ADDRESSING MARITIME DECARBONIZATION THROUGH EDUCATION, RESEARCH AND CAPACITY BUILDING IN MARITIME ENERGY MANAGEMENT (MEM): A SUCCESS STORY OF THE WORLD MARITIME UNIVERSITY

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AIR POLLUTION - MOTIVATION AND DRIVERS & MEM

- Environmental impact of Air Pollutants and GHGs (climate change, ..) and other externalities
- More stringent environmental regulations (MARPOL Annex VI Chapter 4), Kyoto to Paris Agreement and the latest IMO GHG Strategy
- Volatile fuel oil price
- World population, energy demand and prices
- Energy resources scarcity and Energy security
- UN2030 Agenda (SDGs 7 & 13 in particular)

THE HOLISTIC VIEW OF MARITIME ENERGY MANAGEMENT

- Regulatory framework
- Energy efficiency
- Renewable / Cleaner energy
- Technology and Innovation
  - 4th Propulsion Revolution?
- Human element
- Economics of energy management

NEW TECHNOLOGIES FOR GREENER SHIPPING

IMO
World Maritime Theme for 2021
Seafarers: At the Core of Shipping’s Future

IMO
World Maritime Theme for 2020
Sustainable Shipping for a Sustainable Planet

IMO
World Maritime Theme for 2022
New Technologies For Greener Shipping

Air Pollution

- Ballast Water (Invasive Species)
- Sewage
- Marine Litter
- Under Water Noise
- Chemicals
- (Anti) Fouling
- Oil Spilage

Source: (WMU Maritime Energy Management Specialization EGY102 Lecture Notes)
MAINSTREAMING MARITIME DECARBONISATION IN HIGHER EDUCATION
THE PG PATHWAY IN MEM STREAM

**Research Priority Areas:**
- Maritime Energy Management
- Marine Technology and Innovation

**Professional Development Courses**

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

**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**

**MSc in Maritime Energy Management**

**PhD in MARITIME ENERGY MANAGEMENT**

FUTURE MARITIME LEADERS

- 62 Graduates from MSc in MEM
  - 34 out of 62 are from Africa

- More than 40 Graduates in PG Dip in ME

- Maritime administrations, ports, classification societies, shipping companies, shipyards, academic institutions and so on.

- Colleagues at IMO

- Country delegation in plenary session of MEPC

- ......
RESEARCH

- EU Funding from FP6, FP7 to H2020
  - CHEK (deCarbonizing sHipping by Enabling Key technology symbiosis on real vessel concept designs)

- Regional Funding
  - Trafikverket – ETS Impact

- PhD Research
  - Wide Spectrum of Topics

- MSc dissertations ([https://commons.wmu.se/mem_dissertations/](https://commons.wmu.se/mem_dissertations/))

- Collaboration with IMO
  - Literature Review of the Com. Impact Assess. of short term measures – MEPC76

- Research Workshops
  - Nordic Energy Research Seminar

- Link curriculum content and delivery to research
OUTREACH AND CAPACITY BUILDING

- PG Diploma in Maritime Energy by DL
- Professional Development Courses
- Global Sulphur Limit Workshops
  - With Collaboration with MTCCs and DMA
- Conferences and Seminars
  - MARENER 2017 Conference
  - MTCC Seminar at WMU
THE WAY FORWARD

- Holistic and transdisciplinary view
- Right combination of thematic pillars and measures
- Mindset change and paradigm shift
- Global collaboration amongst all stakeholders
- Life-cycle perspective within energy and maritime supply chain
- Last but not least **INVEST ON FUTURE MARITIME LEADERS**
  - (WMU model and its translation into regional/local context)

While keeping the following in mind:
- **Empowering women in the maritime industry and**
- **Building resilience for disruptions such as COVID-19**
THANK YOU

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