



Marine Fuels – New challenge for the Energy Community How the EU did it?

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European Commission,
DG Environment, Clean Air Unit**

Outline

1. Introduction: why is air pollution a problem?
2. Implementation and enforcement of the Sulphur Directive
3. Further work on reducing air pollution from ships
RELEVANCE TO THE ENERGY COMMUNITY



Increasing awareness of air quality urgencies



BBC NEWS
Science & Environment
Polluted air causes 5.5 million deaths a year new research says
By Andrew Owen
BBC Science Correspondent, Manchester UK
11 January 2016, Science & Environment




Süddeutsche Zeitung
SZ.de Zeitung Magazin
Die Luft bleibt dreckig - mindestens bis 2030
5. Februar 2016, 16:40 Uhr
Die Stadtwerke sind hauptsächlich für die schlechte Luft in den Städten. Die Industrie steht in der Kritik. Doch die sind nicht immer so sauber wie wir denken.




EL PAIS
ESPAÑA · Madrid
CONTAMINACIÓN
La capital vulnera por sexto año seguido los límites de contaminación
El informe anual de Ecologistas en Acción concluye que en 2015 los niveles de contaminación han sufrido un incremento notable
Las alertas por contaminación se vuelven cotidianas
"Intentamos pasar muy poco tiempo al aire libre"
ESTHER SÁNCHEZ | Madrid | 13 DICIEMBRE 2015 | 21:27 CEST




LE SOIR
Actu Sports Culture Économie Débats Blogs Images
La qualité de l'air belge est l'une des plus mauvaise d'Europe
Belgique
Le problème principal est celui des particules fines. Les véhicules diesel sont pointés du doigt.




Pollutions Le Monde.fr
PLANÈTE POLLUTIONS
Nouveau pic de pollution à Paris
Le stationnement inhabituel est gratuit, mercredi 20 janvier à Paris, en raison d'un nouvel épisode de pollution atmosphérique. Auparavant, l'association de




wyborcza.biz
Dziennik Wschód 01.02.2016 11:00
Najgorszej jakości węgiel i przestarzałe piece kład w odstawki. Po Krakowie uchwał antysmogowych chcą władze Wrocławia i Legnicy, a marszałek Śląska przepisami antysmogowymi zamierza objąć ponad 100 gmin.




the guardian
The world's largest cruise ship and its supersized pollution problem
As Harmony of the Seas sets sail from Southampton docks on Sunday she will leave behind a trail of pollution - a toxic problem that is growing as the cruise industry and its ships get ever bigger




De Morgen Cult. Zine.
Fijnstofconcentraties blijven hoog door gebrek aan wind
Ook maandag en de volgende dagen blijven de meteorologische omstandigheden van die aard dat de fijnstofconcentraties hoog



Why is air pollution a problem?

Europe's air quality is slowly improving, but fine particulate matter and ground-level ozone in particular continue to cause serious impacts on health.

Estimates point to well above 400.000 premature deaths in EU-28 each year due to particulate matter; and more than 15.000 due to ground-level ozone.

1 out of 10 EU citizens are exposed to particulate matter concentrations above the EU limit value; with 9 out of 10 exposed above WHO guidelines.

Assessed against EU Limit Value



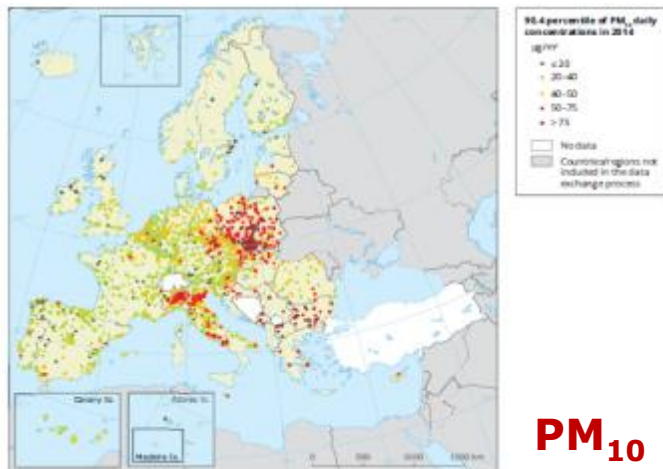
Assessed against WHO Guidelines



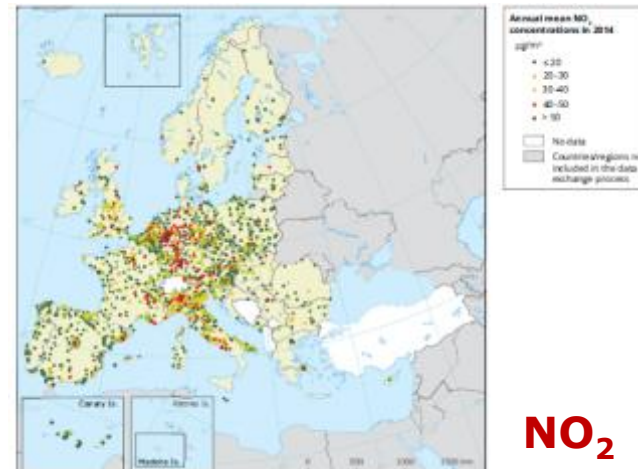
63%

Air pollution exceeds eutrophication limits in 63% of ecosystem area, and in 73% Natura 2000 areas.

