

Project: 101128747 — Zero C — ERASMUS-EDU-2023-CBHE



Cluster meeting "Green transition in Montenegrin higher education landscape"

Enhancing knowledge and skills at WB HEIs in preparation for zero carbon maritime transport and logistics society (Zero C)

(Unaprijeđenje znanja i vještina u visokoškolskim ustanovama Zapadnog Balkana s ciljem pripreme društva za postizanje nulte emisije ugljenika u sektoru pomorskog transporta i logistike)

Project Coordinator: prof. Danilo Nikolić, PhD
UoM/Faculty of Maritime Studies Kotor
16th April 2024, UCG/GF













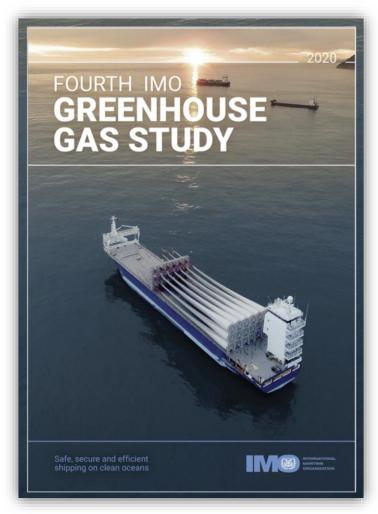




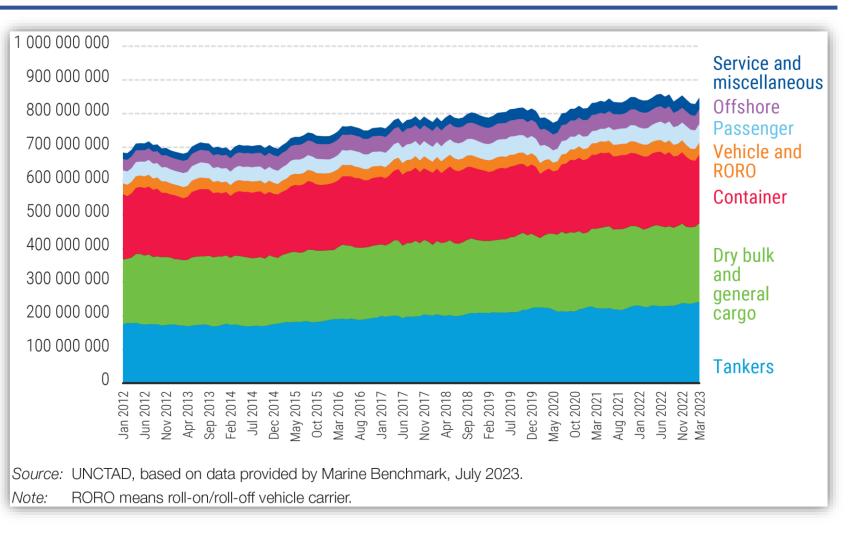




## **Contribution of Maritime transport to Carbon emissions**

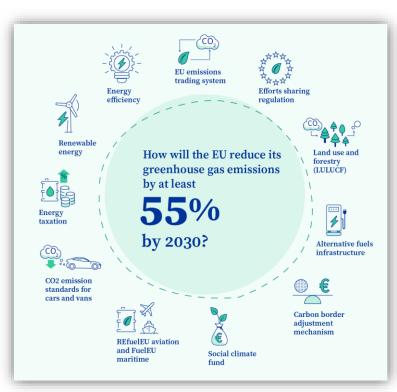


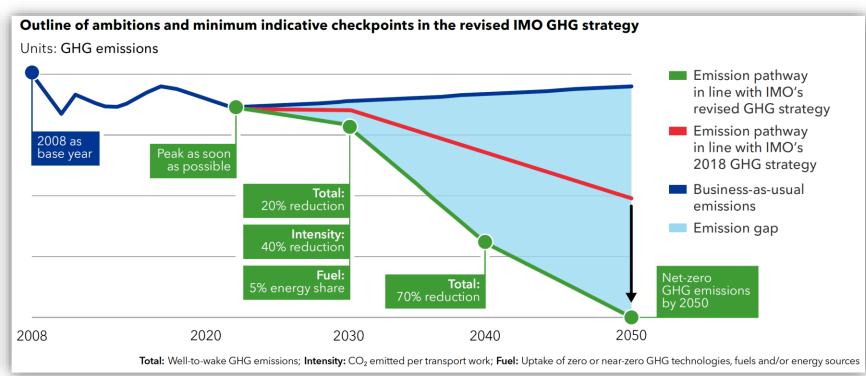
The share of shipping GHG emissions is **2.89% in 2018**.



