



EU Sulphur Directive

Sergio Alda

Senior Project Officer Unit 1.1 - Sustainability

***REGIONAL WORKSHOP ON THE CONSISTENT IMPLEMENTATION OF IMO 2020 AND
THE 0.10% SULPHUR LIMIT UNDER ANNEX VI TO (MARPOL) IN THE MED SOX ECA***

Malta, 22 - 23 May 2024



Legal Basis

- **Directive (EU) 2016/802**
 - Limits on sulphur content in heavy fuels and gas oil regulated in the EU
- **EC Implementing Decision 2015/253**
 - Rules concerning frequency of inspections and samplings as regards the sulphur content in marine fuels
- **Aims of the Legislation**
 - Reduce SO_x (and PM) shipping emissions due to combustion of marine fuel
 - Prevent the contribution of SO_x to air emissions, harmful for human health

Limitations on Fuels

- **% of Sulphur in Marine Fuels**

- 0.10% at berth in EU Ports (includes at anchor) and in SECAs (for EU MSs: Baltic Sea, North Sea (and English Channel) and **from 1st May 2025 also in the Mediterranean Sea**, as defined by MARPOL Annex VI)
- 0.50% outside SECAs

Maximum fuel sulphur content (by mass - % m/m*) established by the Directive

	outside EU SECAs**	inside EU SECAs**	Exceptions
Ships at berth in EU ports (includes at anchor)	0.10% Not if timetable < 2 hrs or engines switch off and shore-side electricity		Ships using Approved Emission Abatement Methods ⁴ ***
Passenger ships on regular services to/from EU ports	0.50%	0.10%	
Other ships/cases			

* Concentration for Solutions = grams solute /grams solution × 100%

** Current EU SECAs are the Baltic Sea, North Sea (and English Channel) as defined in MARPOL Annex VI Regulation 14.3.1

*** Emission abatement methods and alternative fuels (e.g. exhaust gas cleaning systems, mixtures of marine fuel and boil-off gas, LNG, fuel cells and biofuels) are permitted for ships of all flags in EU waters as long as they continuously achieve reductions of SOx emissions which are at least equivalent to using compliant marine fuels.

Marine Fuel Inspections and Sampling

- **Actors**

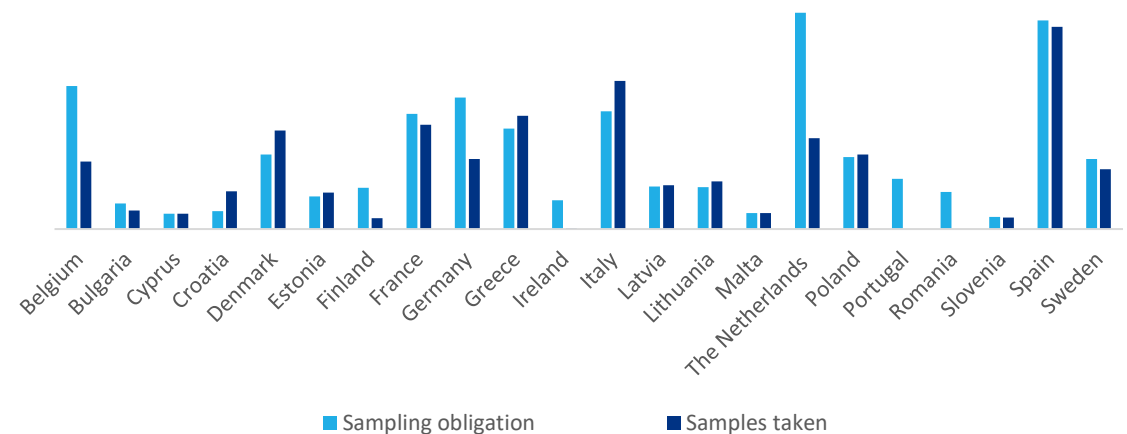
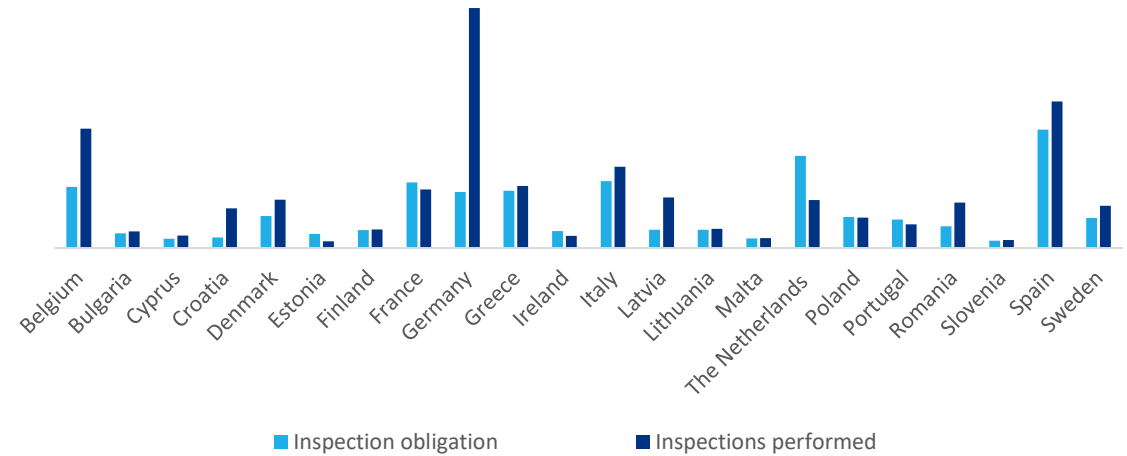
- 22 Coastal EU Member States + 1 EU land locked State

