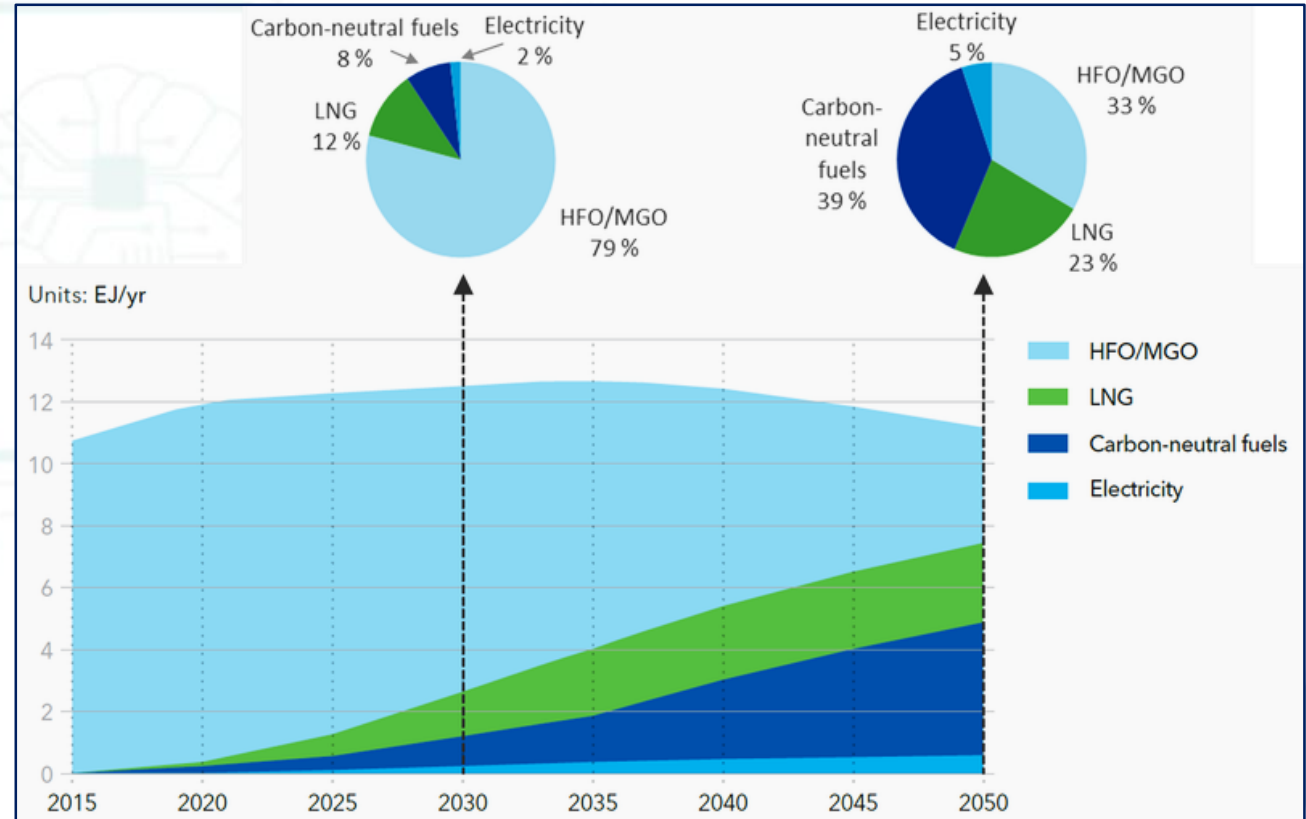
What does future bring

Shipping CO₂ emission reduction by measures (2018-2050)



Source: <https://www.dnv.com/expert-story/maritime-impact/the-future-proof-ship.html>

