# Shipping Decarbonisation: Regulations, Best Practice and Compliance

# Topic 3 – EU Shipping Decarbonization Regulations

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# Learning objectives

## By the end of this presentation you will be able to:

- Appreciate the scope of EU shipping decarbonisation regulations.
- Give an overview of the EU MRV regulations.
- Discuss the FuelEU Marine regulations and its implications.
- Give and overview of the EU ETS and its application
- Explain how compliance is generally achieved and what will happen if non-compliant.
- Name regulatory documents that must be present on-board ships and in the company.

# Content

## This presentation provide information on a number of subjects:

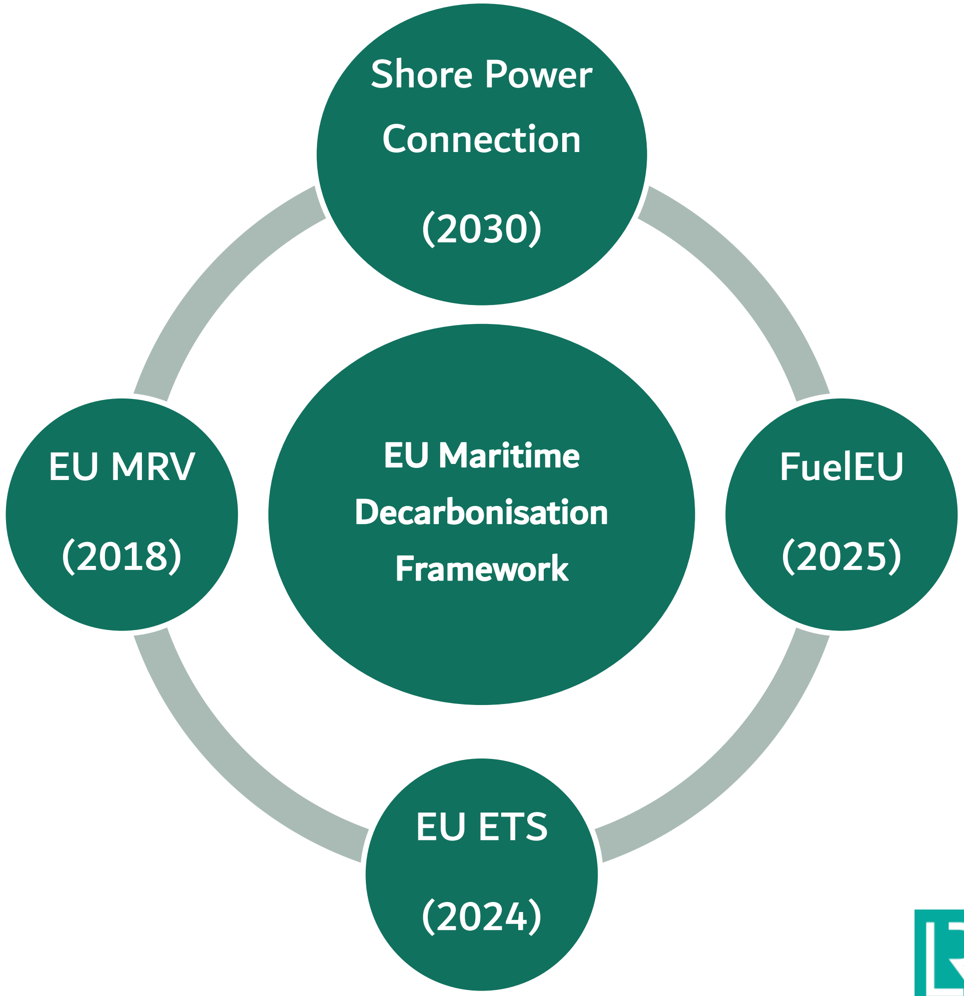
- Regulatory framework
- EU MRV
- FuelEU Marine
- EU ETS for shipping
- Compliance and implications
- Exercises and discussion

# EU Regulatory Framework

# EU regulatory framework

## EU regulatory framework has generally ahead of the IMO regulations.

- 4 main regulatory areas now.
- MRV (Monitoring and Reporting and Verification) of ships' GHG emissions.
- FuelEU Marine: Bring down the GHG intensity of energy/fuel used by ships.
- Shore Power Connection: Some ships must connect to shore power if stay at berth for 2 hours or more.
- EU ETS (Emissions Trading System): Inclusion of the shipping into the EU ETS. Charging ships for their GHG emissions.