- **Duties of MSs**

- Ensure **sulphur content** does not exceed the maximum sulphur requirements of the Directive
- Correct completion of **ships' logbooks**, including fuel change-over operations
- Check by **sampling** the sulphur content of marine fuels being used by vessels while in relevant ports and seas

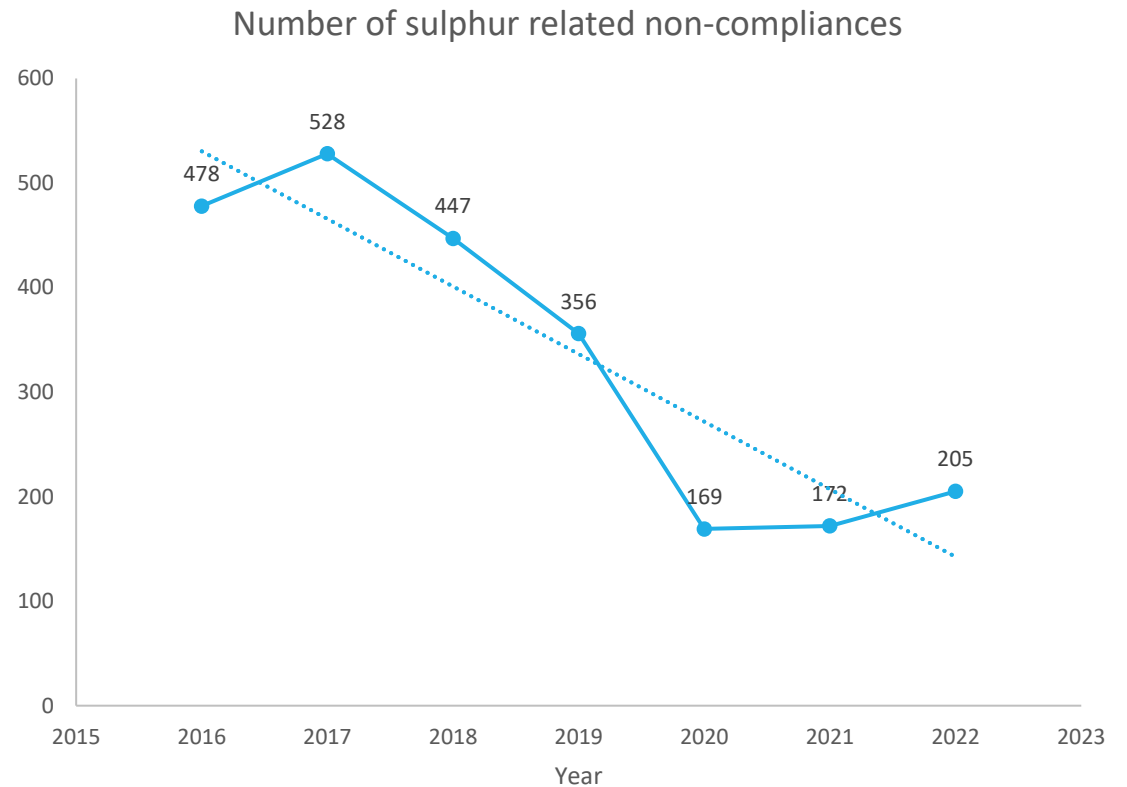
- **Frequency**