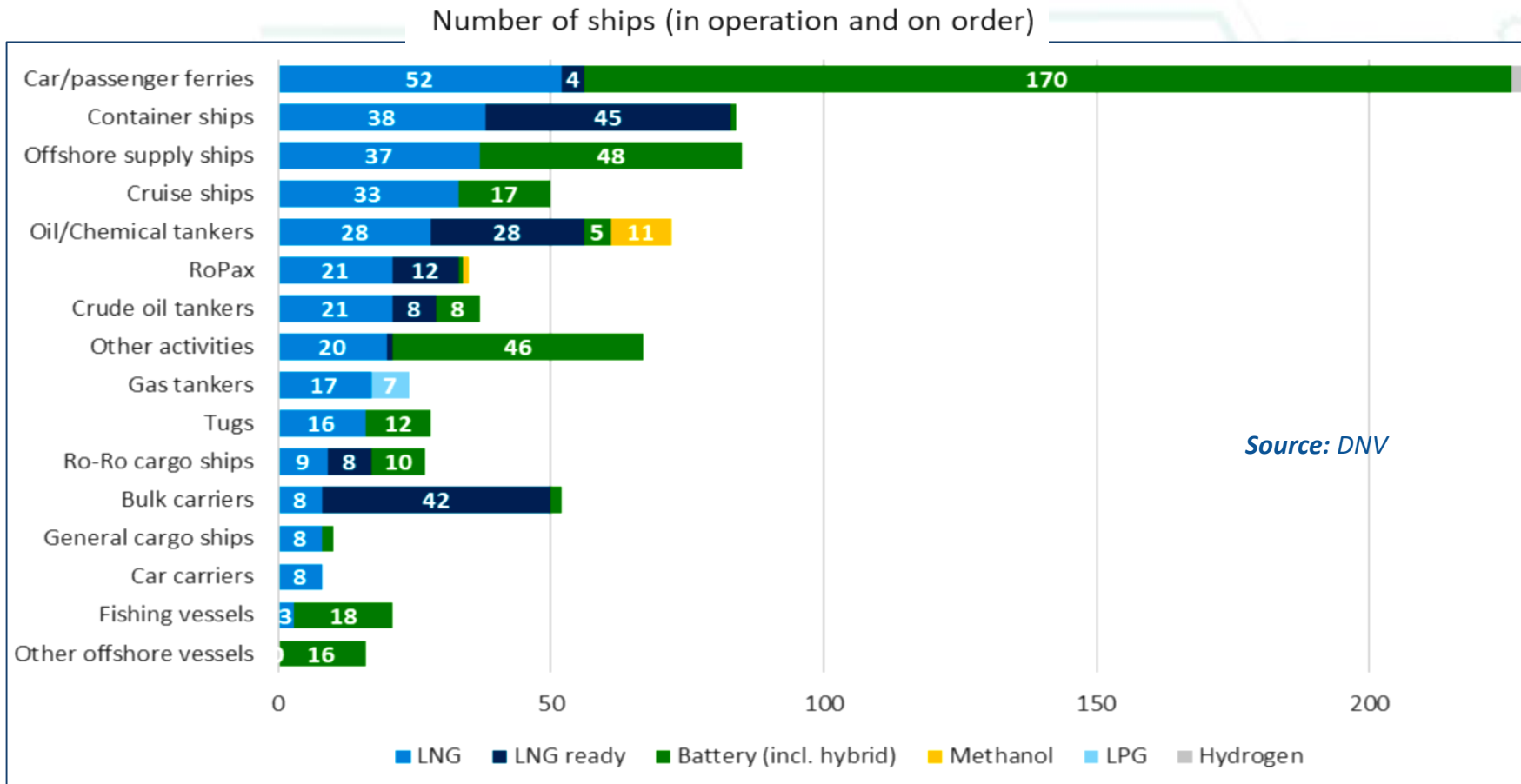
Energy use in shipping towards 2050



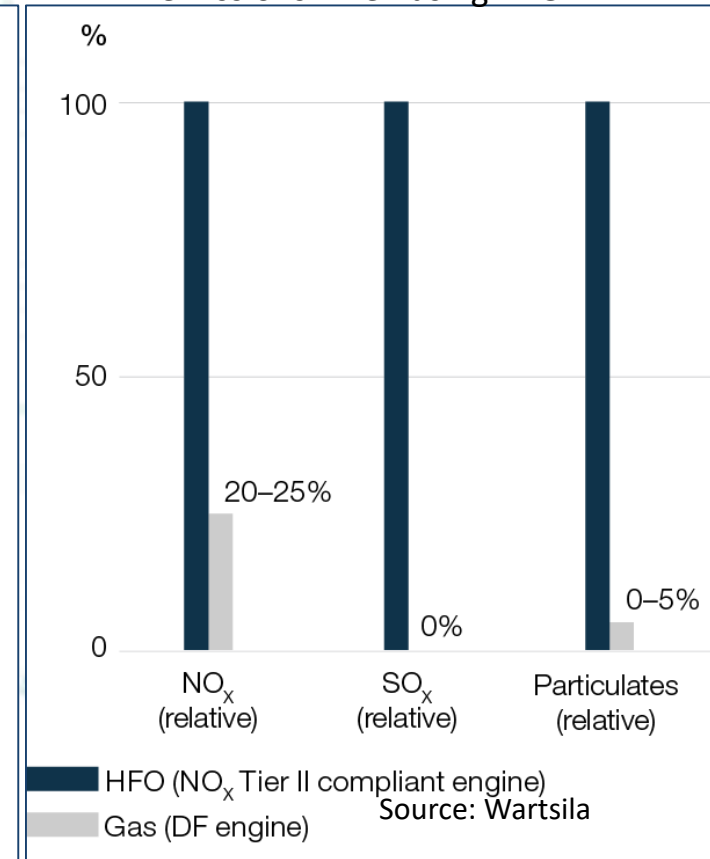
Source: Maritime Forecast to 2050, DNV GL 2018



Uptake of Alternative Fuels in the World Fleet (July 2019)

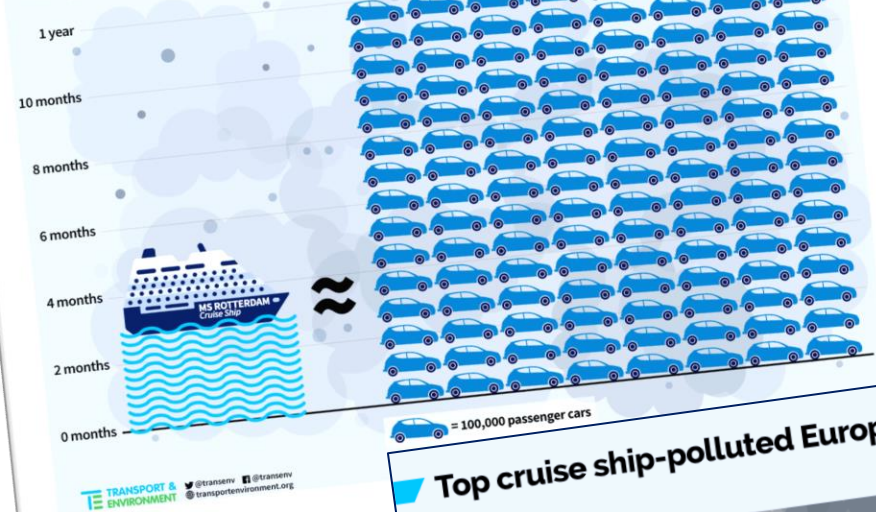


Comparison of typical NO_x, SO_x and PM emissions when using LNG

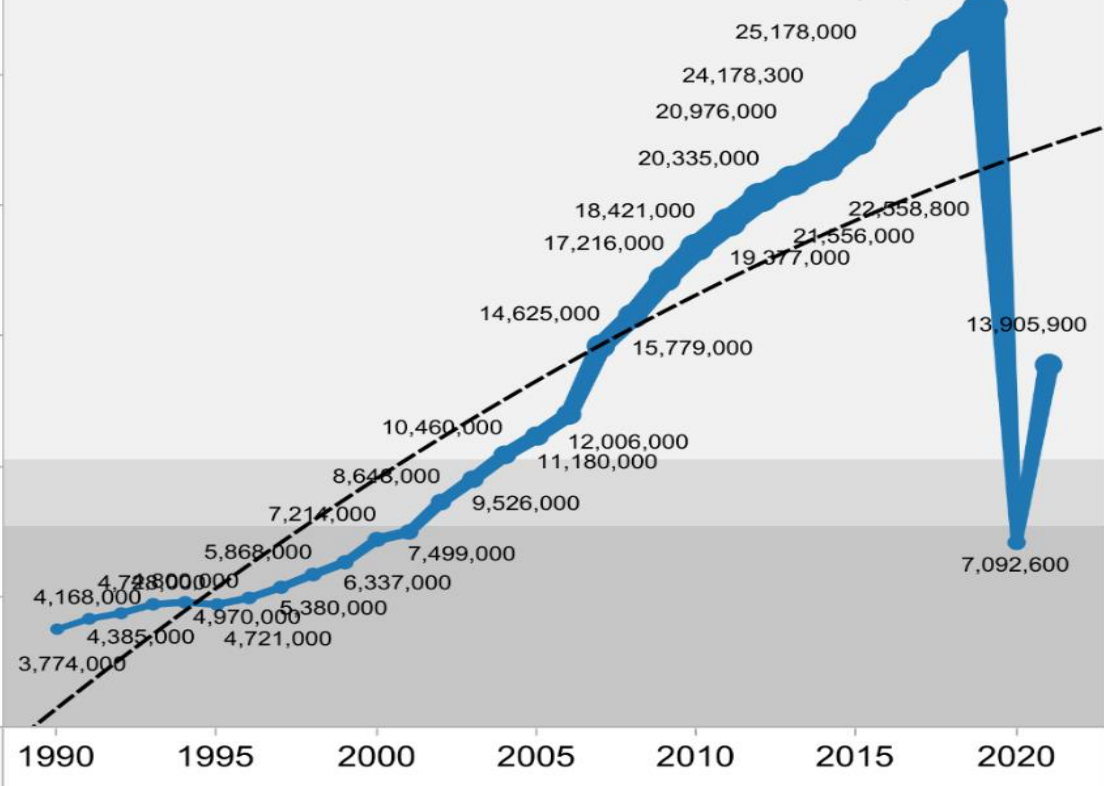


Focus on Sustainable Cruise Tourism

MS Rotterdam emitted the same sulphur pollution in 3 months as 12 million passenger cars emit in 1 year

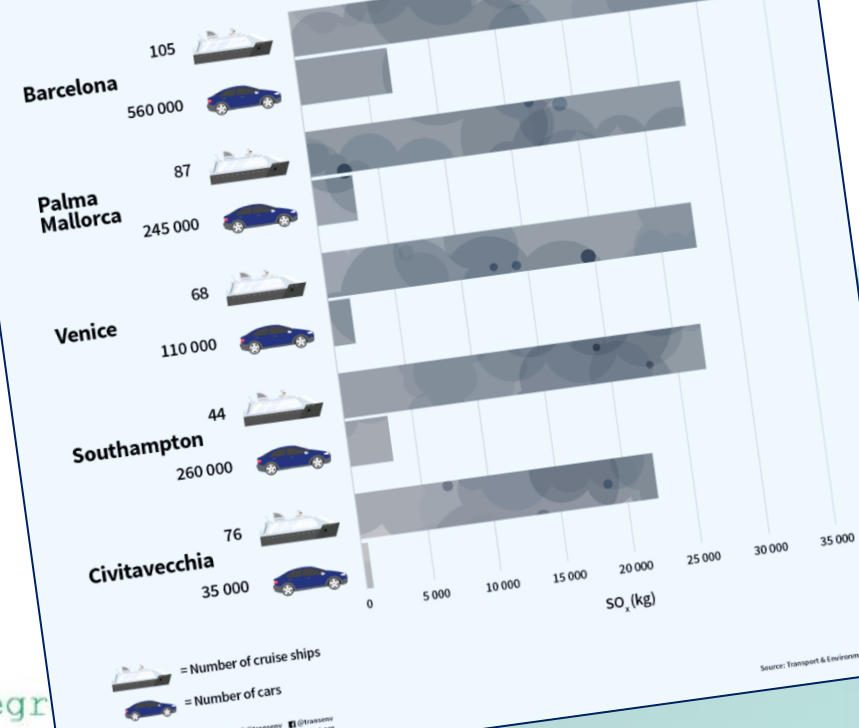


Worldwide Passengers Carried



Source: Cruise Market Watch

Top cruise ship-polluted European ports (SO_x)