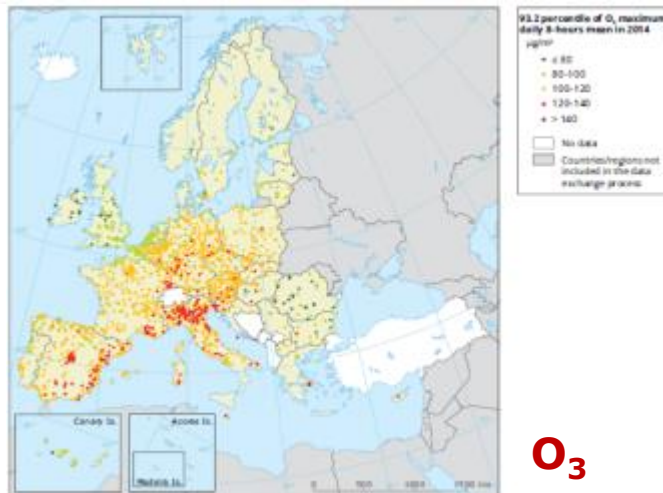
Where is air pollution a problem?



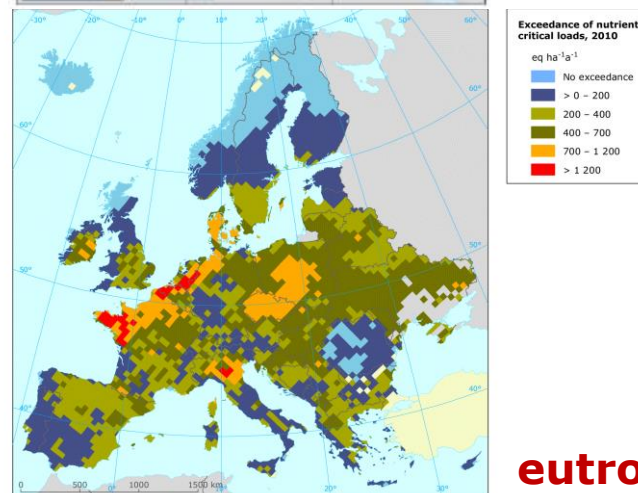
PM_{10}



NO_2

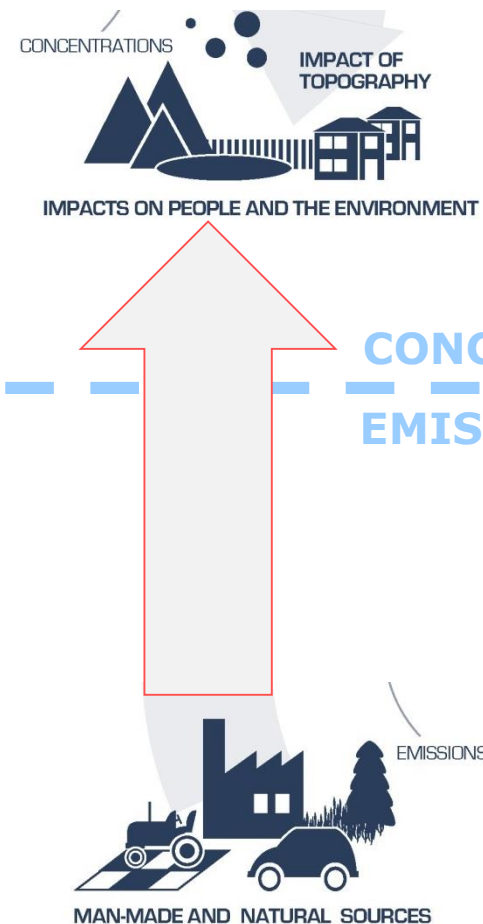


O_3



eutrophication

Clean Air Policies in Europe – An Overview



Ambient Air Quality Directives

Maximum concentrations of
air polluting substances

CONCENTRATIONS
EMISSIONS

National Emission
Ceilings Directive

National emission totals
(SO₂, NO_x, NMVOC, PM
2.5, NH₃)

