WORLD MARITIME UNIVERSITY

People. Development. Impact.

Maritime Energy Management: WMU's Journey Towards Zero/Low Carbon & Energy Efficient Maritime Future

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THE SHIPPING CONFERENCE – LEADERSHIP 2023

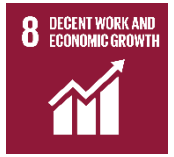
31 OCTOBER 2023

OUR COMMITMENT TO THE UN SDGs

ensure inclusive & equitable **quality education & promote lifelong learning** opportunities for all

achieve **gender equality and empower all women** and girls

ensure access to affordable, reliable, **sustainable and modern energy** for all



promote inclusive and sustainable **economic growth**, employment and **decent work** for all

build resilient infrastructure, promote inclusive and **sustainable industrialization and foster innovation**

take urgent action to **combat climate change** & its impacts

promote just, **peaceful** and **inclusive societies**

strengthen the means of implementation and revitalize the **global partnership for sustainable development**

Conserve and **sustainably use** the **oceans**, seas and marine resources for sustainable development

INITIAL & REVISED IMO GHG STRATEGY

	2023	2018
Vision	• **Phasing out GHG emissions from international shipping** as soon as possible	• **Phasing out GHG emissions from international shipping** as soon as possible in this century
Level of Ambitions	• 2030: reduce **CO_2 emissions per transport work by at least 40%**, compared to 2008 • 2030: Uptake of zero or near-zero GHG emissions technologies, fuels, energy sources; to represent at least 5% (striving for 10%) of the energy used by international shipping • 2030 (indicative checkpoint): **reduce the total annual GHG emissions by at least 20% (striving for 30%),** compared to 2008 • 2040 (indicative checkpoint): **reduce the total annual GHG emissions by at least 70% (striving for 80%),** compared to 2008 • By or around, i.e. close to, 2050: Reach net-zero GHG emissions	• Further **strengthen energy efficiency design requirements** for ships • 2030: reduce **CO_2 emissions per transport work by at least 40%**, compared to 2008 • 2050: reduce **CO_2 emissions per transport work by at least 70%**, compared to 2008 • 2050: **reduce the total annual GHG emissions by at least 50%,** compared to 2008
Other Key Elements	• **Well-to-Wake** Life-Cycle consideration • **Impacts on States** of candidate GHG reduction measures to be assessed before adoption • The Strategy to be **revised by 2027**	• **Tank-to-Wake** Life-Cycle consideration • **Impacts on States** of candidate GHG reduction measures to be assessed before adoption • Initial Strategy to be **revised by 2023**

WMU RESPONSE: MAINSTREAMING MARITIME DECARBONISATION IN HIGHER EDUCATION

(Net) Zero/Low Carbon and Energy Efficient Maritime Industry

WMU WORLD MARITIME UNIVERSITY

THE PG PATHWAY IN MEM STREAM

BREADTH KNOWLEDGE
(Technology & Innovation, Human Factors, Economics etc.)

PhD in MARITIME ENERGY MANAGEMENT

MSc in Maritime Energy Management

Foundation Studies (Term 1)

Subjects in Term 2

Subject 1: Energy for Sustainable Maritime Industry
Subject 2: Energy-Efficient Ship Design and Operation
Subject 3: Energy Management in Maritime Onshore Facilities
Subject 4: Alternative Fuel/Technologies and Marine Renewable Energy
Subject 5: Maritime Energy Management and Operational Research
Field Studies and Seminar(s)

Dissertation (Term 3)

PG Diploma in Maritime Energy by DL

Summer Institute, Professional Development Courses

Research Priority Areas:

Maritime Energy Management

&

Marine Technology and Innovation

Source: Kitada M., Schönborn A., Ölçer A.I., Ballini F., Dalaklis D. (2020) Addressing Climate Change Through Education and Research in Maritime Energy Management: The Case of World Maritime University. In: Leal Filho W., Nagy G., Borga M., Chávez Muñoz P., Magnuszewski A. (eds) Climate Change, Hazards and Adaptation Options. Climate Change Management. Springer, Cham. https://doi.org/10.1007/978-3-030-37425-9_45