High pollution level on cruise ships

NABU finds high pollution levels on cruise ships deck

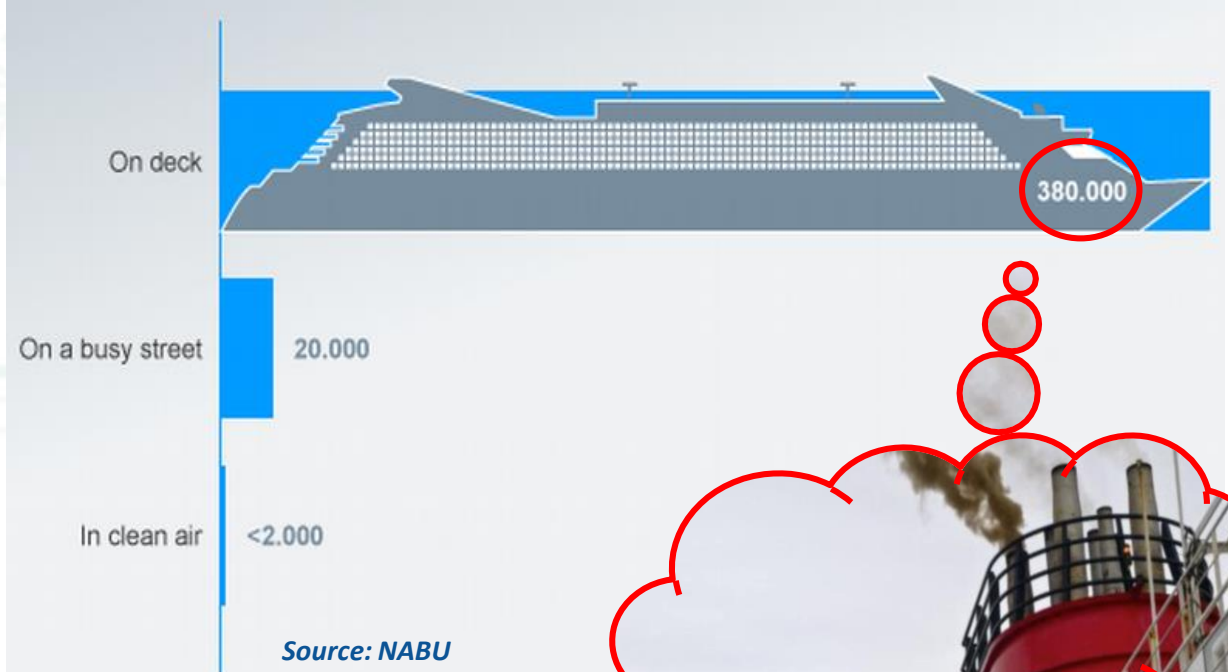
by The Editorial Team — January 25, 2017 in Emissions

Undercover air tests on the passenger deck of a European cruise ship have shown 'high levels of health damaging ultra-fine particles' in the ambient air, the German NGO NABU (Nature And Biodiversity Conservation Union) says.

NABU conducted a series of air pollution measurements in the passenger deck of a European cruise ship now unveiled high loads of health damaging ultra-fine particles in the ambient air. A journalist documented concentrations up to 200 fold above natural background levels.

The measurements were carried out by a French TV team working for the famous TV show "Thalassa" which was broadcasted last Friday, January 20th on France 3. In recent months NABU had already conducted a series of air pollution measurements in several port cities and next to cruise ship terminals in Venice, Hamburg, Marseille and Barcelona.

Small particle emissions on cruise ships per m³



Environmentally friendly cruise ships

LIQUIFIED NATURAL GAS (LNG)

- 49% of new capacity on order will rely on LNG for primary propulsion

EXHAUST GAS CLEANING SYSTEMS (EGCS)

- More than 69% of global capacity utilizes EGCS and 96% of non-LNG new builds will have EGCS installed

SHORE SIDE ELECTRICITY

- 58% of new capacity is committed to be SSE compatible 32% of global fleet capacity already capable of SSE, and 25% of existing capacity will be retrofitted to use SSE

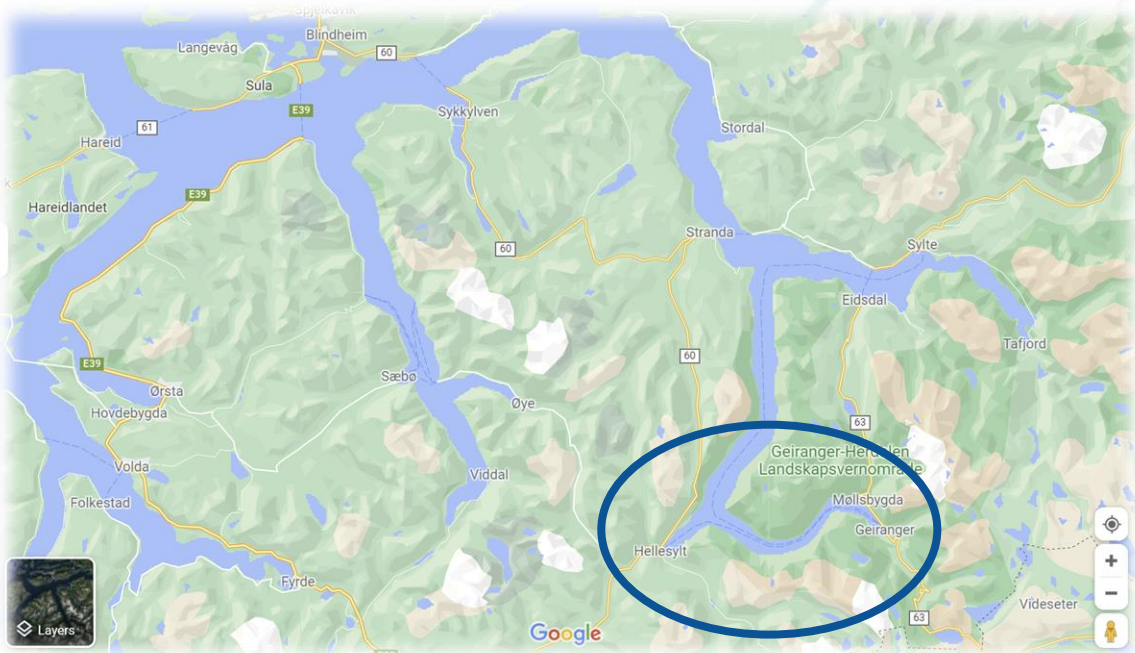
ADVANCED WATER TREATMENT SYSTEMS

- 99% of new ships on order will have these systems in place, bringing global capacity served by these systems to 78.5%



October, 29th 2021

Norwegian experience



Geiranger Fjord

Norwegian parliament adopts zero-emission regulations in the fjords

3RD MAY 2018 | IN NEWS | BY MARIE LAUNES

The Norwegian Parliament has adopted a resolution to halt emissions from cruise ships and ferries in the Norwegian world heritage fjords as soon as technically possible and no later than 2026. This will make the fjords the world's first zero emission zone at sea. The decision will have a positive impact on the local population, transport and tourism, climate and the environment, and the maritime industry.

