

E-Learning course on the Energy Efficient Ship Operation

9th Steering Group Meeting of UN CC:Learn Members
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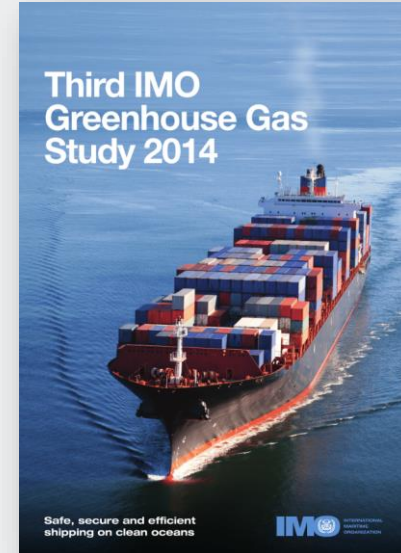
International Maritime Organization

- Specialized agency of the UN
- 174 Member States
- Develop and maintain a comprehensive regulatory framework for shipping
- Safety, **environment**, legal matters, technical cooperation, security and the efficiency of shipping



GHG emissions from international shipping

- > 80% of global trade by volume (> than 70% by value) carried on board ships (raw materials, finished goods, foodstuffs, fuel etc.)
- 2012: international shipping CO₂ emissions = 2.2% of global CO₂
- By 2050, CO₂ emissions from international shipping could grow by between 50% - 250%, depending on future economic growth and energy developments
- Demand is the key driver for growth in emissions



- In view of IMO's activities and commitments towards climate change mitigation, IMO joined UN CC:Learn Partnership in 2015
- IMO provides wide portfolio of capacity building activities on ship emission reductions /ship energy efficiency - but so far no E-Learning solutions

UN CC:Learn Affiliation Programme

- Spring 2018: Initial discussions with UNITAR on UN CC:Learn Affiliation Programme and potential hosting of E-Learning
- Oct 2018: Signed Letter of Collaboration - identifying responsibilities and timelines

UNITAR support from the very start and through all course development stages:

- Provided set of standards detailed in the UN CC:Learn Affiliation Programme: “Criteria for quality, design and technical compatibility”
- Conducted quality standards / technical compatibility review and provided inputs and suggestions on:
 - Course syllabus, methodology and mode of delivery
 - Course mock up or prototype including all major design elements (e.g. IT testing with course developer)
- Conducting final review, testing and approval, providing final comments and suggestions

UN CC:Learn Affiliation Programme - Benefits

- UN CC:Learn platform has a wide reach (exposure to a growing and engaged community of 150,000 learners)
- Hosting of affiliated product at no cost for duration up to 2020
- IT support to users (e.g. answering questions about registration or access to course)
- Marketing of the course as a UN CC:Learn affiliated product through UN CC:Learn communication channels and IMO Media channels
- UNITAR strong expertise in the development and delivery of E-Learning solutions → professional support and expert advice through all stages of course development and implementation

Thank you to the entire UNITAR team and
UN CC:Learn partnership collaboration!



E-Learning course on the Energy Efficient Ship Operation

An Introduction
to Energy-
Efficient Ship
Operation

Energy Saving at
Sea

Energy Efficiency
and the Shore
Office

- 3 sub-courses
- KVH Videotel contracted to develop course
- Expected delivery by Summer 2019