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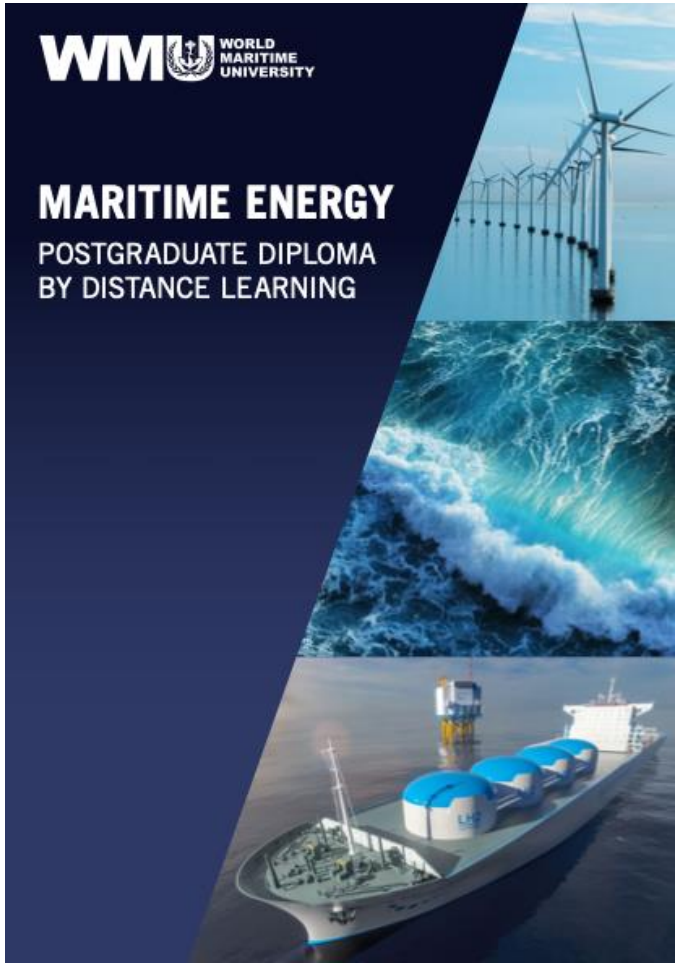
FIRST IN-HOUSE PGDIP OF WMU
PG DIP IN MARITIME ENERGY



- M1: Maritime Energy and Sustainable Development
- M2: Ships and Energy Efficiency
- M3: Future Propulsion Technologies
- M4: Energy Conservation in Ports and Shipyards
- M5: Best Practices and Life-Cycle Perspectives

The Maritime Energy Postgraduate Diploma programme is endorsed by Wartsila and CETENA.

WÄRTSILÄ CETENA

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THE SUMMER INSTITUTE ON MARITIME DECARBONISATION

- The philosophy behind this course is that the inevitable maritime energy transition is an opportunity for the industry.

- 36 participants from 20 different countries and from no less than 5 continents (Africa, America, Asia, Australia and Europe)

Participants who complete the WMU Summer Institute on Maritime Decarbonization should:

- Understand the regulatory framework of air pollution resulting from international shipping along with the UN 2030 Agenda
- Gain a deeper understanding of different technical and operational options for decarbonizing the maritime sectors
- Grasp current innovation in the maritime industry, with a focus on future energy technologies, and GHG reductions
- Be familiar with the range of financing mechanisms and potential government support (financial incentives) to facilitate the energy transition of the shipping sector
- Be familiar with the wide range of actors in the maritime sector including ports

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FUTURE MARITIME LEADERS

- The WMU is at the forefront of MEM education and research. Since 2016, WMU has offered a MEM specialization within the Master of Science in Maritime Affairs programme, and in 2018 launched a new postgraduate diploma programme in MEM by distance learning. MEM has been disseminating expertise to the graduates' home countries to maximize the global efforts towards decarbonization of international shipping.

- 91 Graduates from MSc in MEM from 42 developing States (as of Nov'23)
  - 49 out of 91 are from Africa
- More than 50 Graduates in PG Dip in ME (former and current)

Including Maritime Professionals from LDCs and SIDS

- Maritime administrations, ports, classification societies, shipping companies, shipyards, academic institutions and so on.
- Colleagues at IMO & Country delegation in plenary session of MEPC
- ……

Mr. Kitack Lim

Professor Max Mejia

WORLD MARITIME UNIVERSITY

WMU ALUMNUS RECEIVES RINA IAN TELFER PRIZE

29 April 2021

WMU ALUMNUS RECEIVES RINA IAN TELFER PRIZE

The World Maritime University (WMU) is pleased to announce that WMU Alumnus, Mr Eko Maja Priyanto from Indonesia (MSc 2017), has been awarded the Royal Institute of Naval Architects (RINA) Ian Telfer Prize for the best published paper on energy and environment related issues by an author under the age of 35. The paper resulted from Mr Priyanto's MSc dissertation under the supervision of Professor Aykut I. Ölcer.