“For the first time in the world there is a requirement for emission-free sailing in the fjords and their harbours. Norway has long been a world leader in emission-free ferries based on sound political decisions on zero-emission requirements. Now the country is taking a step further in the maritime green shift, with global repercussions. At the national level, this will mean a welcome development towards emission-free solutions on many tourist ships, a significant decrease in greenhouse gas emissions and a halt to harmful local air pollution,” says Marius Holm, head of the environmental foundation ZERO.



In 2026 only ships with zero emissions will be allowed to tour the scenic Geiranger fjord.

<https://www.cruiseindustrynews.com/>

Norway Extends Zero-Discharge for Heritage Fjords to 2030

May 04, 2020

The Norwegian Maritime Directorate (NMD) has recommended an extension of the zero discharge deadline for the so-called World Heritage Fjords from 2026 to 2030. The recommendation was sent to the Norwegian Ministry of Climate and Environment.

<https://maritimecleantech.no>

Comparative considerations

Geiranger Fjord



The West Norwegian Fjords



United Nations Educational, Scientific and Cultural Organization



The West Norwegian Fjords



Kotor Bay



A World Heritage Site



Source: wallpaperflare.com



October, 29th 2021

Hotel Cattaro, Old Town KOTOR (Montenegro)



Possibilities for exhaust emission reduction from Cruise Ships in Kotor Bay area

- Monitoring of air quality available
- Monitoring of marine fuel quality (sulfur content) available
- Shore side electricity available
- Shore side or barge based exhaust gas after-treatment technology available
- Optimization of cruise ship stay in the Kotor Bay
- New taxation in accordance of cruise ship's green level
- Anchor position change to outside of Kotor Bay, etc.



EXCLUSIVE - Dubrovnik Port Authority installs air quality monitoring system

Written by Mark Thomas | Jul 24, 2019 | [Print](#) | [Email](#)

The Dubrovnik Port Authority has taken a huge step in order to monitor the quality of the environment and the air of the busiest cruise ship ports in Croatia.

Given the ever more frequent topics related to environmental protection, air pollution, the sea, the land and their causes, and just who and indeed what is "guilty" an air quality measuring station has been installed at the Port of Dubrovnik.

As part of the Inter-PASS Intermodal Interconnection between ports and airports, a project approved by the INTERREG ADRIAN program, an ECO measuring station was acquired for the purpose of monitoring air quality, relative humidity, atmospheric air, air temperature, nitrogen oxide and monoxide concentrations, sulphur dioxide, carbon monoxide, UV index with display results on the screen and

Published in
[Dubrovnik](#)

Read
1780 times

Source: Port of Gothenburg



Center for Research, Innovations and Entrepreneurship at the MFK

Main goals & activities of the Center:

- ✓ Research and innovation activities;
- ✓ Joint projects with strategic partner institutions;
- ✓ Cooperation with institutions in the field of blue economy;
- ✓ Provision of professional development courses;
- ✓ Providing support in the development of business incubators within the Faculty, etc.

The Center currently has the following laboratories:

- ✓ Sea and coastal environment protection from maritime transport;
- ✓ Petroleum quality testing lab;
- ✓ Off-shore technologies;
- ✓ Marine electrical engineering, and
- ✓ Shipwrecks underwater archeology.



Dodatak Sertifikatu o akreditaciji - identifikacioni broj: 0095
Annex to Accreditation Certificate - identification number: 0095

Datum izdavanja dodatka: 29.12.2020.
Issue date of annex: 29.12.2020.
Zamjenjuje dodatak:
Replaces Annex dated:

Dodatak Sertifikatu o akreditaciji sa akreditacionim brojem Li 20.31
Annex to Accreditation Certificate Accreditation Number Li 20.31

Standard: MEST EN ISO/IEC 17025:2018

Datum dodjele /obnavljanja akreditacije:
Date of granting / renewal of accreditation:
29.12.2020./

Akreditacija važi do: 28.12.2024.
Accreditation is valid to: 28.12.2024.

Akreditovana laboratorija za ispitivanje
Accredited laboratory of testing

Univerzitet Crne Gore
Pomorski fakultet Kotor
Laboratorija za ispitivanje nafte i naftnih derivata
Dobrota br. 36, Kotor

Područje akreditacije / Scope of accreditation

Fizičko-hemijska ispitivanja tečnih goriva naftnog porijekla
Physical-chemical testing of liquid fuels of petroleum origin

Prediction of pollutant and GHG emission from ships in Kotor Bay

Table 7 Total annual exhaust emission from cruise ships in the Boka Kotorska Bay in 2015 (tons/year)

Month	NOx	CO	CO ₂	VOC	PM	SOx ^a	SOx ^b
January	1.017	3.374	12.097	0.772	0.045	0.0378	2.021
February	1.54	5.122	183.622	1.172	0.069	0.0574	3.064
March	1.23	4.04	145.643	0.923	0.055	0.0455	2.43
April	13.469	32.13	1,348.232	7.101	0.506	0.4213	22.499
May	34.074	74.088	3,264.452	16.175	1.224	1.0201	54.476
June	40.071	92.154	3,941.245	20.272	1.478	1.2316	65.77
July	34.48	75.709	3,318.375	16.552	1.244	1.037	55.375
August	37.082	82.632	3,593.37	18.102	1.348	1.1229	59.964
September	42.686	94.137	4,116.418	20.593	1.544	1.2863	68.693
October	32.982	71.155	3,148.458	15.518	1.181	0.9839	52.54
November	17.127	36.393	1,623.624	7.92	0.609	0.5074	27.094
December	2.74	7.86	301.208	1.774	0.113	0.0941	5.026
Total (tons/year)	258.498	578.794	24,996.744	126.874	9.416	7.8453	418.952

^aEstimation for average sulphur content in fuel of 0.0457% m/m

^bEstimation for average sulphur content in fuel of 2.67% m/m

Nikolic et al, DOI 10.1007/698_2016_34,

Estimation of Air Pollution from Ships in the Boka Kotorska Bay

Danilo Nikolić, Radmila Gagić, and Spiro Ivošević

Abstract The Boka Kotorska Bay, with the Port of Kotor, has become one of the most attractive cruising destinations at the Adriatic Sea. It shows not only great potential in terms of economy, but also great danger if environmental issues are taken into consideration. Emission from cruise ships represents majority of anthropogenic emissions of pollutants in this area, since there are no merchant ports and industrial plants in the bay.

In this paper exhaust emission from ships in the Boka Kotorska Bay in 2015 was calculated by using emission estimation methodology. Only cruise ships were taken for research since that is the only shipping activity in the bay, besides yachting. Cruise ship's gross tonnage, marine engine types, marine fuel types, navigation modes and retention times of the ship in the Bay were taken into consideration in the study. Total emissions from cruise ships in the Boka Kotorska Bay area in 2015 were estimated as follows: 258.50 t y⁻¹ of NOx, 578.80 t y⁻¹ of CO, 24,996.74 t y⁻¹ of CO₂, 126.87 t y⁻¹ of VOC, 9.42 t y⁻¹ of PM and 7.84 t y⁻¹ of SOx in the case when assumed that cruise ships burn low sulphur fuels and 418.95 t y⁻¹ of SOx in the case of high sulphur fuels.