- Nr. of **inspections**: at least **10% of individual ships calling MSs' ports**
- Nr. of **samplings and analysis**: at least the **40% of inspected ships in SECA** and at least **30% of inspected ships in partly bordering SECAs or not bordering SECAs**



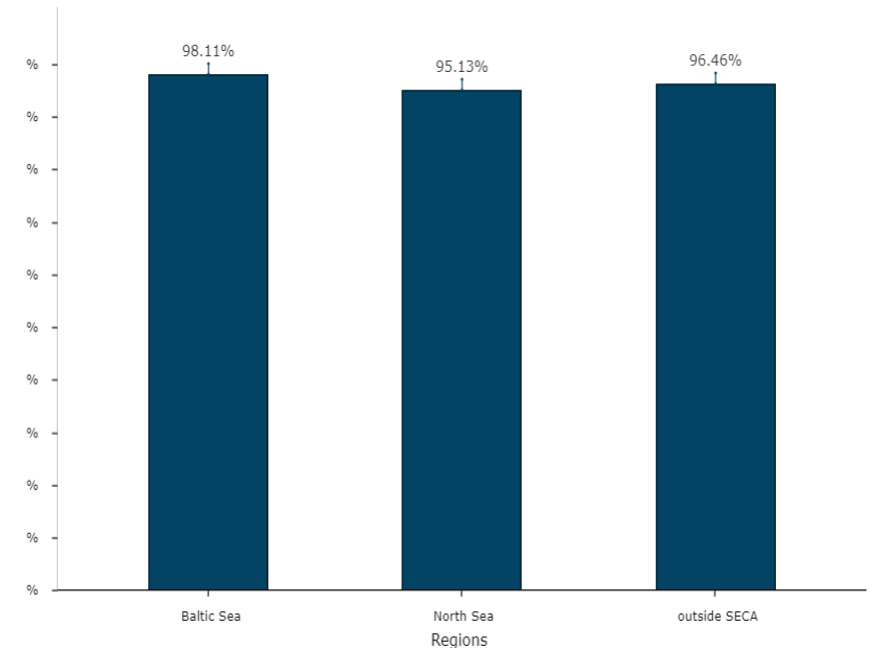
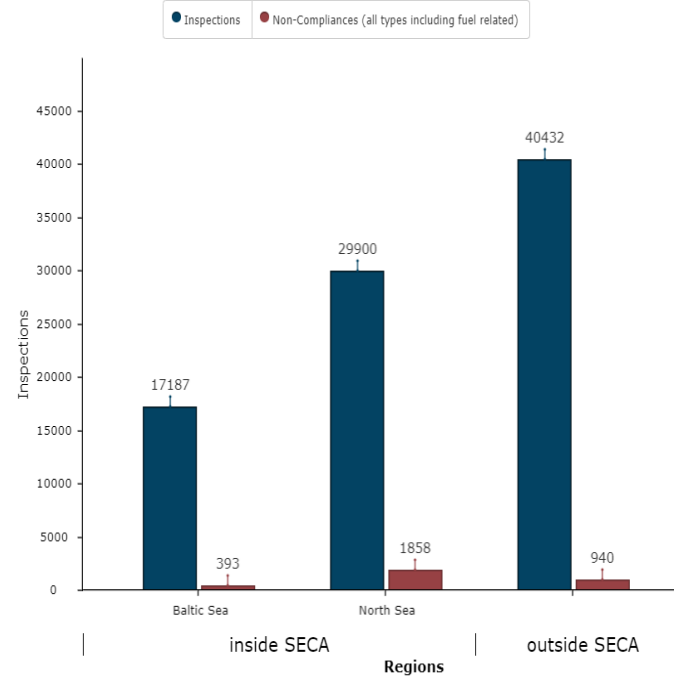
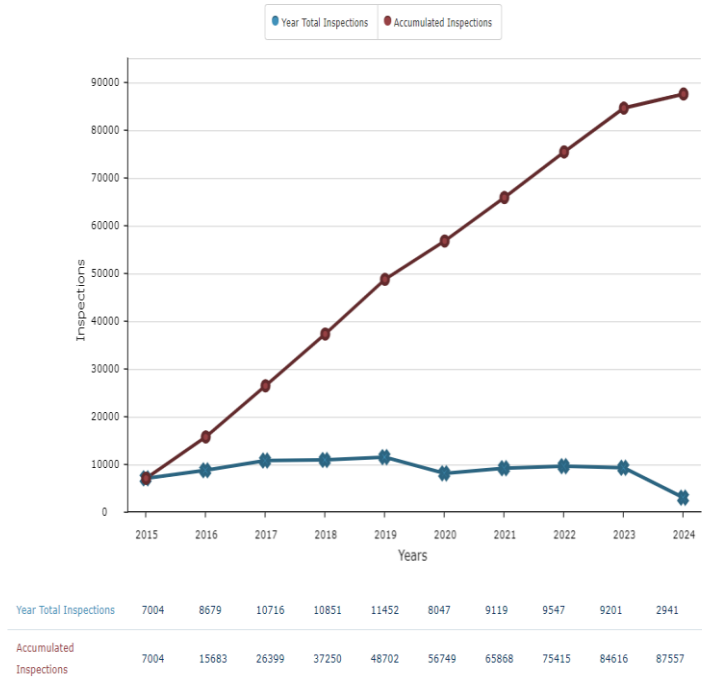
Providing Annual Reports by MSs