Source-specific emission
standards

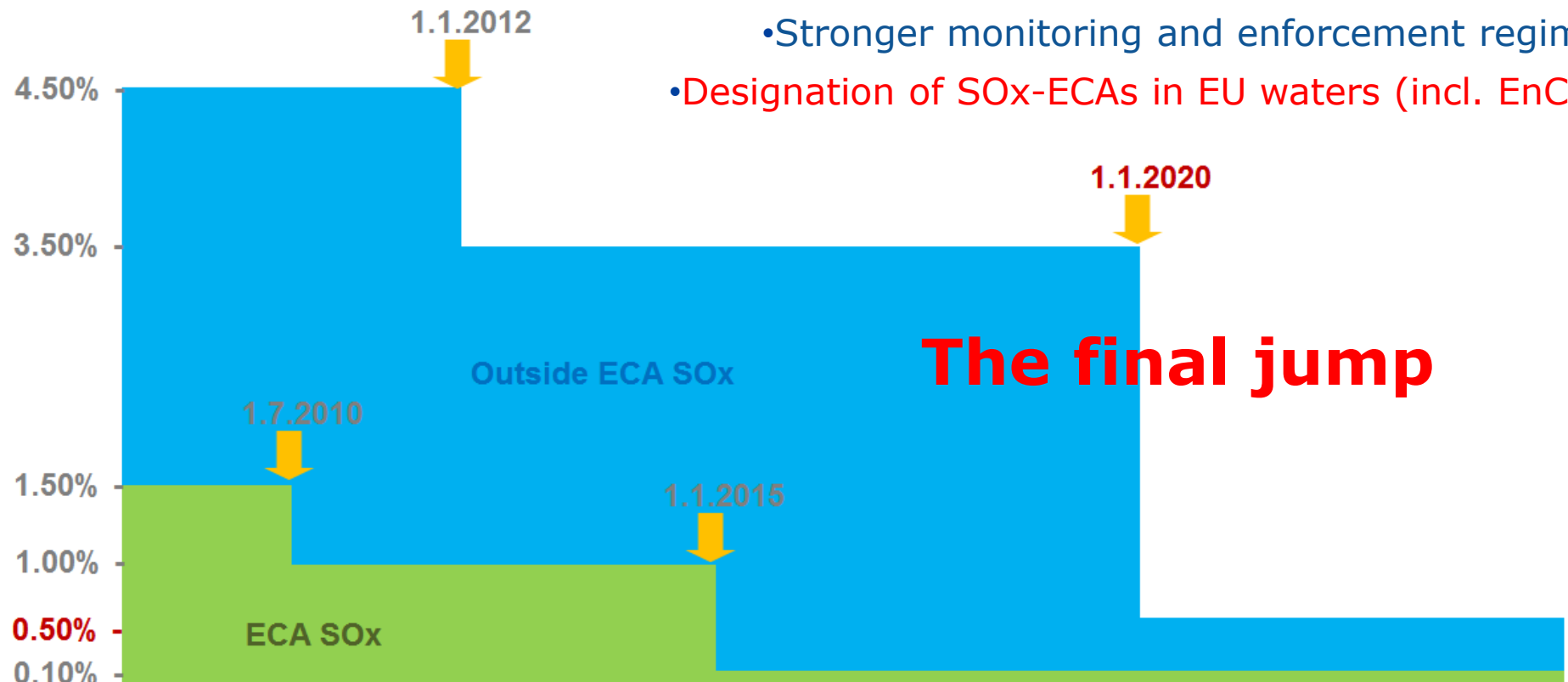
- Euro and fuel standards
- Industrial Emissions Directive
- Energy efficiency standards
- Sulphur Directive

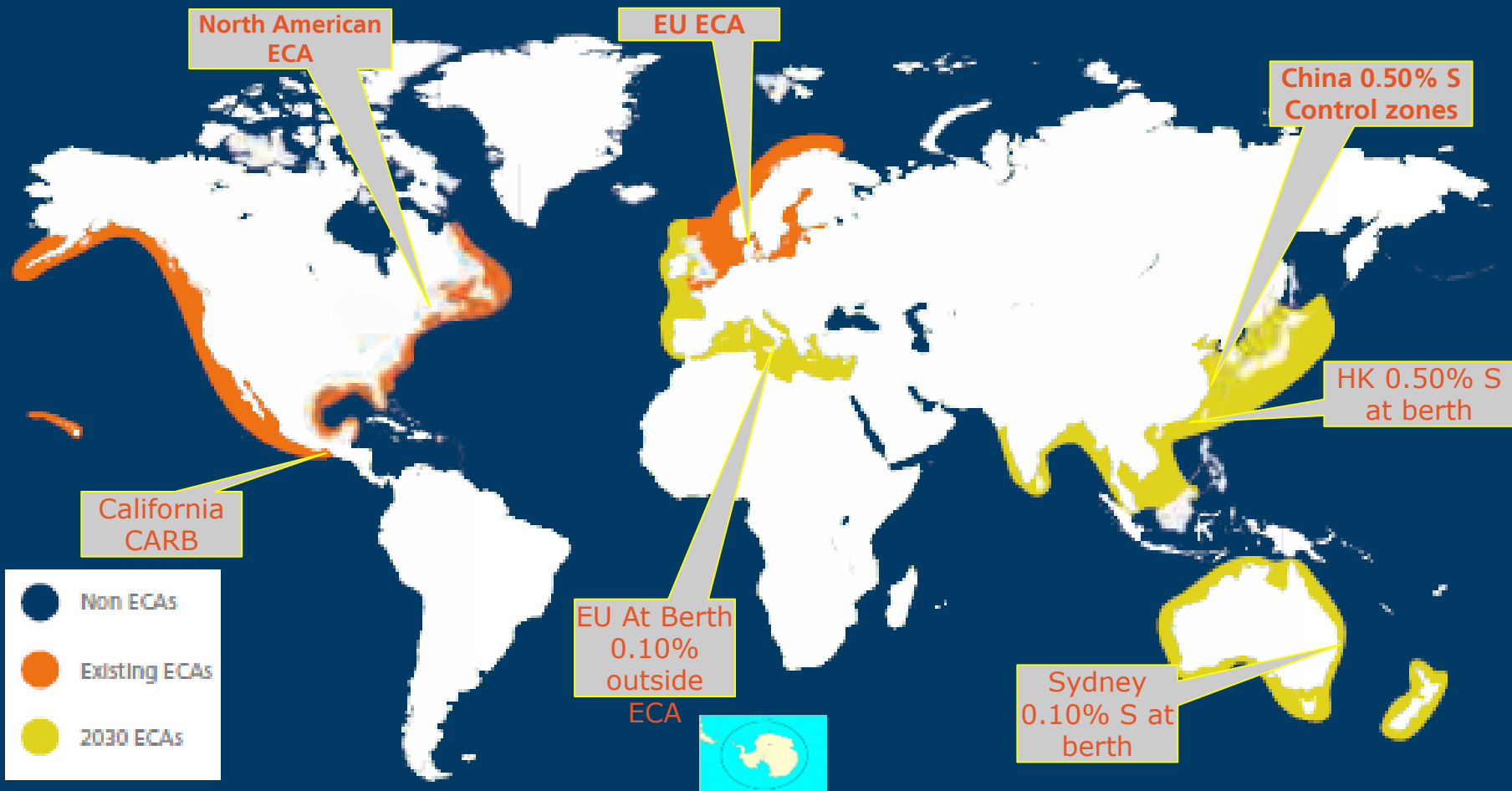
Main elements of the Sulphur in Marine Fuel Directive:

- Reduction of ship emissions (SO_x and PM) to protect human health and the environment
- Use of 0,10% sulphur content while in port
- Use of 1.5% by passenger ships on regular journeys
- **0,50% max. sulphur content as of 2020 in all EU waters**
- Stronger monitoring and enforcement regime
- **Designation of SO_x-ECAs in EU waters (incl. EnC?)**

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Globally: SOx ECA – in and out

Implementation and enforcement of the Sulphur Directive

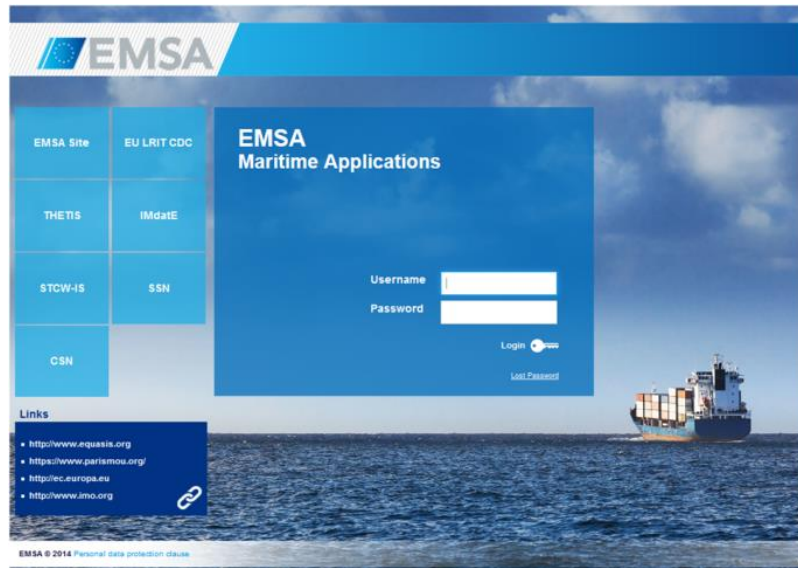


Adoption of Commission Implementing Decision 2015/253 ensures robust and cost effective enforcement :

- *Harmonised rules concerning on-board fuel (spot) sampling*
- *Binding minimal number of annual inspections (**10%** of individual ships) and **20-40%** fuel sampling*
- *Rules for use of alternative enforcement technology*
- *Enhanced controls of bunker suppliers*
- *Union information system for EU inspectors (EnC?)*

Thetis-EU: the Union Key enforcement tool

- Findings of each sulphur inspection + sampling recorded
- All findings are exchanged between Member States
- Possibility to insert 'alerts' that trigger targeted inspections
- Follow track-record of ship(s)(types)
- Developed and managed by EMSA **EnC access to Thetis-EU**



<https://portal.emsa.europa.eu/web/thetis-eu/home>

Sulphur Site Inspection Portlet(1.0.10@27.01.2015_10:09)