Keywords Air pollution, Boka Kotorska Bay, Cruise ships, Exhaust emission estimation

Contents

- 1 Introduction
- 2 Cruise Ship Traffic in the Boka Kotorska Bay
- 3 Methodology for Quantification of Pollutant Emission

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University of Montenegro, Maritime faculty Kotor, Dobrota 36, 85330 Kotor, Montenegro
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A. Joksimović et al. (eds.), *The Boka Kotorska Bay Environment*,
Hdb Env Chem, DOI 10.1007/698_2016_34,
© Springer International Publishing Switzerland 2016

Some Results of Air Pollution from Passenger Ferries in the Boka Kotorska Bay

Maja Škurić, Vladislav Maras, Mirko Đurović, Igor S. Zonn, Andrey G. Kostianoy, Radmila Gagić, and Danilo Nikolić

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 - 2 Regulatory Achievements
 - 2.1 International Legislative Framework
 - 2.2 National Legislative Framework
 - 3 Bottom-Up Methodology: An Observation
 - 3.1 Results of the Bottom-Up Approach from Corbett and Farrell
 - 3.2 Results of the Bottom-Up Approach from Tzannatos
 - 3.3 Specifics of the Bottom-Up Approach Described in Eyring et al.
 - 3.4 Activity-Based Method from Nunes et al.
 - 3.5 Activity-Based Emissions from Dragović et al.
 - 3.6 Applied Methodology in Murena et al.
 - 4 Quantification of Ferry Emission in the Boka Kotorska Bay
 - 4.1 Input Data
 - 4.2 Load and Emission Factors Determination
 - 4.3 Emission Calculation Formulation
 - 5 Results
 - 6 Conclusion
- References

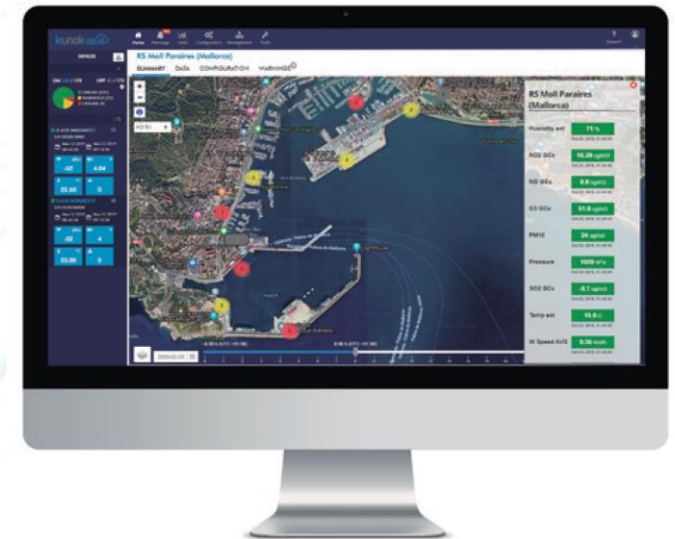
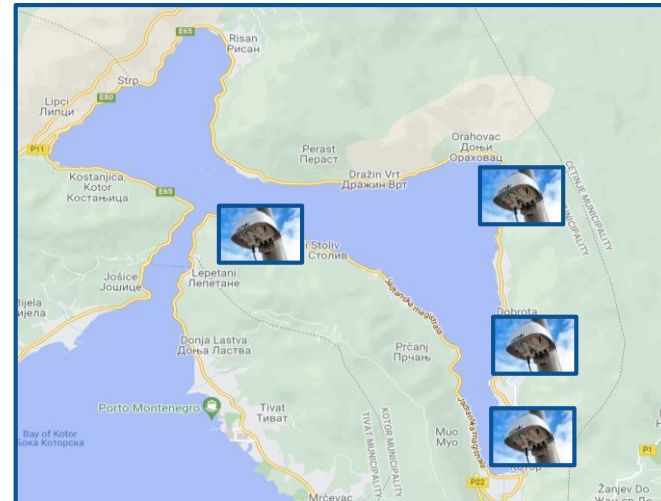
Abstract Emission from passenger ships represents a threat especially for a population in the coastal area that is exposed to air pollution due to the port traffic throughput and other frequent activities at the seaside. Passenger ferries are one of the marine small vessels that have a primary role in connecting domicile inhabitants and serves as a favorite mode of transport for short tourist visits. In this chapter, the

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Danijela Joksimović, Mirko Đurović, Igor S. Zonn, Andrey G. Kostianoy, and Aleksander V. Semenov (eds.), *The Montenegrin Adriatic Coast: Marine Chemistry Pollution*, Hdb Env Chem, DOI 10.1007/698_2020_702, © Springer Nature Switzerland AG 2020

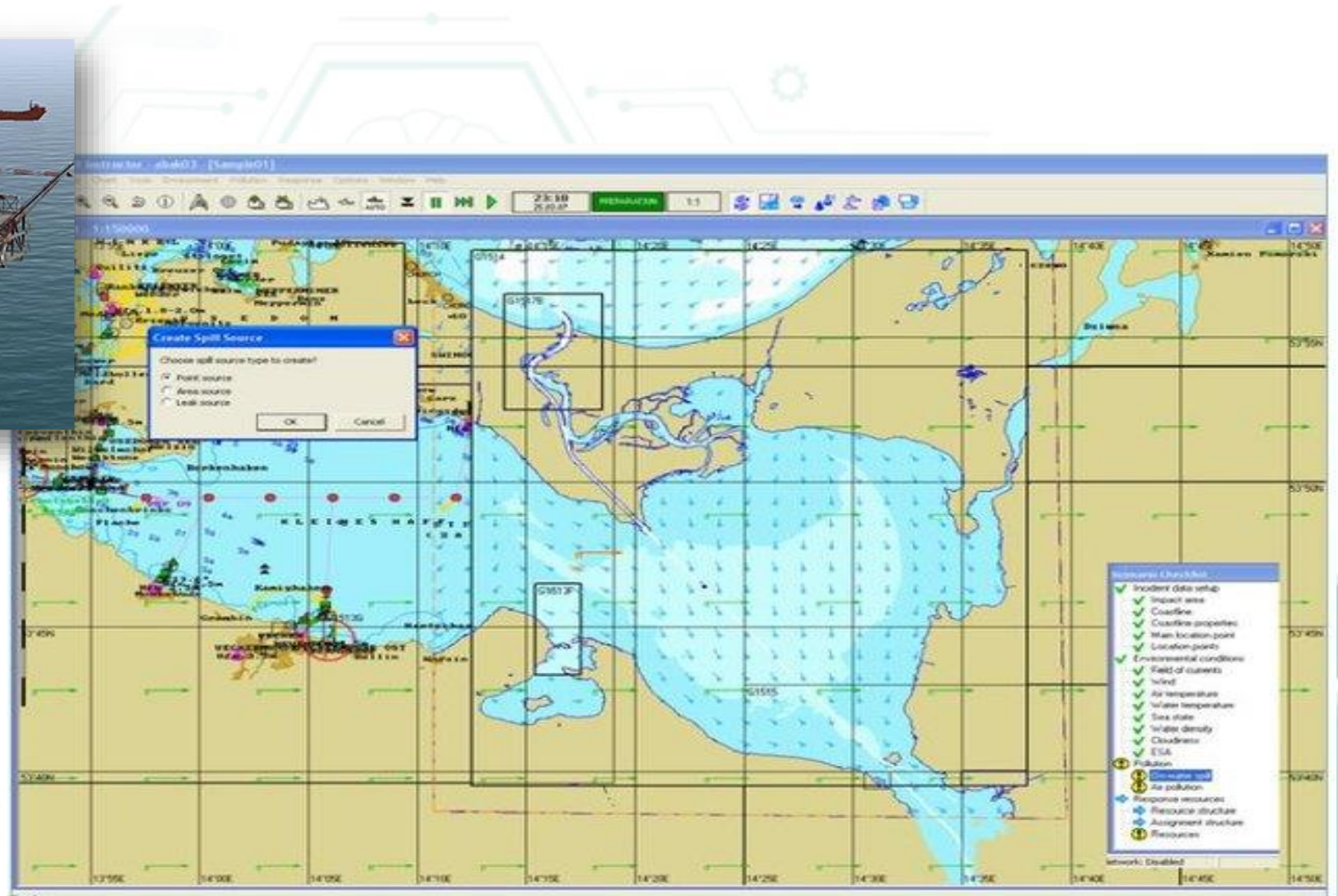
Measurement of PM concentration in Kotor Bay area



Simulations of oil spills in Kotor Bay / South Adriatic sea



Wärtsilä Oil Spill Response Simulator




Research on fossil and alternative marine fuels

Research on three types of second-generation biodiesel made from:

- Olive husk oil;
- Waste sunflower, and
- Waste palm oil from frying.