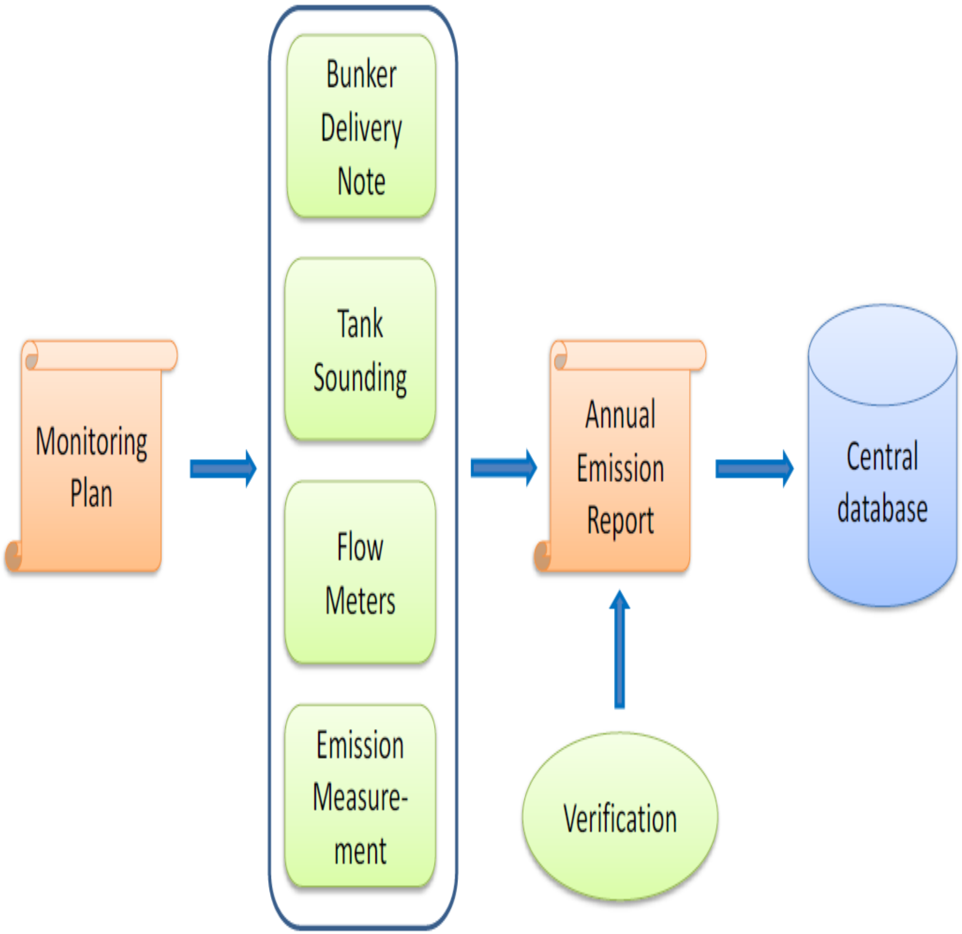
# EU MRV framework (agreed in 2015 and revised in 2023)

## (1) Monitoring/Report → (2) Verification → (3) Reporting → Compliance

| Monitoring | Verification | Reporting | Compliance |
|---|---|---|---|
| • Companies must measure and report for each ship, according to their Monitoring Plan, data on GHG emissions, fuel consumption, etc.<br><br>• Both voyage and annual data will go into the "ship emissions report". | • The "ship emissions report" must be verified by an accredited MRV verifier.<br><br>• A "Document of Compliance" will be issued to the ship by the verifier. | • By 30 April of each year (31 March as of 2025), the company must submit to the Commission and to the relevant flag States a "verified emissions report" for each ship for the previous calendar year. | • By 30 June of each year, the company must ensure that applicable ships carry on board a "Document of Compliance".<br><br>• This may be subject to inspections by Member States' authorities. |

# EU MRV Monitoring Plan

- Main data items to be recorded/reported:
  - Fuel consumption and GHG emitted.
  - Distance travelled
  - Time spent at sea
  - Cargo carried
- The ship must have an agreed Monitoring Plan.
- Ship will do the recording and reporting according to its Monitoring Plan.
- Fuel consumption measurement: 4 methods are acceptable.
- Annual emissions report must be verified and submitted to a central database.