Total carbon dioxide emissions by vessel types, tons, January 2012—March 2023 (**684 mil t CO<sub>2</sub> - 850 mil t CO<sub>2</sub>**)

## EU Green Deal & Revised IMO Strategy on GHGs in Maritime transport





https://www.ivalua.com/blog/delivering-the-european-green-deal-the-decisive-decade/

DNV: Maritime Forecast to 2050

## Solutions that can Contribute Decarbonisation of the Shipping sector



## LOGISTICS AND DIGITALIZATION

Speed reduction

Vessel utilization

Vessel size

Alternative routes

>20%



#### **HYDRODYNAMICS**

Hull coating

Hull-form optimization

Air lubrication

Cleaning

5%-15%



#### **MACHINERY**

Machinery efficiency improvements

Waste-heat recovery

Engine de-rating

Battery hybridization

Fuel cells

5%-20%



#### **ENERGY**

LNG, LPG

Biofuels

Electrification

Methanol

Ammonia

Hydrogen

Wind power

Nuclear

0%-100%



#### **AFTER-TREATMENT**

Carbon capture and storage

0%-90%

DNV: Maritime Forecast to 2050

## Need for Education and Training to Support Decarbonization of Shipping

- The introduction of alternative fuel technologies is expected to have a significant impact on maritime operations on board ships and will require seafarers to develop and acquire new skills and competencies to ensure safe and efficient operations in the decades up to 2050 and beyond.
- This transition will lead to a need for new and additional education/training for current and future seafarers.

#### **Montenegro seafarers facts:**

- cca 6.000 seafarers cca 1% of total population, highest procentage in the world



#### **Key finding**:

- In the 'Carbon neutral scenario', the number of seafarers requiring additional until 2050 is 1,8 million, globally.
- By 2030 some 450,000 seafarers would require some additional training, while 800,000 seafarers by the mid-2030s.

## **Education to Support Decarbonization od Shipping @ UoM/PFK**

☐ Project title: Enhancing knowledge and skills at WB HEIs in preparation for zero

carbon maritime transport and logistics society

☐ Acronym: ZERO C

☐ Program: Erasmus + CBHE

☐ Co-financed: European Commission

Partners Aleksander Moisiu University Durres, University of Montenegro,

University of Vlore, National Technical University of Athens,

Hamburg University of Technology, ITS Logistica Puglia,

Durres Chamber of Commerce and Industry, General MaritimeDirectorate,

Environmental Protection Agency, Chamber of Economy of Montenegro

☐ **Duration:** 36 months (1.11.2023 – 31.10.2026)

Grant: 846,992.00 € (90% co-fanced by European Commission)

## ZeroC Overall Objective

 Enhanced industry-oriented skills of university students and professionals in Albania and Montenegro (Western Balkans WB) related to decarbonisation and increasing energy efficiency of the maritime transport and logistics sectors (MT&L).

### **ZeroC Specific Objectives**

- Revised and modernised HND, BSc and MSc courses for students in accordance of industry needed knowledge and skills on decarbonisation, energy efficiency and port logistics optimisation in the MT&L sector at the WB Maritime HEIs.
- Developed new LLL programs for training of professionals in accordance of industry needed knowledge and skills on decarbonisation, energy efficiency and port logistics optimisation in the MT&L sector at the WB Maritime HEIs.
- Increased human and technical capacities of the WB Maritime HEIs in providing state of the art specific shipping industry-oriented knowledge and skills for students and professionals.
- Increased awareness in the private sector on new and increased skills for decarbonization and energy efficiency in the MT&L sector

## Specific objective #1 - Revised and modernised courses

#### UoM will have:

- revised/modernised course catalogues at BSc programs
  - ✓ Marine fuels, lubricants and water, 3 ECTS;
  - ✓ Marine engines I, 5 ECTS;
  - ✓ Marine engines II, 5 ECTS,
  - ✓ Environmental protection of the coast and sea from influence of ships part of IMO Marpol Annex VI, Chapter4, 4 ECTS
- revised/modernised course catalogues at MSc program
  - ✓ Technologies for sustainable development in maritime transport, 6 ECTS;
  - ✓ Technologies for removing harmful substances from ships, 5 ECTS
  - ✓ Global strategies of marketing logistics, 5 ECTS