- **Submission of Annual Reports to EC**
 - MSs shall submit an annual report on the compliances with the sulphur standards through a new portal DONA
- **Total Numbers (2022)**
 - Mandatory and Recorded **Inspections**:
7257 / 10386: **+43 %**
 - Mandatory and Recorded **Samples**:
2504 / 1971: **- 21%**
 - **Non compliances and infringements** procedures: **205 / 130**
- **Local Marine Fuel Suppliers**
 - Providing complete list of the local marine fuel suppliers
 - Total volume sold by local marine fuel suppliers per type of fuel



Union Information System - [THETIS-EU - Compliance \(europa.eu\)](https://europa.eu)

- A system using the port call data of individual ships within SafeSeaNet, established by Article 22a of Directive 2002/59/EC. It records and exchange information of the results of individual compliance verifications
- Operated by the European Maritime Safety Agency
- It has several dedicated modules for implementing regulations including Sulphur Directive, PRF Directive, Maritime Security, Ship Recycling Report, etc.
- The system foresees also targeting mechanism and alerts based on predefined requirements set by EU legislation on which it is possible to prioritise ship inspections based on potential risk



Alerts and Risk Targeting Parameters

- **Approach**

- It is impossible to inspect all the ships calling EU ports. It is essential to establish a static correlation between non-compliances and specific parameters, so that inspectors can be more confident in their decisions. Generic and historical Targeting Parameters:
- **Generic Parameters**, such as total installed Power or keel before 1st of July 1998
- **Port State Control Parameters**, such as previous MARPOL related deficiencies and detentions
- **Sulphur related Parameters**, such as active remote sensing alerts



■ Emission monitoring



200kg, >4h, EO/IR, sniffer



<15kg, >50min, EO/IR, sniffer

■ Multipurpose Maritime surveillance



180kg, >10h, 500km(SATCOM)
EO/IR, Mar. radar, Still camera,
radar detector, phone detector,
EPIRB



47.6kg, >9h, 140km
EO/IR with automatic
scanning mode, EPIRB
VTOL (incl. from vessels)