EU MRV monitoring requirements [Lloyd's Register]

# Ship-board Monitoring Plan structure

## Monitoring Plan (MP) should address the following main elements:

| Basic Data | Activity data | Data Gaps | Review aspects |
|---|---|---|---|
| • Identification of the ship .<br>• Company information.<br>• Emission sources and fuel types used.<br>• Emissions factors.<br>• Procedures and systems and roles, etc. | • Fuel consumption measurement methods and cross checks.<br>• Measurement instruments and their quality assurance.<br>• Procedures for recording, analysis and storing of data.<br>• Method for determination of fuel density.<br>• Level of uncertainty of measurements.<br>• List of voyages<br>• Distance travelled (procedures, etc.)<br>• Amount of cargo carried & Number of passengers (procedures, etc.).<br>• Time spent at sea (procedures, etc.) | • Methods used to estimate fuel cons.<br>• Methods used to treat data gaps on all reported parameter. | • Regular check of adequacy of the MP.<br>• Quality assurance of information system used.<br>• Internal reviews for data validation.<br>• Corrections and corrective actions<br>• Outsourced activities, if any.<br>• Documentation |

# EU MRV – Ship Emissions Report

- The Ship Emissions Report will include the following sections:
  - Part A - Data identifying the ship and the company
  - Part B - Verification details
  - Part C - Information on the monitoring method used and the related level of uncertainty
  - Part D - Results from annual monitoring of the parameters:
    - Fuel consumption and CO2 emitted
    - Distance travelled, time spent at sea and transport work
    - Energy efficiency .
- Details are listed in the relevant template.

# EU MRV - Enforcement

In the case of a ship that has failed to comply with the monitoring and reporting obligations for two or more consecutive reporting periods:

- The competent authority of the Member State of the port of entry may issue an expulsion order. Notification of regulatory authorities are part of the process.

- The fulfilment of those monitoring and reporting obligations shall be confirmed by the notification of a valid document of compliance to the competent national authority which had issued the expulsion order.

- Also Member States can use penalties to ensure compliance.

# Revised EU MRV 2023

# Revised EU MRV

## EU MRV were revised in 2023 to cater for FuelEU and EU-ETS

- The revision was agreed in May 2023. Accordingly:
  - $CO_2$ → GHG (GHG means $CO_2$, $CH_4$ and $N_2O$)
  - From 2025, all general cargo ship and offshore ships ( >400 GT) are included.
  - Link to EU ETS added (example: Administering Authority Responsible (AAR))
- From 1 January 2024, each ship needs to start reporting according to the revised MRV.
- By 31 March each year from 2025, a verified Company Emission Report needs to be submitted to the AAR as well.
- This Company Emission Report would include the annual all-ships' aggregates for EU ETS purposes.

# Administering Authority Responsible (AAR)

- Each shipping company will have one AAR only.
- The relevant AAR for a shipping company is:
  - In the case of a shipping company registered in a Member State, the relevant Member State.
  - In the case of a shipping company that is not registered in a Member State, the Member State with the greatest number of port calls by that company in the preceding four monitoring years.
  - In the case of a shipping company that is not registered in a Member State and that did not carry out any voyage in the preceding four monitoring years, the Member State where a ship of the shipping company has started or ended its first voyage.

# Company Monitoring Plan

- Similar to ship-board Monitoring Plan, each company will have a dedicated Company Monitoring Plan.
- It has to be developed according to the relevant template.
- It has to be approved by the AAR.
- Data collection and reporting will then follow procedures as specified in the Company Monitoring Plan.

# Aggregated emissions data and report

- "Aggregated emissions data at company level" means the sum of emissions by a company's ships during the reporting period.
- Companies shall report the company-level aggregated emissions data.
- The verifier shall assess the conformity of the company-level aggregated data and emissions report to the requirements.
- Upon satisfactory verification, the verifier shall issue a "Verification Report" to demonstrate compliance (of the company).