## Specific objective # 2 - Developed new LLL programs

#### **UoM** will have:

- developed and verified at university/faculty level minimum one LLL training program (with minimum 2 courses or subjects) for professionals in the field of Energy efficiency and decarbonization of maritime transport and logistics.
- The IMO 1978 STCW Convention prescribes minimum standards relating to training, certification and watchkeeping for seafarers which countries are obliged to meet or exceed.
- The IMO 1978 STCW Convention adopted a new set of amendments in Manila in 2010 called "The Manila Amendments".
- These amendments were necessary to keep training standards in line with new technological and operational requirements that require new shipboard competencies.
- New Amandmends expected in 2026



## Specific objective # 3 - Increased <u>human</u> and technical capacities

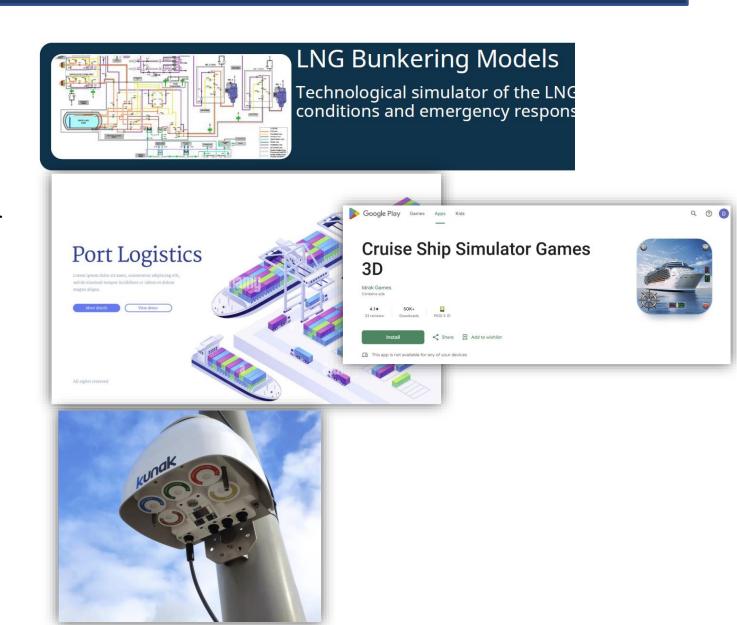
#### Know-how transfer from program to partner countries:

- International/EU legislation on climate change and strategies for reducing CO2 emission and toward zero carbon emission in maritime transport sector.
- Energy efficiency and decarbonisation in maritime transport technical measures, operational measures, alternative fuels, alternative propulsion systems.
- Energy efficiency and decarbonisation in port operations and logistics optimisation Technical measures, Operational measures in order to decrease energy consumption in logistics and port areas.
- IoT (digitalization) as support toward improved energy efficiency and zero carbon emission in maritime transport and logistics.
- Innovative teaching and learning methodology (train the trainer).

## Specific objective # 3 - Increased human and technical capacities

#### UoM:

- Marine training simulator (software and hardware), classroom version, on alternative marine fuels bunkering and storage systems;
- Port logistics optimisation training simulator (software and hardware), classroom version;
- 4 sets (4 casings/positions) of low cost IoT sensors for air quality monitoring system upgrade in regard to carbon pollution and GHG emission (CO, CO2, VOC, PM1, PM2.5, PM10).
- In total max. 60,000 EUR



## Specific objective # 4: Increased awareness in the private sector on new and increased skills

- Establishing a Zero-C network WB HEIs and stakeholders in maritime transport and logistic sector
- The main purpose of establishing the ZeroC network will be to invite the private and public stakeholders to support the project implementation more proactive and consider potentials of its exploitation.
- From a legal point of view, the Zero-C network of stakeholders will be established through signing of the Memorandum of Understanding. The MoU will be delivered by the coordinator and beneficiaries.