36kg, >10h, 140km, up to
400km with ground relays
EO/IR, radar
Launcher & net

■ Light RPAS



<5kg, >35min, EO/IR

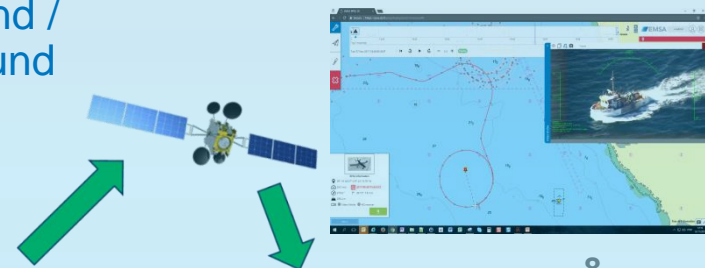
Operational modes

- **Local operations:** for emission monitoring and areas of specific interest
- **High seas operations:** based on RPAS with SATCOM capabilities
- **Extended coastal operations:** Ground relay stations for extending the coastal range
- **Ship-based operations:** rotatory-wing RPAS (and launcher/net RPAS)
- **Multi-purpose operations:** Addressing different user requests and communities with the same flights/operations

■ SAT-COM

- RPAS to ground /
- ground to ground

■ Data Centre

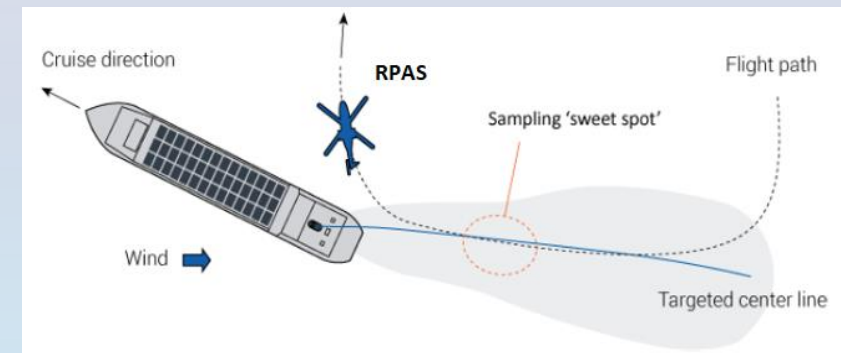


Atlas 4



- More than 2,000 SO_x measurements collected until end of 2023
- All the measurements are transferred to THETIS-EU
- Services conducted in SECA and non-SECA countries
- Camcopter S-100 (>4h endurance) is operated in shipping lanes far from shores
- ATLAS (>45 minutes) is employed at port or berthing areas

Schiebel CAMCOPTER



■ Emissions monitoring

- The Channel (France and Belgium) – EMSA MMO 2024
- North Sea (Germany)
- Spain (port of Barcelona)

■ Multipurpose – Regional Operations

- Baltic (Finland, Estonia and Latvia)
- North Sea (Denmark and potentially Norway)
- Mediterranean (Italy and potentially France)
- Atlantic (Spain and Portugal)

■ Support to EFCA

- EFCA vessel Ocean Sentinel
- Potential a second EFCA vessel

■ Light RPAS on Standby Oil Spill Response Vessels

- 13 EMSA Vessels Equipped with Light RPAS
- Activated for Emergency Response

Different Maritime and Non-Maritime Backgrounds

- **Harmonisation**

- To provide harmonisation and spread the on-field experience about Sulphur Directive and Inspections, EMSA plays a central role in delivering tools for EU MSs officials

- **Sulphur Directive Guidance**

- Prescriptions of the regulation
- Frequency of the sampling
- Easy access to all the information

- **Visits to Member States and aggregation of MSs' Reports**

- Dissemination of best practices, Fuel Suppliers, common non-compliances, inspections obligations.

- **Sulphur Trainings**

- Based on the information gathered, EMSA Academy delivers specific courses to EU MSs' inspectors, online and in person at EMSA premises, with specific real case scenarios: **3 sessions of the Curriculum for Sulphur Inspectors**, 2022, 2023 and 2024 (the latter a joined Curriculum EU Member States, and IPA and ENP Countries) with a total of **85 inspectors from EU Member States, and 14 from IPA/ENP Countries**.
- Live sessions comprehend discussions about real case scenarios. They are about conversations between the inspectors and EMSA staff, acting as Chief Engineers.
- Unfortunately, I do not have statistics on the background of the inspector. Nevertheless, please note that so far we have delivered three sessions of the Curriculum for Sulphur Inspectors, in 2022, 2023, and 2024.