# EU MRV revised - Important dates

- By 1 April 2024, companies shall for each applicable ship, submit to the AAR the verified monitoring plan that would include $CO_2$, $CH_4$ and $N_2O$ emissions.
- By 6 June 2025, the AAR shall approve the ships' Monitoring Plans.
- From 2025, companies shall submit to the AAR by 31 March of each year the aggregated "company emissions data".
- The Commission shall biannually update the list of neighbouring container transhipment ports.
- So far, East Port Said (Egypt) and Tanget Med (Morocco) have been selected.

# Summary of how EU MRV works

**Ship-level**

- There must be a revised and verified Monitoring Plan on-board applicable ships.
- Ship-board staff will work according to Monitoring Plan and collect relevant data.
- Company needs to produce the Ship Emissions Report annually.
- The Ship Emissions Report is verified and a DoC is issued to the ship annually.
- The verified Ship Emissions Reports are submitted to a central database.
- In case of non-compliance for two or more years, the ship will be expelled from entry into EU. Penalties may also be imposed.

**Company-level**

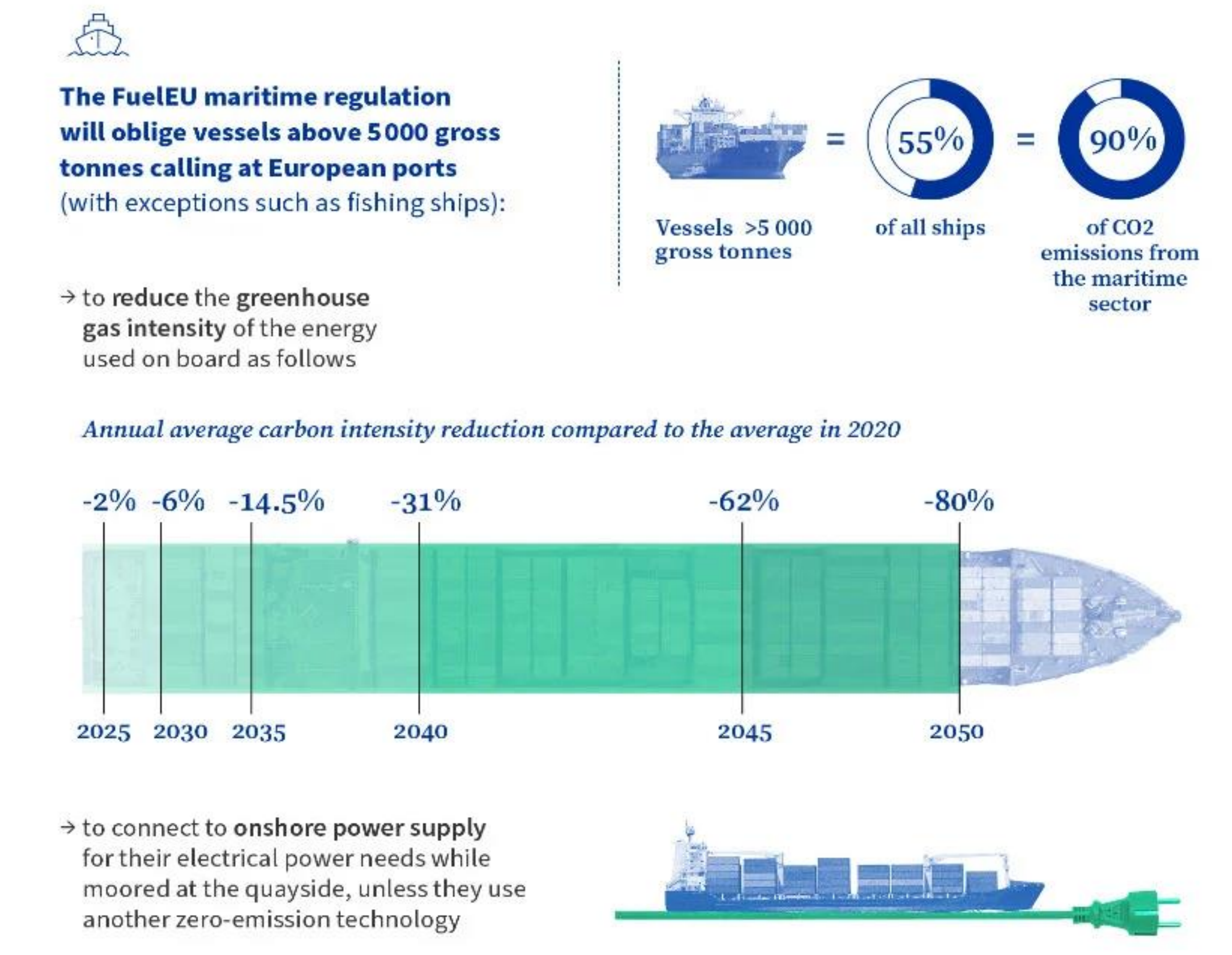
- The verified Ship Emissions Reports will be used to produce the Company Emissions Report that would include all aggregated ships' data.
- The Company Emissions Report must be verified and company should retain a Verification Report.
- The Company Emission Report will also be submitted toe Administering Authority Responsible.
- The Company Emissions Report will form the basis for company's compliance under EU ETS.