The paper, entitled The Potential of Methanol as an Alternative Marine Fuel for Indonesian Domestic Shipping, was published in the Transactions of the Royal Institution of Naval Architects (Ref IJME590). WMU co-authors include Professor Aykut I. Ölcer, Associate Professor Dimitrios Dalaklis, and Assistant Professor Fabio Ballini. The analysis aims to provide insight to the future usage of methanol as well as an alternative marine fuel for domestic ships in Indonesia. The analysis also includes an overview of the potential application, the availability of resources and stakeholder readiness. The potential performance of methanol as a fuel is discussed and evaluated through the shipowner and government perspectives as well as case studies of two passenger ships. The feasibility study also includes a scenario approach based on the combination of economic measures as well as a technical scenario. Short, medium, and long term recommendations have been made as the basis for future consideration.

Mr Priyanto graduated from WMU in 2017 with an MSc in Maritime Affairs, specializing in Maritime Energy Management (MEM). He is employed by Indonesia Classification Societies (PT. Biro Klasifikasi Indonesia) and received his fellowship to study at WMU from the Sasakawa Peace Foundation. In responding to receiving the award, he stated "Nothing is easy, particularly for developing countries in the current maritime world situation. They are faced with stringent maritime regulations and depletion of petroleum-based fuel resources. Breakthrough solutions need to be developed. I was fortunate to study at WMU in the MEM Specialization at a pivotal time and return to my home country with the knowledge to contribute to change. This paper is one contribution from me and my co-authors, and it is my hope that my contribution will encourage others to work towards an attainable sustainable maritime future."

Dr. Ölcer, Head of the Maritime Energy Management specialization and co-author said, " I am overjoyed with this well-deserved achievement for Mr Priyanto, and congratulate him on this prestigious award. He exhibited great passion and dedication during his studies in the MEM Specialization at WMU. I am proud to see his contribution to achieving decarbonization of international shipping in line with the UN SDGs 7 and 13. This award is an outstanding example of the impact WMU has within the context of capacity building. I believe that this success will continue to inspire Mr Priyanto and others in the years to come in addressing the critical issue of decarbonization."

WMU is at the forefront of MEM education and research. Since 2016, WMU has offered a MEM specialization within the Master of Science in Maritime Affairs programme, and in 2018 launched a new postgraduate diploma programme in MEM by distance learning. MEM is also a WMU Research Priority Area (RPA) that examines issues raised in respect to energy management with a view to reducing air pollution and generating and consuming energy in a sustainable manner to achieve a low/zero carbon and energy efficient maritime future.

To learn more about WMU's educational offerings, research, and commitment to MEM, click here.

WMU RESEARCH PRIORITY AREAS

Maritime

- RPA1: Maritime Energy Management
- RPA2: Maritime and Marine Technology and Innovation
- RPA3: Maritime Economics and Business
- RPA4: Maritime Social and Labour Governance
- RPA5: Maritime Law, Policy and Governance
- RPA6: Maritime Safety
- RPA7: Environmental Impact of Maritime Activities

Ocean

- RPA8: Navigational Right & Freedoms
- RPA9: Deep Blue: Capacity Building & Areas Beyond National Jurisdiction
- RPA10: Oceans, Climate Action & the UN 2030 Agenda
- RPA11: Blue Limits: Spatial Governance of Ocean Space & the Ocean/Coastal/Terrestrial Interface
- RPA12: Challenges in Ocean Governance

RESEARCH IN MARITIME ENERGY MANAGEMENT (MEM)

- EU Funding from FP6, FP7, H2020 to Horizon Europe and Academic Partnership
  - CHEK (deCarbonizing sHipping by Enabling Key technology symbiosis on real vessel concept designs)
  - SEANERGY (Sustainability EducationAl programme for greeNER fuels and enerGY on ports"–SEANERGY Project)
- Regional Funding and Academic Partnership
  - Nordic Energy Research – CAHEMA (Concepts of ammonia/hydrogen engines for marine application)
  - Trafikverket – ETS Impact on International Shipping
- MSc dissertations (https://commons.wmu.se/mem_dissertations/)
  - WMU alumnus receives RINA Ian Telfer prize (https://www.wmu.se/news/wmu-alumnus-receives-rina-ian-telfer-prize)
- PhD Research
  - Wide Spectrum of Topics (energy modelling, ports/shipyards & MEM, economic measures, alternative fuels etc.)
- Research Seminars/Webinars/Workshops
- Link currculum content and delivery to research