Edit Inspection

Back to Search Ships

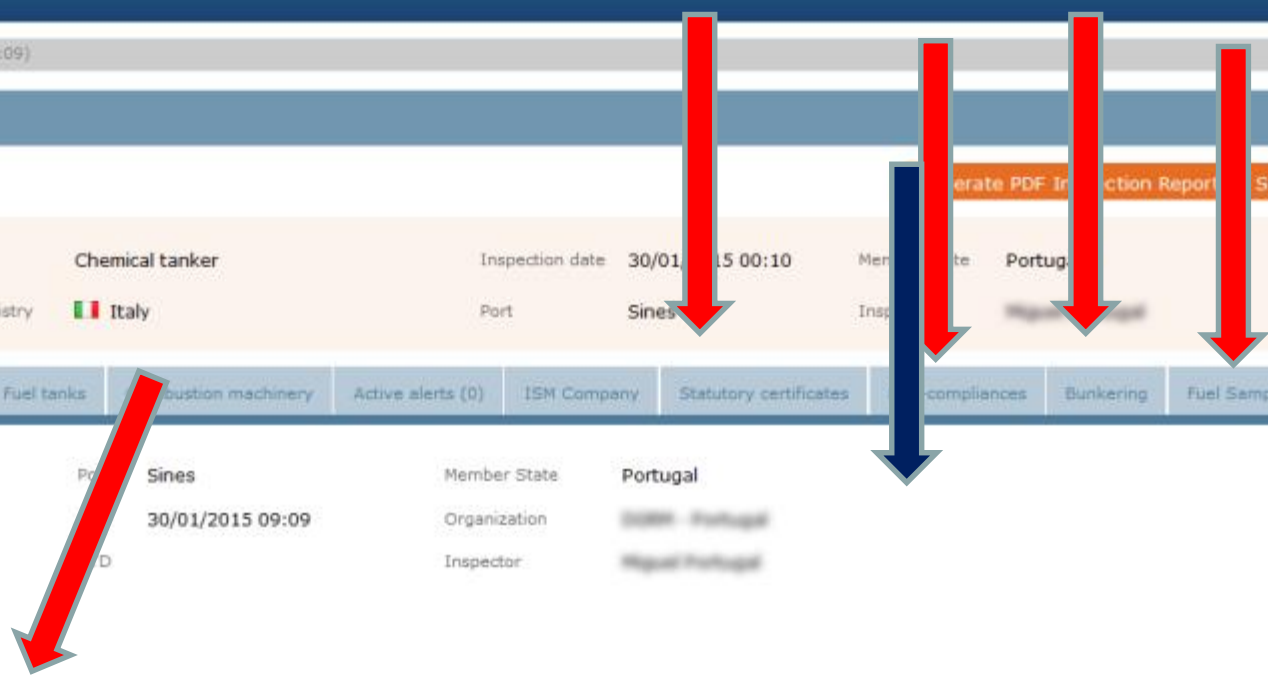
Generate PDF Inspection Report Save Delete

IMO	8010000	Ship type	Chemical tanker	Inspection date	30/01/2015 00:10	Member State	Portugal
Name	RECONA	Flag state/Registry	Italy	Port	Sines	Inspector	Rafael Portugal

Inspection particulars | Ship particulars | Fuel tanks | Combustion machinery | Active alerts (0) | ISM Company | Statutory certificates | Compliance | Bunkering | Fuel Sampling | Support

Inspection date	30/01/2015 00:10	Port	Sines	Member State	Portugal
Outcome	Inspected	Start date	30/01/2015 09:09	Organization	EMSA - Portugal
Port in SECA area?	No	Inspector	Rafael Portugal		