# FuelEU Marine

# FuelEU regulations

## FuelEU aims to reduce the GHG intensity (in **gCO2e/MJ** ) of ship's fuels

- Gradual reduction over the future years relative to 2020 average.
- Timeline for change is shown in the diagram.
- Data collected under EU MRV is used for the purpose.
- In case of non-compliance, penalties will be imposed.




Source: https://www.offshore-energy.biz/eu-council-adopts-fueleu-maritime-clearing-the-final-adoption-stage/

# FuelEU Maritime - Scope

- Applicable to ships of 5000 GT and above in respect to:

  a) 100% of the energy used during their stay within an EU port.

  b) 100% of the energy used on inter-EU voyages.

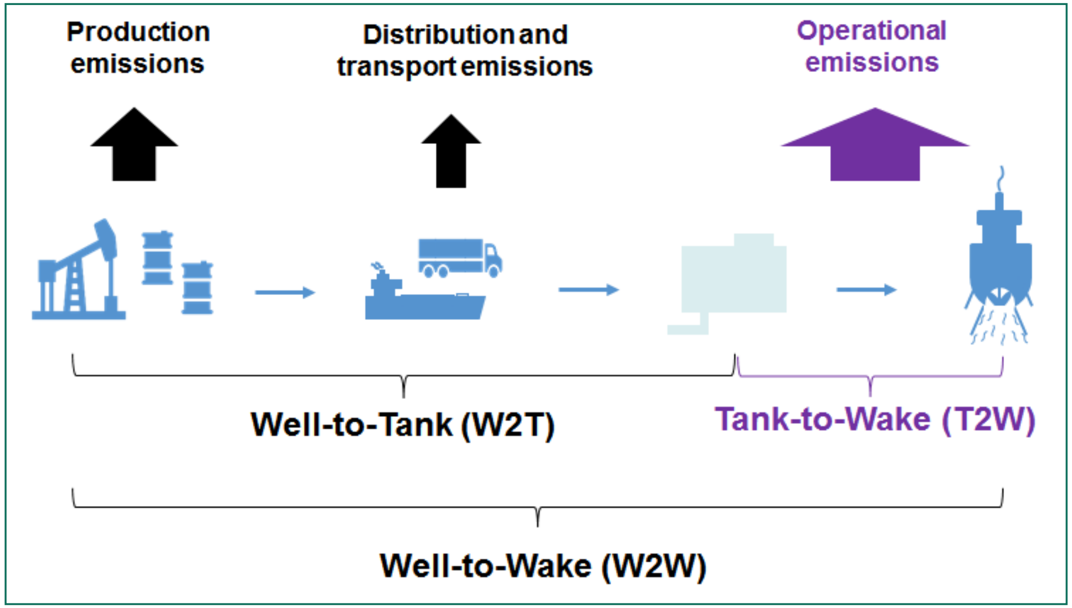
  c) 50% of the energy used on voyages in or out of the EU. Departing from or arriving to an EU port where the last or the next port is a non-EU port.