E-Learning course on the Energy Efficient Ship Operation

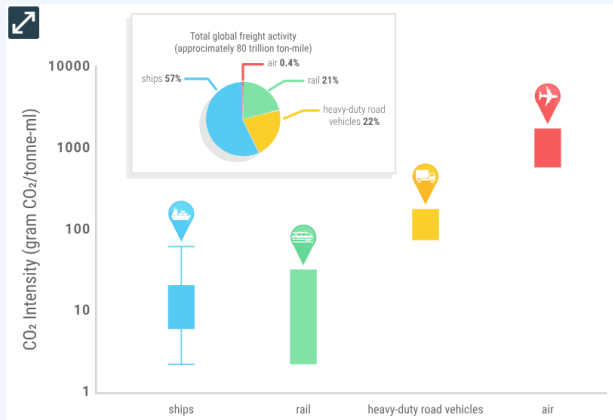
Course	An Introduction to Energy-Efficient Ship Operation	Energy Saving at Sea	Energy Efficiency and the Shore Office
Modules	<ul style="list-style-type: none"> • GHG and Energy Efficiency in the Shipping Industry • Practical ways of Reducing Energy Use at Sea 	<ul style="list-style-type: none"> • Deck Department (Operations management) • Engine Department (Shipboard Energy Management) 	<ul style="list-style-type: none"> • Energy efficiency management • Commercial aspects of energy efficiency
Overall Learning Objectives	<ul style="list-style-type: none"> • Understand the issue of GHGs and climate change • Introduction to the energy efficient operation of ships • Relevant IMO regulations and activities • What can be done by those in the maritime industry to reduce GHGs 	<ul style="list-style-type: none"> • Understand all variables that can impact energy efficiency • Potential gains that can be achieved by developing, implementing, monitoring and improving energy efficiency measures 	<ul style="list-style-type: none"> • Importance of commitment from the top to improving energy efficiency • Types of shipping contracts and how they influence ship operation and the fleet's energy efficiency • Ship loading and ship capacity utilization, Just In Time operation, optimised ship handling, and e-navigation • Pros /cons of investment in new equipment and retrofitting

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Greenhouse Gases and Energy Efficiency in the Shipping Industry • Emissions from the transport sector

Emissions from the transport sector



Energy Efficiency of Shipping

Transportation is a key contributor to emissions, accounting for **about 14% of global GHG emissions**. Greenhouse gas emissions from this sector primarily involve fossil fuels burned for road, rail, air, and marine transportation. Almost all of the world's transportation energy comes from petroleum-based fuels, largely gasoline and diesel.

As can be seen from the graph, which shows the amounts of carbon dioxide emitted per ton of cargo/mile by different modes of transport, shipping is a comparatively efficient method of transporting goods. It generates less carbon dioxide than any other transport mode.

It generates **less** carbon dioxide than any other method.



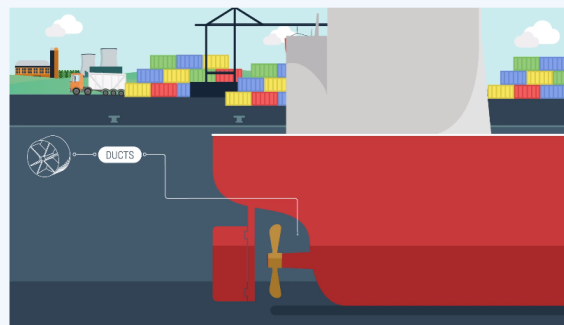
Note

The vertical axis is logarithmic and not linear, so the actual differences are **much larger** than they might seem at first glance.



Practical Ways of Reducing Energy Use at Sea • Fitting new machinery

Fitting new machinery



Whilst we have learned what the engine and deck departments can contribute to the energy efficiency of a ship, which are out of their control.

For example, for the ship owner there is a wide range of energy efficiency measures that can be made available by fitting new and more efficient equipment. These include fitting ducts around the propellers, fitting bladed devices called stators, and fitting propeller guards, making it less turbulent around the propeller and fitting propeller blades.

In course 3 we will learn more about what companies and those who own ships can do to improve energy efficiency.