Biodiesel blends (7%, 20% and 25%) show better emission performance in regard to NO_x, SO₂, CO, and CO₂ than pure low sulfur diesel fuel.

Brodogradnja/Shipbuilding/Open access  Volume 67 Number 4, 2017

Danilo Nikolic
Nada Marstijepovic
Sead Cvrk
Radmila Gagic
Ivan Filipovic

<http://dx.doi.org/10.21278/brod467406> ISSN 0007-215X
ISSN 1845-5859

EVALUATION OF POLLUTANT EMISSIONS FROM TWO-STROKE MARINE DIESEL ENGINE FUELED WITH BIODIESEL PRODUCED FROM VARIOUS WASTE OILS AND DIESEL BLENDS

UDC 621.436:13:665.753:536.46:519.6:629.5.016.8:629.5(05)
Original scientific paper

Summary

Shipping represents a significant source of diesel emissions, which affects global climate, air quality and human health. As a solution to this problem, biodiesel could be used as marine fuel, which could help in reducing the negative impact of shipping on environment and achieve lower carbon intensity in the sector. In Southern Europe, some oily wastes, such as wastes from olive oil production and used frying oils could be utilized for production of the second-generation biodiesel. The present research investigates the influence of the second-generation biodiesel on the characteristics of gaseous emissions of NO_x, SO₂, and CO from marine diesel engines. The marine diesel engine that was used, installed aboard a ship, was a reversible low-speed two-stroke engine, without any after-treatment devices installed or engine control technology for reducing pollutant emission. Tests were carried out on three regimes of engine speeds, 150 rpm, 180 rpm and 210 rpm under heavy propeller condition, while the ship was berthed in the harbor. The engine was fueled by diesel fuel and blends containing 7% and 20% v/v of three types of second-generation biodiesel made of olive husk oil, waste frying sunflower oil, and waste frying palm oil. A base-catalyzed transesterification was implemented for biodiesel production. According to the results, there are trends of NO_x, SO₂, and CO emission reduction when using blended fuels. Biodiesel made of olive husk oil showed better gaseous emission performances than biodiesel made from waste frying oils.

Key words: Olive husk oil; Waste frying oils; Biodiesel; Two-stroke marine diesel engine; Gaseous emission

1. Introduction

The shipping sector has become a key component of the world's economy. The world fleet of seagoing merchant ships comprises over 104,000 ships [1]. At the same time, on an annual average basis (2007–2012), ships account for 13%, and 15% of global sulfur oxide (SO_x) and nitrogen oxides (NO_x), respectively [2]. Shipping air pollution is regulated by

Influence of Biodiesel Blends on Characteristics of Gaseous Emissions from Two Stroke, Low Speed Marine Diesel Engines

Danilo Nikolic, Sead Cvrk, Nada Marstijepovic, Radmila Gagic and Ivan Filipovic

Abstract As a renewable source of energy, biofuels have a favourable impact on the environment and can replace fossil fuels to some extent. Biodiesel is one option for reducing the emission of pollutants and GHG in the shipping sector. By 2030, Lloyd Register predicts a global demand for about 100 million tons of biofuel in shipping, mostly biodiesel. This study investigates the influence of biodiesel blends on the characteristics of gaseous emissions from a two-stroke, low speed marine diesel engine. For this research, a reversible low-speed two-stroke marine diesel engine was used, without any after-treatment devices installed or engine control technology for reducing pollutant emission. Tests were carried out on three regimes of engine speed, 150, 180 and 210 rpm under heavy propeller condition, while the ship was berthed in the harbour. The engine was fuelled with low sulfur diesel fuel and blends containing 7 and 25% v/v of three types of second-generation biodiesel made from cast-off sunflower and palm oil waste from frying. For biodiesel production, a base-catalyzed transesterification was implemented. Biodiesel blends show better emission performance in regard to NO_x, SO₂, CO, and CO₂ than pure low sulfur diesel fuel.

Keywords Used frying oils • Biodiesel • Low sulfur diesel fuel • Two-stroke low speed marine diesel engine • Gaseous emission

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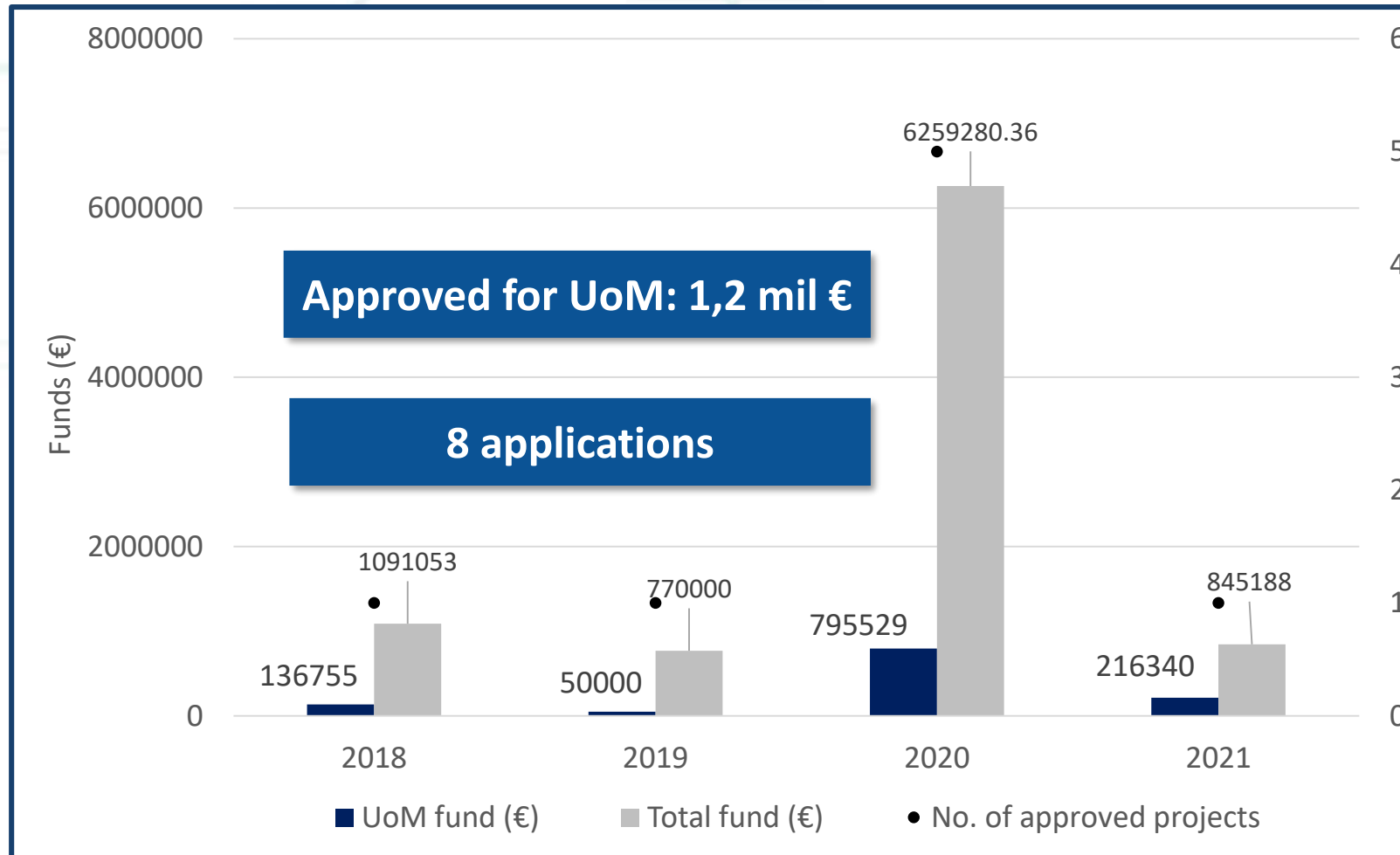
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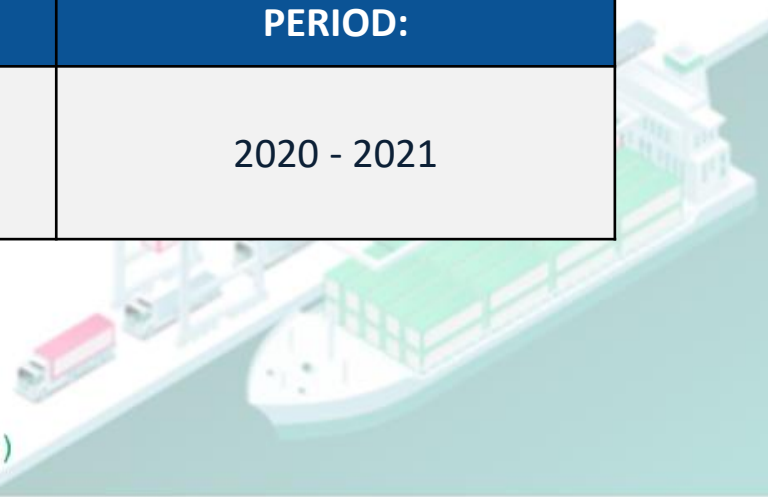
Created success in the international projects applications 2018-2021