- This Regulation lays down uniform rules imposing:

  - The limit on the GHG intensity of energy used by the above ships.
  - Mandates use of on-shore power supply or zero-emission technology in EU ports.

# FuelEU status

- FuelEU regulations already adopted.
- Entry into force from 1 January 2025.
- Based on Well-to-Wake (WtW) GHG emissions intensity of fuel used.
- Applicable to ships calling at the EU or European Economic Area (EEA) ports.



# FuelEU regulatory details

## The FuelEU regulations contain the following main provisions

- Aims for the GHG intensity of used fuels to gradually decrease over time (by 2% in 2025 to up to 80% by 2050).
- A special incentive regime to support the uptake of the Renewable Fuels of Non Biological Origin (RFNBO).
- A voluntary pooling mechanism, under which ships will be allowed to pool their compliance balances with one or more other ships (with the pool as a whole meeting the GHG intensity limits on average).
- Method of use of revenues generated ('FuelEU penalties').
- Revenues should be allocated to the Innovation Fund under EU ETS Directive 2003/87/EC for promotion of alternative fuels.

# Use of shore power

## Mandatory use of shore power when at berth

- FuelEU regulations mandates shore power for container and cruise ships in certain EU ports from 2030.
- The applicable ships are required to connect to shore power when at berth for more than two hours in a Trans-European Transport Network (TEN-T) port.
- From 2035, the requirement applies to all ports where shore power is available.
- This does not apply to
  - Ships at berth for less than two hours.
  - Ships that use zero-emission technologies.
  - Ships that have to make a port call for reasons of safety or saving life.
  - When there is no compatible shore power connection points in a port.

# FuelEU Maritime – Fuel emissions factors

## Certification of biofuels, biogas, renewable liquid and gaseous transport fuels of non-biological origin and recycled carbon fuels

- Where these fuels are used, the following rules apply:
  - GHG emission factors of biofuels, biogas renewable fuels of non-biological origin and recycled carbon fuel shall be determined according to the methodologies set out in Directive (EU) 2018/2001(promotion of renewable fuels).
  - Thus need for fuel certification to take advantage of use of such fuels.
  - Biofuels and biogas that are non-compliant to the requirements of Directive (EU) 2018/2001 or that are produced from food and feed crops shall be considered to have the same emission factors as the least favourable fossil fuel pathway for this type of fuel;

# FuelEU – Monitoring Plan, Verification, etc.

## To monitor progress and reporting requirements, a Monitoring Plan is needed

- By 31 August 2024, companies shall submit to the verifiers a Monitoring Plan for each ship.
- For ships falling under the scope of this Regulation for the first time after 31 August 2024, companies shall submit a Monitoring Plan to the verifier no later than two months after each ship's first call to a port in a Member State.
- There are significant details under Article 7 on the content of Monitoring Plan. Examples:
    - Information on ship and its technical system
    - Information on installed shore power connection, if any
    - Well to wake emissions factors used
    - Aspects such as those under EU MRV Monitoring Plan, Etc.

# FuelEU Maritime - Monitoring and recording

- Based on the Monitoring Plan, companies shall record, for each applicable ship, the following information:
  - Port of departure and port of arrival details: Date, departure and arrival and time spent at berth, etc.
  - Details of the use of on-shore power or the existence of any of the exceptions.
  - The amount of fuel consumed by type at berth and at sea.
  - The well-to-wake emission factors for each type of fuel consumed at berth and at sea, broken down by well-to-tank and tank-to-wake.
  - Details of fugitive (unintentionally released) GHG emissions.
  - The amount of all substitute types of energy consumed at berth and at sea.

# FuelEU Maritime - Certificate of compliance

- By 30 March of each year, companies shall provide to the verifier the relevant information that need to be verified.
- By 30 June of the year, the verifier shall issue a FuelEU Certificate of Compliance for the ship.
- The FuelEU certificate of compliance shall be valid for the period of 18 months after the end of the reporting period.
- The verifier shall inform the Commission and the flag State of the issuance of certificate.
- In case of non-compliance, the verifier will establish details of non-compliance and penalties to be paid.
- After payment of penalties, the Certificate of Compliance will be issued to the ship.