Edit



Node: qwls11.emsa.local

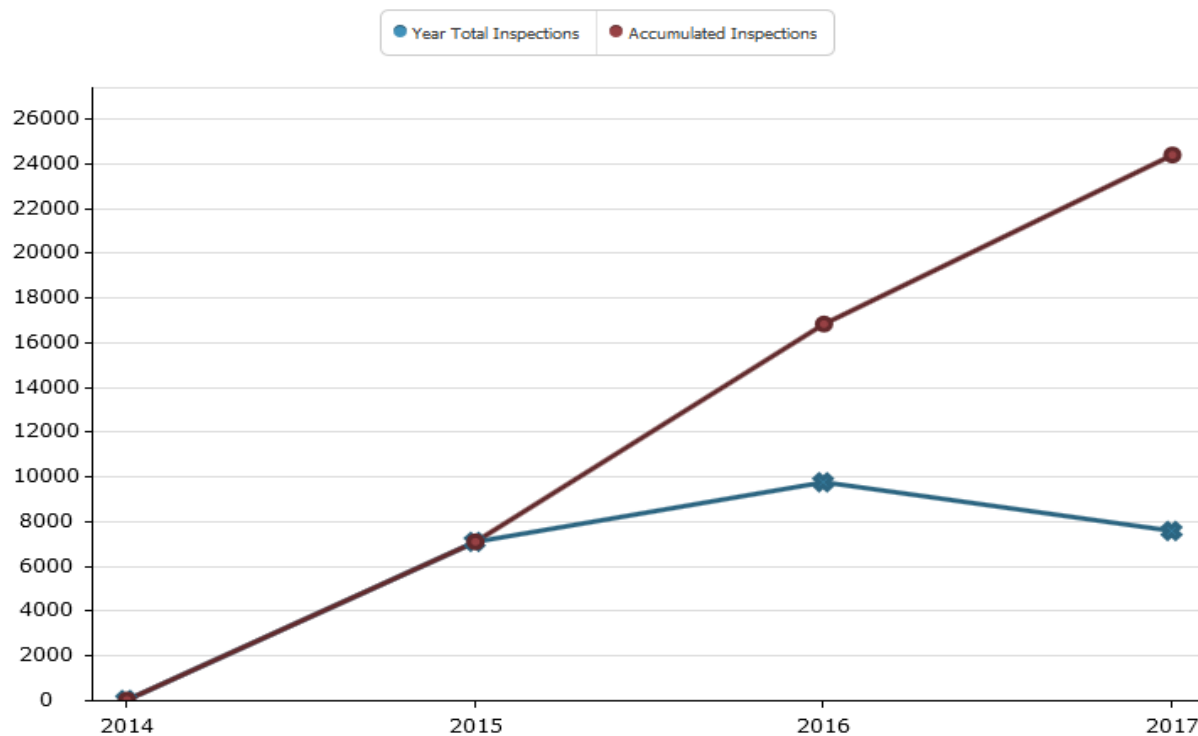
Actions

Consult → Select → Inspect → Report

Actions	RECONA	Islands	Lisbon	02-02-2015 15:00	02-02-2015 13:00	05-02-2015 08:00	Active
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Inspection data as recorded in Thetis-EU