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COLLABORATION WITH IMO

- GMN Project (https://www.wmu.se/news/maritime-energy-management-executive-development-course-delivered-in-london)
- IMO-GHG Smart Project
  - Potential scholarships for MEM MSc/PGDip
- IMO CARES Project

- Literature review on comprehensive impact assessment of the short-term measure as part of IMO's mepc76 (https://www.wmu.se/news/wmu-literature-review-on-comprehensive-impact-assessment-of-the-short-term-measure-as-part-of-imos-mepc76)
- Enhancing safety and energy efficiency of domestic passenger ships in the Philippines (https://www.wmu.se/news/enhancing-safety-and-energy-efficiency-of-domestic-passenger-ships-in-the-philippines)

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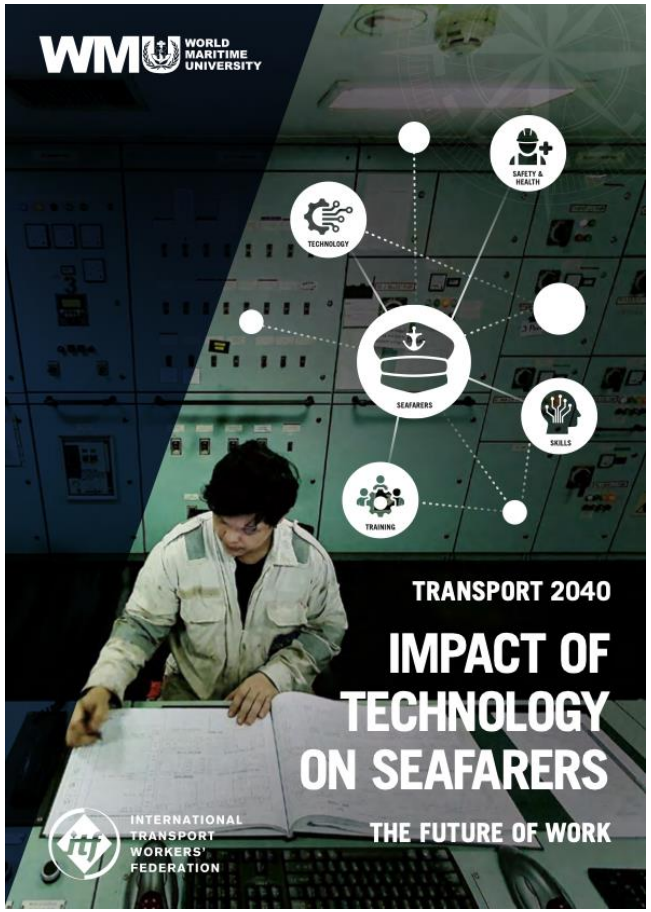
TRANSPORT 2040 - IMPACT OF TECHNOLOGY ON SEAFARERS

2 Years Research Project Generously Financed by the ITF

- Continuous Assessment of Trends in Automation and Technology (Technology Evolution and Technology Roadmap)
- Future Maritime Skills, Competencies and Career Opportunities
- Case Studies (x4): Occupational Health and Safety



Source: (https://commons.wmu.se/lib_reports/78/)