# FuelEU Marine - Pooling of compliance

## Methodology and dates

- The balances of two or more ships, which are verified by the same verifier, may be pooled for the purposes of compliance.
- By 30 March of the year following the reporting period, the company shall notify the verifier the intention of including the ship's compliance balance in a pool.
- In the case where the ships participating in the pool are controlled by two or more companies, the companies shall make a joint notification to the verifier. Specific rules apply on how to distribute emissions between companies.
- By 30 April of the same, the pool shall be recorded in the compliance database by the verifier (no change of pool allowed after this).
- In case of pooled compliance, the company may decide how to allocate the total compliance balance of the pool to each individual ship, provided that the total pool compliance balance is respected.
- The company may no longer include the ship's compliance balance in a pool once the FuelEU certificate of compliance has been issued.

# FuelEU Maritime - Penalties

## Condition under which penalties will be imposed:

- Where on 1 May of the year following the reporting period, the ship has a compliance deficit, the company shall pay a penalty.
- The verifier shall calculate the amount of the penalty by multiplying the amount of EUR 250 by megawatts of power installed on-board and by the number of completed hours spent at berth.
- The company shall pay a penalty for each non-compliant port call.
- The verifier shall issue a FuelEU Certificate of Compliance once the penalties have been paid. The details shall be recorded in the FuelEU certificate of compliance.

# EU-ETS for Shipping

# EU ETS regulations

## EU ETS aims to use market mechanisms to charge shipping for their GHG emissions

- ETS is a cap-and-trade system.
- Cap set by regulator; allowances purchased by shipping.
- If in credit, one could sell and if in debit, one should buy.
- **For shipping companies, there is no cap and trade but simply paying for all of their GHG emissions.**


Source: https://climatechangeconnection.org/solutions/carbon-pricing/cap-trade-system/

# Inclusion of shipping in EU-ETS

## EU have already decided to include shipping in its ETS

- Applicable to commercial cargo and passenger ships above 5000 GT.
- Shipping companies need to acquire and surrender emission allowances for their $CO_2$ emissions from 2024.
- From 2024, the marine EU ETS will include $CO_2$ emissions only. From 2026, $CO_2$ + $CH_4$ + $N_2O$.
- Amount of emissions are those measured under EU MRV (100% European voyages and ports and 50% outside voyages)
- Special provision for transhipment for containerships are included.
- The revised EU MRV includes the requirements of shipping EU ETS.

# EU ETS – Economic aspects

- Shipping companies will receive no free allowances.
- Allowances can be purchased from relevant markets (auction or trading).
- Money raised from shipping allowances will be used partly for shipping innovative projects (about 20% of it) and the rest will go to EU Member States.
- Companies that fail to surrender allowances are liable to an excess emissions penalty of €100/tonne $CO_2$, and are still liable for the surrendering of the required allowances.
- Companies that fail to comply for two or more consecutive periods may be denied entry in the EU for all ships under their responsibility.

# Who pays for the EU ETS allowances?

## Shipping companies can be reimbursed for the EU ETS cost by other entities based on contracts

- Shipping companies (primarily owners) are responsible for compliance to requirements of the maritime EU ETS.

- However, Member States shall take the necessary measures to ensure that when the ultimate responsibility for the purchase of the fuel, or the operation of the ship, or both, is assumed by an entity other than the shipping company pursuant to a contractual arrangement, the shipping company is entitled to reimbursement from that entity for the costs of EU-ETS.

- The above generally means that those who (contractually) pay for the fuel would ultimately pay for the EU ETS charges as well.

# Phase-in of the maritime EU ETS

- Shipping companies shall be liable to surrender allowances according to the following schedule:

  - 40% of verified emissions reported for 2024.

  - 70% of verified emissions reported for 2025.

  - 100% of verified emissions reported for 2026 and each year thereafter.