#### **ZeroC Flow Chart**

| WP1 - Project  |
|----------------|
| Management and |
| coordination   |

**Task T1.1** - Setting up of management structures and principles

**Task T1.2** - Providing proper management and communication

**Task T1.3** - Providing proper quality control and monitoring, risk management and reporting

Milestone MS1 - Peer review of Project Implementation Handbook PIH

**Milestone MS2** - Peer review of project's QMS documentation

Deliverable D1.1 - Partnership Agreements (PA) signed

**Deliverable D1.2** - Project management structure established

Deliverable D1.3 - PIH delivered

**Deliverable D1.4** - Internal Quality Control and Monitoring Plan & annual QA reports delivered

Deliverable D1.5 - Impact analysis delivered

WP2 - Development and implementation of skills-oriented curricula, teaching materials and methodology **Task T2.1** - Skills needs (re)assessment for the MT&L sector in energy efficiency and decarbonization

**Task T2.2** - Revision of existing and development of new skills-oriented course catalogues

**Task T2.3** - Development of innovative course teaching materials and methodology

**Task T2.4** - Preparation of documentation needed for verification of HND, BSc and MSc courses and LLL programs @ university/faculty level(s)

Milestone MS1 - Questionnaire for stakeholders

**Milestone MS2** - Peer review of revised/modernised and new course catalogues for BSc&MSc/LLL programs

**Milestone MS3** - Peer review of new innovative teaching materials for revised/modernised HND/BSc&MSc and new LLL programs

**Milestone MS4** - Verification of revised and modernised courses and of LLL programs

**Deliverable D2.1** - Developed guidelines for modernisation and development of courses

**Deliverable D2.2** - Revised and developed course catalogues

**Deliverable D2.3** - Developed teaching materials and methodology

**Deliverable D2.4** - Start-up of HND, BSc and MSc courses and LLL programs

WP3 - Capacity building through staff training and installation of new equipment **Task T3.1** - Acquisition of state of the art equipment for supporting teaching/training process

**Task T3.2** - Conducting know-how transfer to WB HEIs staff

Milestone MS1 - Procurement of the equipment

**Milestone MS2** - Capacity building of WB HEI academic staff

**Deliverable D3.1** - Equipment installed and functional

**Deliverable D3.2** - Enhanced academic staff knowledge and skills

WP4 - Impact and Dissemination

**Task T4.1** - Dissemination and exploitation activities

Task T4.2 - Establishing a ZeroC network

**Milestone MS1** - Development of dissemination and exploitation plan

Milestone MS2 - Development of MoU

**Deliverable D4.1** - Dissemination and exploitation plan delivered

**Deliverable D4.2** – Digital collaborating & dissemination web platform created and functional

**Deliverable D4.3** - Promotional materials produced and events organised

**Deliverable D4.4** - Established regional Zero-C network

## **ZeroC** aligns with the following Strategies:

## Global strategies

- EU Green Deal Carbon neutral society by 2050
- IMO Strategy on decarbonisation of shipping sector Carbon neutral shipping by 2050

## **UoM** strategies

- University of Montenegro, Strategy of development 2019 2024
- University of Montenegro, Strategy of Internationalisation 2021 2026
- Faculty of Maritime Studies Kotor, Strategy of development 2019 2024

## Additional projects @ UoM/PFK in topic of the

"Green transition in Montenegrin higher education landscape"



# WELCOME TO THE OFFICIAL WEBSITE OF ERASMUS+ MEP&M PROJECT

This is the official website of Erasmus+ Capacity building in the field of Higher Education project: "Development of Regional Joint Master Program in Maritime Environmental Protection and Management (MEP&M)", project no. 619239-EPP-1-2020-1-ME-EPPKA2-CBHE-JP

26.02.2024

**Univerzitet Crne Gore** 

Pomorski fakultet

Pomorski fakultet Kotor će predvoditi međunarodni projektni konzorcijum za dekarbonizaciju pomorskog saobraćaja kroz razvoj strategije za uspostavljanje zelenih pomorskih koridora između putničkih luka u Jadransko-jonskoj regiji





European Regional Development Fund - Instrument for Pre-Accession II Fund

Univerzitet Crne Gore/Pomorski fakultet Kotor, Centar za istraživanje, inovacije i preduzetništvo će rukovoditi projektnim konzorcijumom pod nazivom "Uspostavljanje zelenih pomorskih koridora za ugljenično neutralni kruzing i trajektni saobraćaj u Jadranskojonskom regionu" (eng. *Green Corridors for Carbon-Neutral Cruise and Ferry Shipping in the ADRION Region - GREENROUTES*").



Projekat GREENROUTES usmjeren je ka dekarbonizaciji pomorskog saobraćaja kroz razvoj strategije za uspostavljanje zelenih pomorskih





## THANK YOU FOR YOUR ATTENTION!

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