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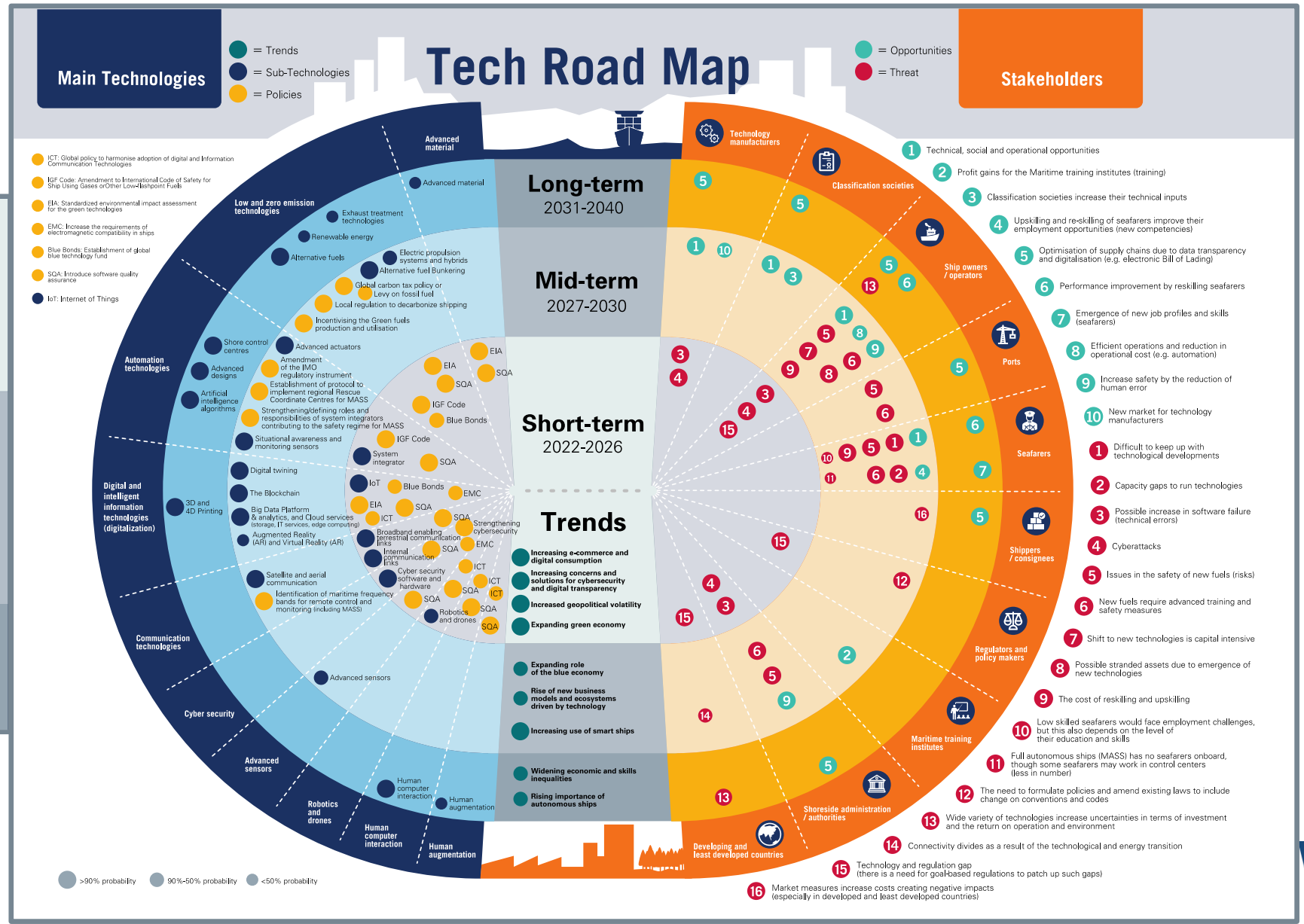
TECHNOLOGY ROADMAP

- Increasing e-commerce and digital consumption
- Increasing concerns and solutions for cybersecurity and digital transparency
- Increased geopolitical volatility
- Expanding green economy
- Expanding role of the blue economy
- Rise of new business models and ecosystems driven by technology
- Increasing use of smart ships
- Widening economic and skills inequalities
- Rising importance of autonomous ships



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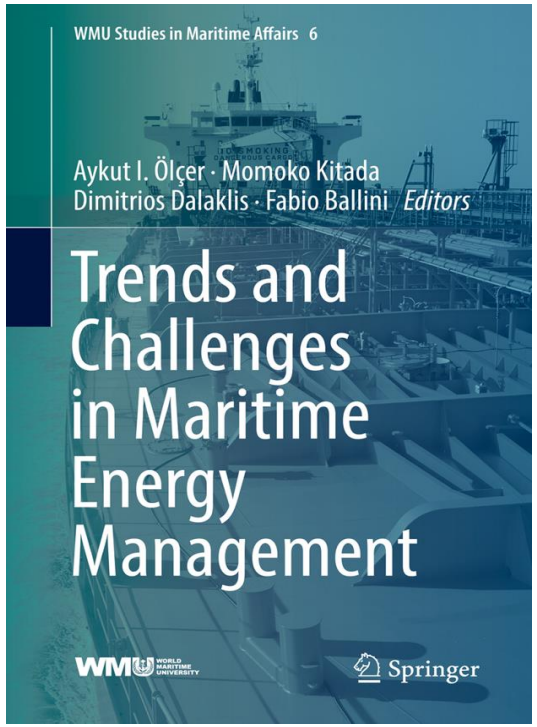

13 CLIMATE ACTION

7 AFFORDABLE AND CLEAN ENERGY

THANK YOU!

SUSTAINABLE DEVELOPMENT GOALS

IMO INTERNATIONAL MARITIME ORGANIZATION