VT5



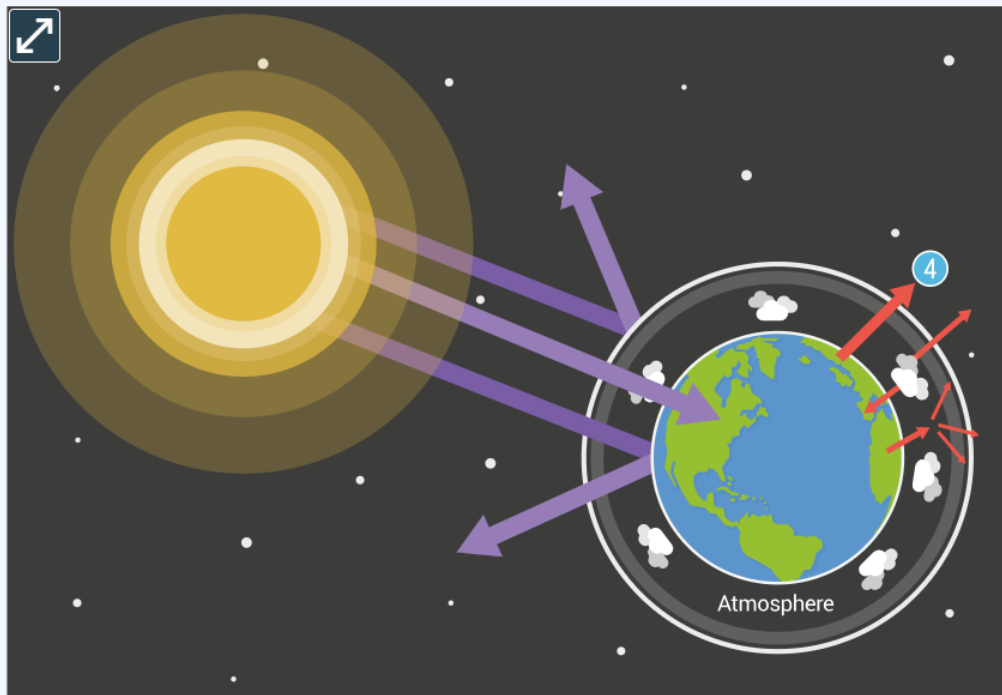
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Greenhouse Gases and Energy Efficiency in the Shipping Industry • The greenhouse effect

The greenhouse effect



← PREVIOUS

NEXT →

An idealised model of the natural [greenhouse effect](#)

4. Some infrared radiation is absorbed by the Earth's atmosphere.

The Earth environment as we know it exists because of the Sun. The absorbed sunlight drives photosynthesis, melts snow and ice, and warms the Earth system.

When radiation from the sun reaches the Earth, some is reflected back into space. Some radiation is absorbed by the Earth's surface.

But about half of it is absorbed by the Earth, keeping it warm. The Earth then radiates back into space as long wavelength infrared radiation.

But the increasing amount of carbon dioxide and other greenhouse gases in the atmosphere is enhancing the greenhouse effect. These gases absorb some of the infrared radiation leaving the Earth's surface, "trapping the heat in the atmosphere", letting sunlight in, but absorbing more of the heat that gets reflected by the Earth into the Atmosphere.

This means that more heat is trapped in the atmosphere, leading to higher temperatures and other changes to our climate.

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Practical Ways of Reducing Energy Use at Sea • Which of the following can contribute to energy saving at sea?

Which of the following can contribute to energy saving at sea?

 Engine Department	 Deck Department	 Catering Department	 Ship Owner
 Ship Charterer	 Ship Manager	 Port Terminal	 Port Authority



Optimising the trim

Trim = 0.2 by the stern.

Extra fuel used per 24 hrs: 0.02 Metric Tonnes

↑ TRIM

↓ TRIM

Optimising the trim is another of the tasks of the deck department. The trim is the difference between the ship's aft draft and the forward draft. Altering it changes the area of the hull in contact with the water and the waves that the ship makes. So it alters the resistance and the engine power required to propel the ship.

Many ships sail with zero trim, also known as 'even keel' operation. And this is the



Weather routing

ROUTE A
ROUTE B
OCEAN CURRENTS

RESULT

Route A: Distance: 250NM; Time Taken: 13.89Hrs; Fuel Consumed: 12.08
Route B: Distance: 200NM; Time Taken: 14.29Hrs; Fuel Consumed: 12.43

SELECT FROM OPTIONS

● PORT A to PORT B
○ PORT B to PORT A

START

RESET

Select appropriate direction and route then press start button

Thank-you for your attention