Since start of Thetis-EU



Year Total
Inspections

2

7068

9732

7556

Accumulated
Inspections

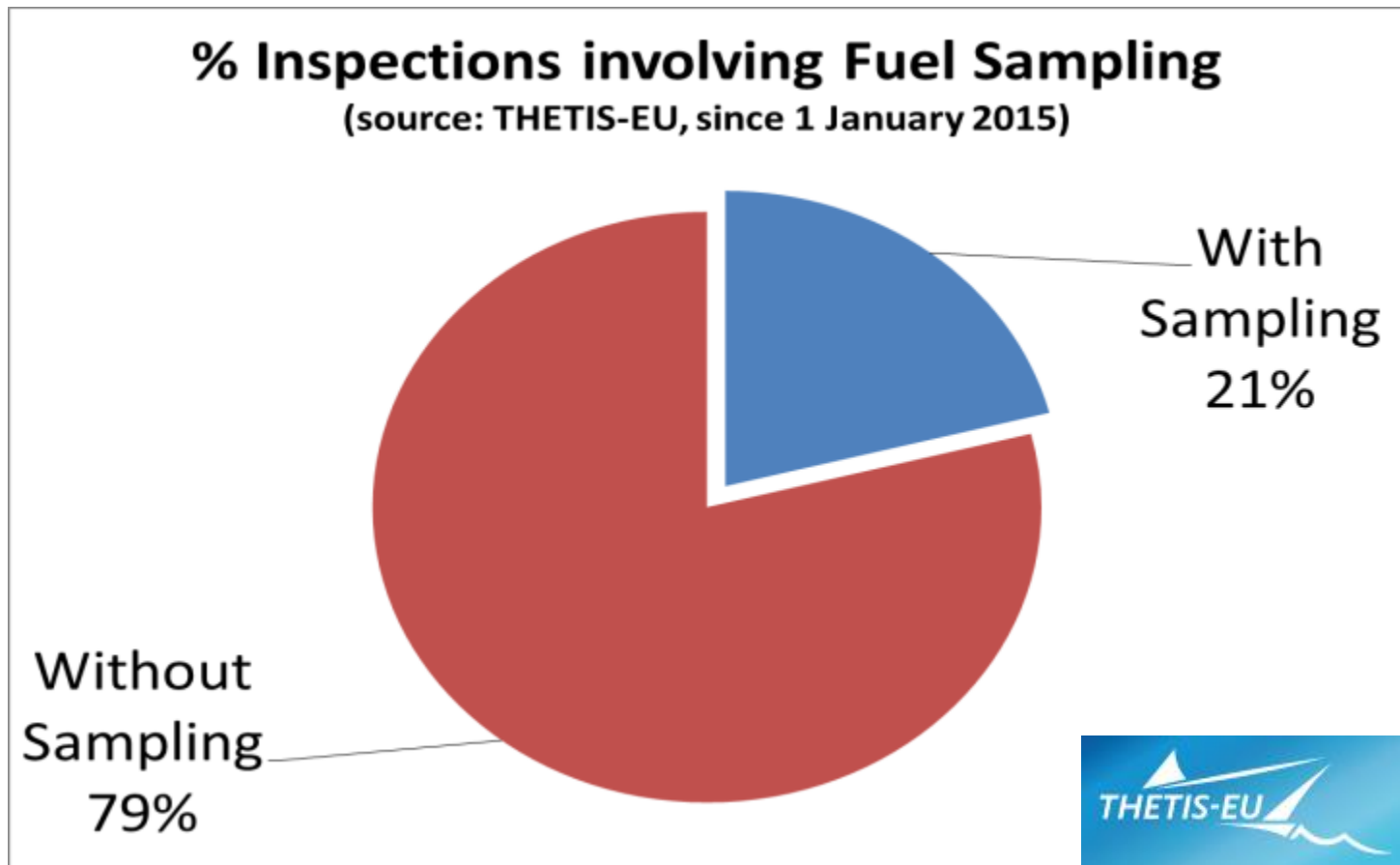
2

7070

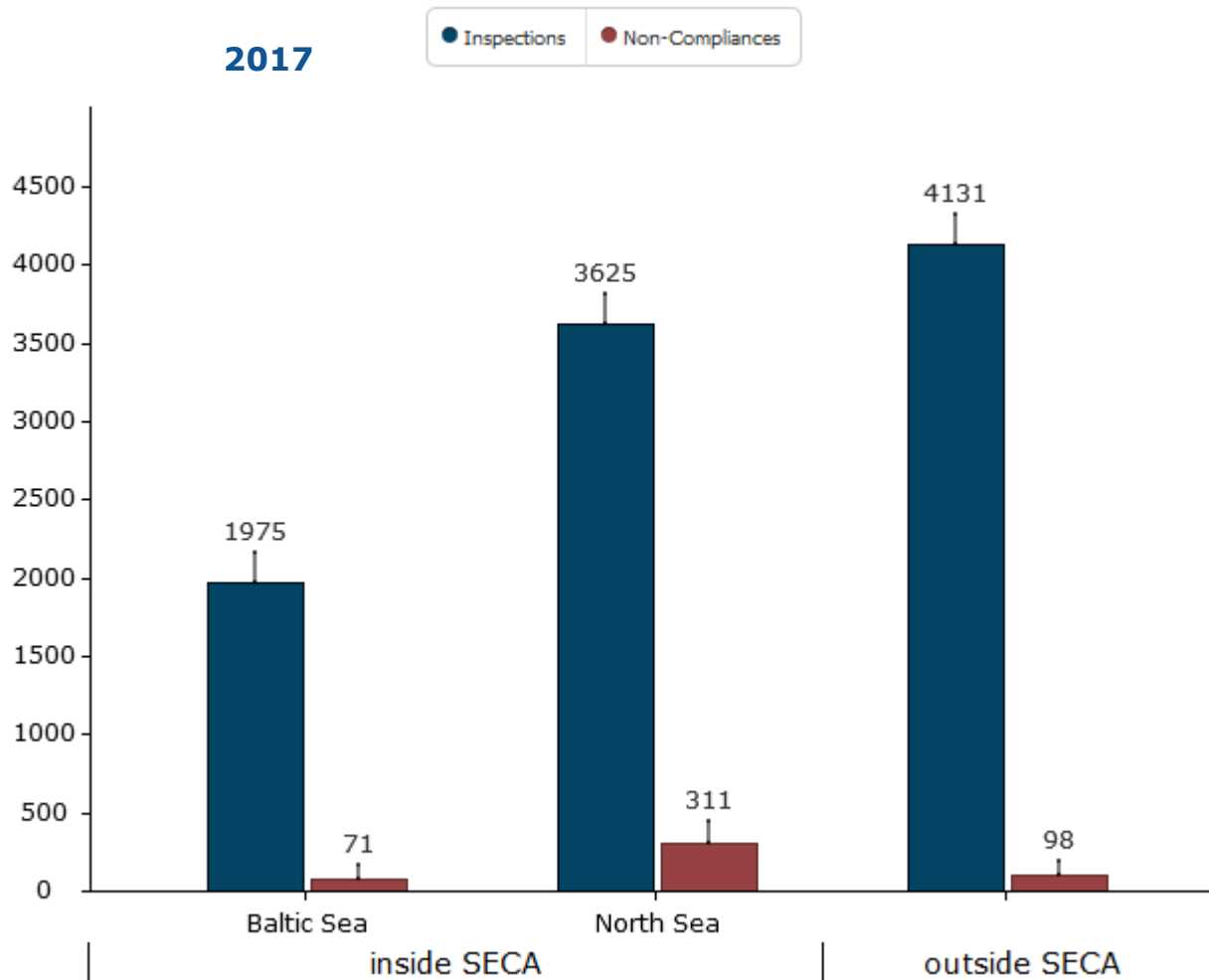
16802

24358

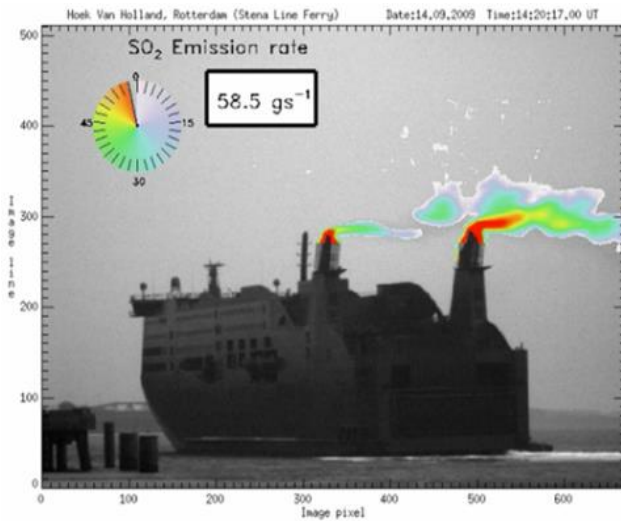
Inspection data as recorded in Thetis-EU