# Summary of how shipping EU-ETS works

## EU ETS is applicable at company level

- EU ETS is applicable at company-level.
- Company Ship Emissions Report, as verified, will be the basis of ETS.
- The Company is liable to surrender EU ETS Allowances equivalent to its annual EU-related GHG emissions.
- In case of lack of allowances, penalties must be paid (and also allowances surrendered).
- There are phased approach to implementation of marine EU ETS starting from 2024.

# Summary of Learning Points

# Summary of learning points

## You are now familiar with the following topics:

- EU shipping decarbonization framework.
- Revised EU MRV 2023 include FuelEU and EU ETS requirements.
- FuelEU scope, timeline, certification, etc. on how EU intends to bring down the GHG intensity of fuel/energy used by shipping.
- EU ETS scope, timeline and financial aspects on how EU intends to charge shipping for their GHG emissions.
- The requirements for verification and central role that verifiers play for each of the above cases.

# Summary of learning points

| Regulations | Status / domain | Compliance |
|---|---|---|
| EU MRV | All ships > 5000 GT; annual and voyage data; actual cargo carried info.; data collection by ship; data verification by accredited verifier; ship emission report. | Verified Monitoring Plan / Verified Ship Emissions Report / Document of Compliance |
| FuelEU Maritime | All ships > 5000 GT; GHG intensity of used fuel to be reported; cap on fuel GHG intensity; penalties; pooling options. | Verified Monitoring Plan / Verified Carbon Intensity Level + Ship Certificate of Compliance |
| EU ETS | All ships > 5000 GT + other ships later; company emission report; payment of company GHG related to EU operations; AAR. | Verified Company Emissions Report / Surrender of Allowances; certificate of compliance |

# True or False?

- EU MRV forms the basis for data collection for both FuelEU and EU ETS regulations?
- FuelEU regulations aims to reduce the CO2 intensity of shipping?
- There is no penalty associated with FuelEU regulations?
- As part of maritime EU ETS, shipping companies must pay for their GHG emissions from year 2025 (year 2025 for emissions of 2024)?
- AAR (Administering Authority Responsible) is one of the EU Member States that the shipping company must be reporting to for its EU ETS compliance purposes?
- Pooling of ships are allowed under the EU-ETS?
- Ships with penalty payments under FuelEU and EU-ETS will be detained until such payments are made?
- EU has set a minimum of 80% reduction limit in ship's fuel GHG intensity by 2050 relative to 2020?

# Exercise 3.1

## Comparison of IMO DCS with EU MRV

# Exercise 3.1 – Compare IMO DCS with EU MRV

- Please complete this table to identify similarities and differences of the two regulations.

| Topic | IMO DCS | EU MRV |
| --- | --- | --- |
| Data on ship cargo carried? | | |
| Fuel consumption data? | | |
| Need for voyage data? | | |
| Need for port related data? | | |
| Need for calculation of GHG emissions? | | |
| Need for ship emissions reporting? | | |
| Type of compliance documents needed? | | |
| Document needed for on-board data collection? | | |
| Access level to IMO-DCS and EU-MRV data? | | |
| Type of ships applicable? | | |
| Reporting period? | | |

# Exercise 3.2

## Cost of EU-ETS to my Ship

# Exercises 3.2 – How much EU ETS will cost to my ship?

- A ship is operating between China and the EU only. The fuel consumption for the ship includes:
  - Voyages: 30,000 MT/Year of HFOeq.
  - EU ports: 5,000 MT/Year HFOeq.
  - Chinese ports: 9,000 MT/Year HFOeq. (assume that 50% is counted as EU-related emissions)
- The fuel carbon factor is 3.1140.
- Assume that the ship produces only $CO_2$ as GHG emissions.
- If emissions allowances are priced at $50/tonne $CO_2eq$, how much the company would need to pay to the EU via purchases of EU ETS Allowances for this particular ship and particular year?

# Exercises 3.2 – Worksheet

# Exercise 3.3

## EU vs IMO regulations

# Exercises 3.3 - EU vs IMO regulations

- In your Group, compare IMO and EU decarbonisation regulations in terms of similarities and differences.
- For comparisons, use the following headings:
  - Ship design related regulations.
  - Ship operation related regulations.
  - Fuel-related regulations.
  - Economic-related regulations.
- Present the outcome to the class.

# Exercises 3.3 – Worksheet

# Questions