Partnership for the promotion of a maritime cross-border strategy - PORTS 4.0

	PROJECT DESCRIPTION:		
FOUNDED BY:	COORDINATING INSTITUTION:	BUDGET:	PERIOD:
EC within Interreg IPA CBC Italy Albania Montenegro program	Istituto Technico Superior per la Logistica, Taranto, Italy	94.00,00 €	2020 - 2021



- The PORTS 4.0 aims at **building up a solid network of public and private stakeholders in the field of logistics and maritime transport for a sustainable and smart development** in the programme area based on new technologies derived from the Industry 4.0 concept.
- The defined approach will be implemented by achieving **three main outputs**:
 - ✓ **Building up of the PORTS cluster;**
 - ✓ **Memorandum of Understanding promoting sustainable cross-border connections;**
 - ✓ **Business Agreement aimed at starting new business relations among logistics, freight and passengers transport operators in the Programme Area.**



Sustainable development of BLUE economies through higher education and innovation in WBC - BLUEWBC

<p>Co-funded by the Erasmus+ Programme of the European Union </p> 	PROJECT DESCRIPTION:		
FOUNDED BY:	COORDINATING INSTITUTION:	BUDGET:	PERIOD:
EC within Erasmus+ CBHE program	NTNU, Norway	985.755,00 €	2020 - 2023
<ul style="list-style-type: none"> The main goal of the BLUEWBC project is to improve Innovation & Entrepreneurship in Blue economy sector through higher education in Montenegro and Albania. BLUEWBC's main objectives will be achieved through next activities: <ul style="list-style-type: none"> ✓ To develop courses for students and professionals to address the long-term market needs in specific Blue economy fields with I&E activities in Montenegro and Albania. ✓ To improve HEIs facilities and establish University centers for I&E in partner countries to support the development of strong links between specific Blue economy fields, education and I&E. ✓ To enhance networking among HEIs and innovation institutions. 			

Development of Regional Joint Master Program in Maritime Environmental Protection and Management - MEP&M

<p>Co-funded by the Erasmus+ Programme of the European Union </p> 	PROJECT DESCRIPTION:		
FOUNDED BY:	COORDINATING INSTITUTION:	BUDGET:	PERIOD:
EC within Erasmus+ CBHE program	UoM, Maritime Faculty Kotor	845.188,00 €	2021 - 2024
<ul style="list-style-type: none"> • Main objective is to develop regional joint interdisciplinary master program in maritime environmental protection and management. • The project focuses on issues regarding the protection of marine and coastal zone environments from global climate change and local/regional pollution issues in both Montenegro and Albania. • Focus groups are BSc students, professionals from Governmental and Blue economy sector enterprises field of MEP&M. 			

MEP&M Questionnaire for Stakeholders



Co-funded by the
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of the European Union

Upitnik za zainteresovane strane

Ovo istraživanje se sprovodi od strane Univerziteta Crne Gore Pomorskog fakulteta Kotor u okviru projekta: „Razvoj regionalnog zajedničkog master programa za zaštitu i upravljanje morskom sredinom (MEP&M)” u okviru Erasmus + programa CBHE. Ovaj projekat finansiran je uz podršku Evropske Komisije. Koordinator projekta je Univerzitet Crne Gore, Pomorski fakultet Kotor. Vrijeme trajanja projekta je 3 godine (15/01/2021 – 14/01/2024).

Projekat je usmjeren ka ostvarenju sljedećih ciljeva:

- Polazeći od najvećih dostignuća obrazovanja i istraživanja u domenu zaštite i upravljanja morskom sredinom (MEP&M), cilj je razviti regionalni zajednički interdisciplinarni program master studija na engleskom jeziku, za studente i stručna lica koji imaju najmanje završene osnovne studije, u cilju rješavanja dugoročnih potreba u posebnim oblastima zaštite i upravljanja u priobalnom i morskom regionu u južnom Jadranu i Jonskom moru, osnažujući međunarodnu konkurentnost na institucija visokog obrazovanja.
- Izgraditi ljudske i tehničke kapacitete u institucijama visokog obrazovanja partnerskih zemalja kako bi se podržali novi master programi u oblasti zaštite i upravljanja morskom sredinom.
- Unaprijediti umrežavanje među institucijama visokog obrazovanja, vladinim ustanovama, kompanijama iz sektora plave ekonomije i nevladinih organizacija u cilju regionalnog djelovanja i sprječavanja posljedica globalnih klimatskih promjena i lokalnog/regionalnog zagađenja morske sredine.

Sve informacije proistekle iz ovog istraživanja će biti strogo povjerljive i koristiće se samo u tu svrhu.

Da li Vaša organizacija/kompanija planira da uključi više aktivnosti iz oblasti zaštite i upravljanja morskom sredinom? *



- Definitivno
- Vjerovatno
- Moguće
- Vjerovatno ne
- Definitivno ne

U slučaju da postoji dvogodišnji master program iz interdisciplinarnе oblasti zaštite i upravljanja morskom sredinom na engleskom jeziku, namijenjen profesionalcima u kompanijama, da li biste predložili kolegama da se upišu i prošire znanje iz ove oblasti? *

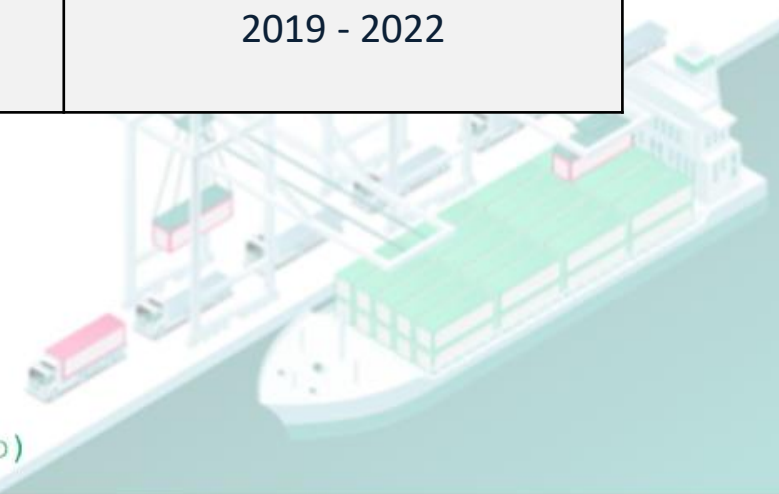
- Definitivno
- Vjerovatno




Fostering Internationalization at Montenegrin HEIs through Efficient Strategic Planning - IESP