TITLE	COMMON CORE CURRICULUM FOR SULPHUR INSPECTORS
DURATION	56 hours over 7 non-consecutive weeks
AUDIENCE	Personnel from the relevant administrations carrying out sampling, and inspections of ships to verify that the sulphur content of fuels used complies with defined IMO and EU-levels and will address the entire spectrum of associated knowledge, skills, and attitudes, including general legal and technical requirements, inspection techniques, fuel sampling and reporting practices in THETIS-EU.



COURSE AIM

This course is designed to develop the necessary individual competencies for carrying out duties associated with the inspection of ships for compliance with the international and EU instruments regarding the limits of sulphur in marine fuels (MARPOL Annex VI and the EU Sulphur Directive). It aims to provide learners with the opportunity to increase the knowledge, skills and attitudes required to carry out inspections professionally, efficiently and effectively and to the required standards established by law and benchmarked industry practice.

COURSE STRUCTURE

The course is offered in blended format (i.e. combination of online synchronous and asynchronous activities as well as in-person session at EMSA).

COURSE CONTENT

The course consists of 3 phases as follows:

Phase 1

- General, Legal and Technical Requirements;
- Preboarding;

Phase 2*

- Fuel Based and Abatement Methods;
- Sampling;
- Report and Logging
- On-board – Fuel based method and Abatement methods;

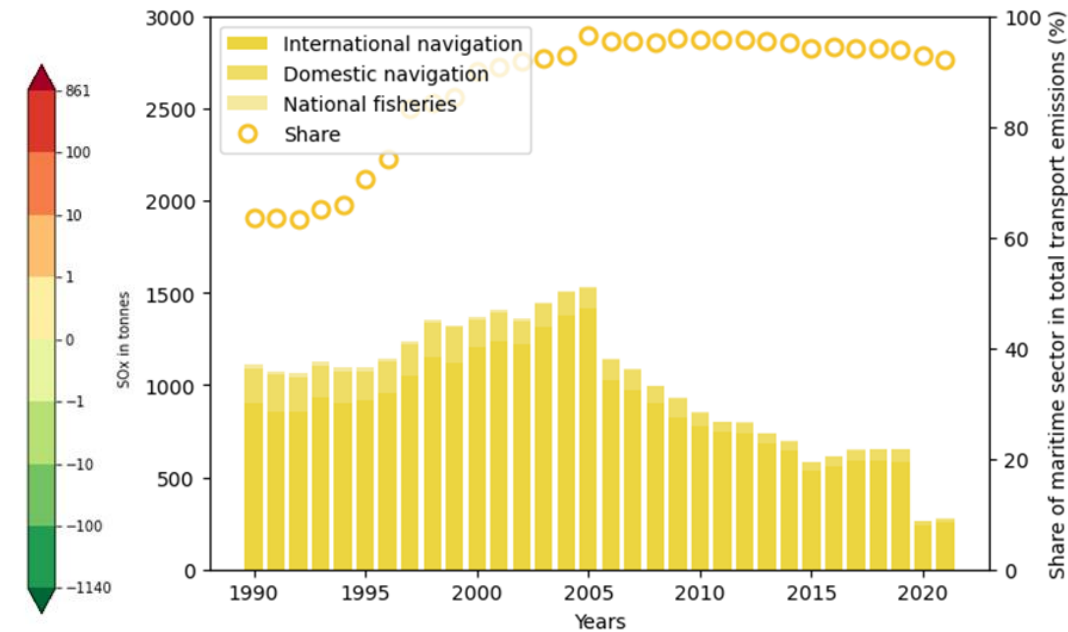
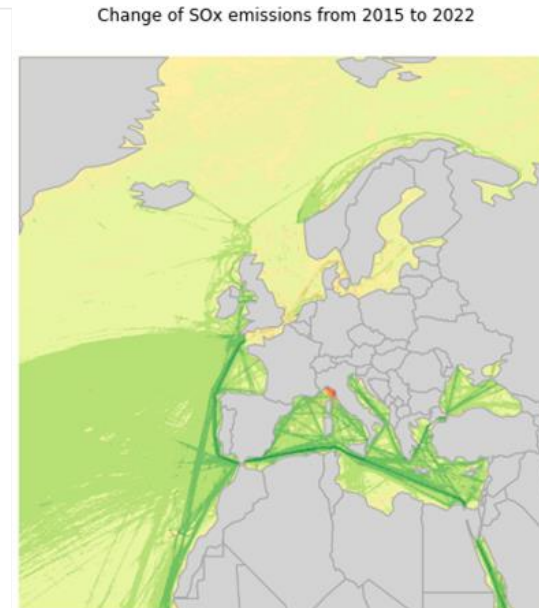
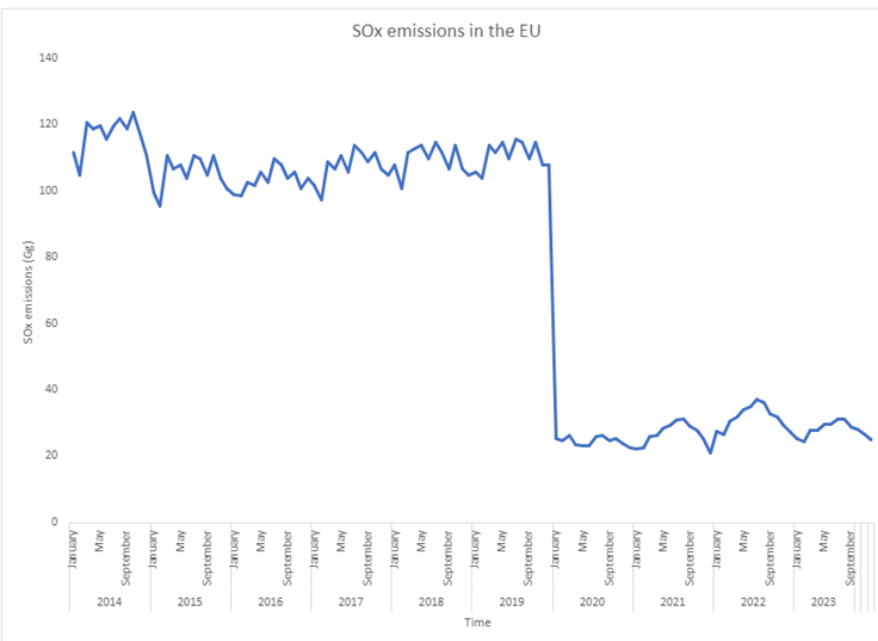
Phase 3

- Communication and Professional Behaviour;
- Tools and Equipment Health and Safety at Work

* Phase 2 includes an in-person session at EMSA

Dropping out of Emissions

- Tendency of SOx Air Emissions after Implementation of Sulphur Directive in Europe