<p>Co-funded by the Erasmus+ Programme of the European Union </p> 	PROJECT DESCRIPTION:		
FOUNDED BY:	COORDINATING INSTITUTION:	BUDGET:	PERIOD:
EC within Erasmus+ CBHE program	University of Montenegro	683.014,00 €	2019 - 2022


- The IESP project aims to **enhance international competitiveness of Montenegrin HEIs**, by providing the best model for **strengthening capacities for various aspects of internationalization**.
- One of specific objectives is **accreditation of summer school at Maritime Faculty Kotor: "Sustainable development of the yachting and cruising industries"**



Protecting underwater heritage through its digitalization and valorization as a novel touristic offer – WRECKS4ALL

 <p>Interreg - IPA CBC Croatia - Bosnia and Herzegovina - Montenegro</p> <p><i>Photo by Darko Kovačević</i></p>	<p>PROJECT DESCRIPTION:</p> <ul style="list-style-type: none"> The main goal of the project is to contribute to the strengthening and diversification of the tourist offer based on the underwater-cultural heritage of the Eastern Adriatic region through cross-border management, protection, promotion and sustainable valorization of underwater shipwrecks. Innovative approach reflected in the digitization of underwater cultural heritage. 3D photogrammetric mapping of underwater shipwrecks is a method for their preservation, monitoring and accessibility to the general public through Virtual (Virtual) and Augmented (Augmented) reality, Internet platforms and virtual educational approach. 		
<p>FOUNDED BY:</p>	<p>COORDINATING INSTITUTION:</p>	<p>BUDGET:</p>	<p>PERIOD:</p>
<p>EC within Interreg IPA CBC Croatia, BiH and Montenegro</p>	<p>UoM, Maritime Faculty Kotor</p>	<p>1.016.778 €</p>	<p>2020 - 2022</p>

Innovative Systems to enhance Antifraud Customs Controls - ISACC

	PROJECT DESCRIPTION:		
FOUNDED BY:	COORDINATING INSTITUTION:	BUDGET:	PERIOD:
EC within Interreg IPA CBC Italy Albania Montenegro program	Istituto Technico Superior per la Logistica, Taranto, Italy	996.997,04 €	2020 - 2022

PROJECT DESCRIPTION:

- The main objective of the project is **to define a so-called customs "footprint", consisting in a digital form that include all info and parameter of goods.**
- On this purpose, the project will be based on three pillars:
 - ✓ **Building up of an international network of public institutions in the customs sector within three programme countries;**
 - ✓ **Design, development and pilot of the IT platform supporting customs controls activities;**
 - ✓ **Capacity building for customs servants, focusing on the use and functionalities of the ISACC platform, and for private stakeholders, focusing on eCustoms procedures.**



Adriatic-Ionian Joint Approach to Development and Harmonization of Procedures and Regulations in the Field of Navigation Safety - EUREKA

 <p>Interreg ADRIAN ADRIATIC-IONIAN <small>European Regional Development Fund - Instrument for Pre-Accession II Fund</small></p>	PROJECT DESCRIPTION:		
<ul style="list-style-type: none"> The aim of the project is to harmonize communication and coordination of safe regional maritime traffic and to apply modern technological achievements in navigation control. In addition to UoM, the partner institution from Montenegro is Directorate of Maritime Safety and Port Management. 			
FOUNDED BY:	COORDINATING INSTITUTION:	BUDGET:	PERIOD:
EC within Interreg V-B Adrion program	Ministry of the Sea, Transport and Infrastructure from Croatia	3.000.000 €	2020 - 2022

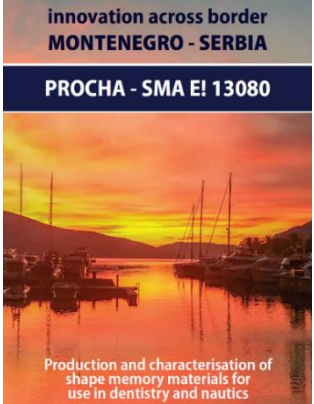


Strengthening, innovation and promotion of nautical tourism and cultural heritage through cross-border cooperation - NAUTICA CBC

 <p>Interreg - IPA CBC Croatia - Bosnia and Herzegovina - Montenegro</p> <p>NAUTICA CBC</p> <p>Strengthening, innovation and promotion of the nautical tourism and cultural heritage through cross-border cooperation.</p> <p>PROJECT TITLE: Strengthening, innovation and promotion of the nautical tourism and cultural heritage through cross-border cooperation.</p> <p>LEAD PARTNER: Ministry of Tourism, Republic of Croatia and Traffic, Science, Education and Sports, Republic of Serbia.</p> <p>PRIORITY AXIS: 3 - Contributing to the development of tourism and preserving cultural and natural heritage.</p> <p>TOTAL PROJECT BUDGET / FWP CONTRIBUTION: 628.712,28 EUR / 314.356,14 EUR</p> <p>PROJECT DURATION: 01/09/2021 - 31/08/2023</p> <p>Normal Institutional Partnership (NIP) Montenegro - Croatia - Serbia - Bosnia and Herzegovina www.interreg-cb-cbc.eu</p>	<p>PROJECT DESCRIPTION:</p> <ul style="list-style-type: none"> The goal is to enhance the cross-border cooperation, strengthen and diversify tourist offer and enable better management and sustainable use of the cultural and natural heritage of the Adriatic region. Specifically, the activities are based on innovative mobile nautical applications, improvement and promotion of tourism infrastructure, and raise the capacity of stakeholders in cross-border cooperation. 		
<p>FOUNDED BY:</p>	<p>COORDINATING INSTITUTION:</p>	<p>BUDGET:</p>	<p>PERIOD:</p>
<p>EC within Interreg IPA CBC (HR-BiH-CG) program</p>	<p>University of Zagreb</p>	<p>628.712€</p>	<p>2021 - 2023</p>

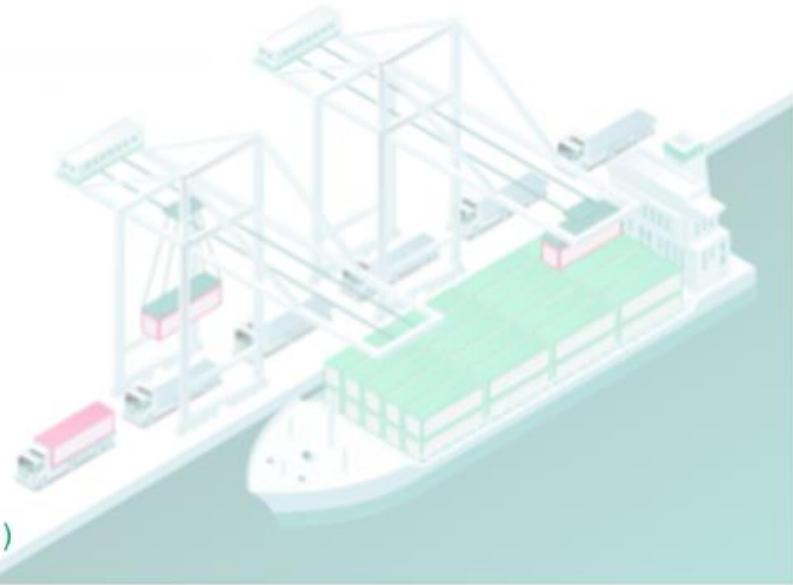


Production and characterization of materials with a memorized shape for use in dentistry and nautical - PROCHA-SMA

	PROJECT DESCRIPTION:		
	<p>The goal is to develop an optimal technological process for the production of new materials with improved properties, biocompatibility and corrosion resistance for application in nautical device components.</p>		
FOUNDED BY:	COORDINATING INSTITUTION:	BUDGET:	PERIOD:
EC within EUREKA program	UoM, Maritime Faculty Kotor	770.000€	2018 - 2021



Looking forward to our cooperation ...



THANK YOU FOR YOUR ATTENTION!

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