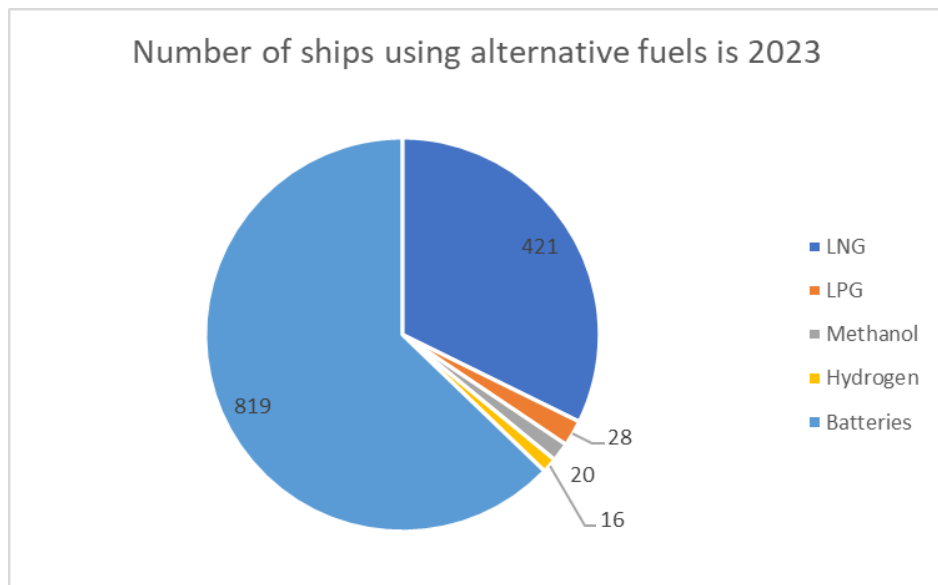


<http://emsa.europa.eu/emter.html>

- **Boil-off gas (LNG carriers)**
- **Exhaust Gas Cleaning Systems**
 - Scrubbers: open-loop, closed-loop and hybrid. Usage of water for cleaning the exhaust gas stream.
 - Wash water discharges, to be delivered ashore to adequate reception facilities
 - Adopt fuel change-over procedure in case of malfunctions or restrictions about wash water discharge
 - Scheme A and B scrubbers, regarding the monitoring of the running device.

- **Biofuels**

- **Other Alternative Fuels**



Ratio Emission only applicable when using petroleum-based distillate or residuals fuel oils

Fuel Oil Sulphur Content (% m/m)	Ratio Emission SO ₂ (ppm)/CO ₂ (% v/v)
4.50	195.0
3.50	151.7
1.50	65.0
1.00	43.3
0.50	21.7
0.10	4.3

- **State of art**

- Why: NOx emissions are harmful for environment and human health
- Current NECAs are Baltic Sea, North Sea in EU, the North American Area, the United States Caribbean Sea
- NOx regulations still do not seem to be affecting NOx emissions: in the 2015-2023 timeframe, NOx emissions increased by approximately 10% at EU level, and more specifically by 33% in the Atlantic, 8% in the Mediterranean Sea and 32% in the Arctic

- **Legal Basis at IMO Level**

- Regulation 13 of Marpol ANNEX VI

- **Selective Catalytic Reduction (SCR)**

- As a reducing agent, water solution of urea ($\text{CO}(\text{NH}_2)_2$) is often used
- Important issue: correct exhaust gas temperature and proper installation of the SCR in relation to the gas source

- **Exhaust Gas Recirculation (EGR)**

- **New MED NECA**

- REMPEC study about the feasibility of the implementation a new NECA in the Med.

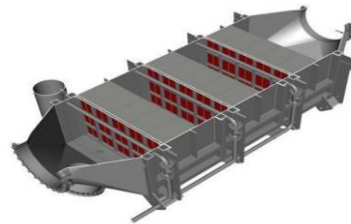
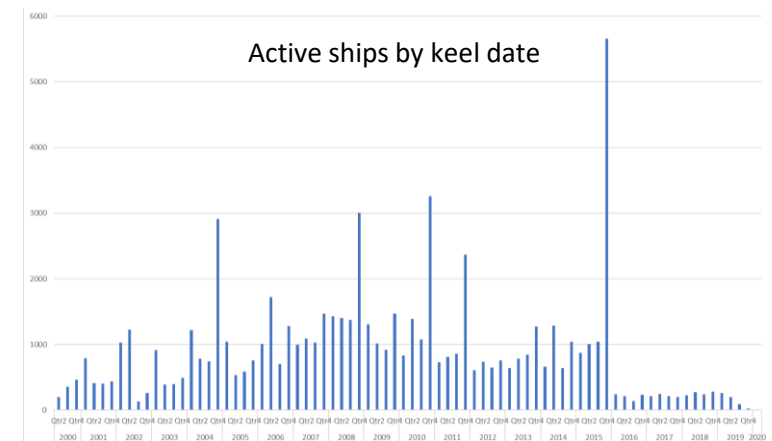


Figure 1: Sectional view of a SCR-catalyst chamber showing the elements in multiple layers





Thank you for your attention

Follow our activities on social media:



emsa.europa.eu/newsroom/connect