Inspection data as recorded in Thetis-EU



Supporting the use of new emission detection technology



Measurement position at the Great Belt Bridge



Reinforced focus on Fuel Suppliers

- **Inspectors can insert/upload/exchange the following information in Thetis-EU:**
 - Bunker Delivery Notes (details)
 - Bunkering location
 - Fuel tank(s) details
 - tank and piping diagrams
 - 'Letters of protests'
 - Fuel-unavailability claims

- **Member States are obliged to take action in case of repeatedly reported 'letters of protests' of fuel suppliers in their territory**

- **DG ENV service contract with Lloyds Register assessing licensing, registration and quality control of bunker suppliers in EU Member States**

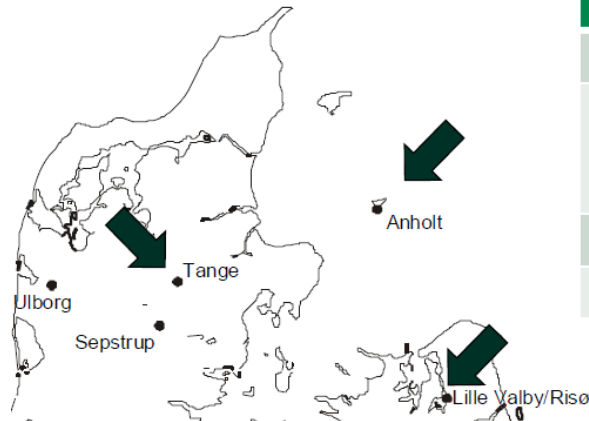
Further support to implementation of the Sulphur Directive

- **European Sustainable Shipping Forum**
 - ❖ Sub-groups on 'Implementation' on 'Air emissions from ships'
- **EMSA Guidance document for sulphur inspectors**
- **EMSA Technical Workshops and Trainings for Member States and EnC**
- **EMSA cycle-of-visits to Member States to verify transposition and application of the Directive**



Further work on reducing air pollution from ships

Low sulphur requirements proven to improve ambient air quality around SOx-ECAs:



	Anholt	Risø	Tange
	µg/m ³	µg/m ³	µg/m ³
Average 2011-2014*	0,33	0,34	0,22
2015*	0,13	0,18	0,10
Reduction	60 %	47 %	63 %

*) January - May

Source: Danish Centre for Energy and Environment

Additional work to reduce ship emissions

1. Preparing for the global sulphur cap in 2020
2. **Cost-benefit analysis of additional SOx-ECAs in EU waters**
3. Assess effectiveness of current and the need for further action needed to address other emissions from ships (NO_x, black carbon,...)



Preparing for the global sulphur cap in 2020

- **Cooperation with EU MS, EEA/EnC and other global partners**
- **Sharing extensive experience of preparing and enforcing the ECA sulphur requirements as from 2015:**
 - 95% compliance across EU and no reported ship safety issues
 - positive experience with 'new' ECA fuels (blends, distillates, ULS HFO)
 - preparing relevant submissions to the IMO
- **Further work needed to enhance cost-effectiveness of enforcement:**
 - EU (risk-based) targeting system for selecting ships for inspection
 - Tools to check compliance throughout the journey and at 'open sea'
 - **Ensure quality of new 0.50% fuels entering the market**

Industry and stakeholders closely involved through the ESSF sub-group on 'Air Emissions from Ships'



0.50% S VLSFO ?

HSFO

Quality of new 0.50% fuels

FOBAS - ISO 8217:2012 - Residual Marine Fuels

Characteristic ¹	Unit	In ISO 8217:2012 the residual grade categories are designated by the letter groupings RMA ... RMK. For the RMA, RMB, RMD & RME grades there is only one maximum viscosity limit given whereas for the RMG & RMK grades there are a number of maximum viscosity options. A particular grade reference is given by a combination of the relevant letter group and viscosity limit, for example: RME 180, RMG 380, RMK 500					
		RMA ^a	RMB	RMD	RME	RMG	RMK
Kinematic Viscosity at 50°C	mm ² /s, cSt	10.00	-	-	-	-	-
		-	30.00	-	-	-	-
		-	-	80.00	-	-	-
		-	-	-	180.0	180.0	-
		-	-	-	-	380.0	380.0
		-	-	-	-	500.0	500.0
		Category ISO-F-					
		RMA ^a	RMB	RMD	RME	RMG	RMK
Density at 15°C	kg/m ³	920.0	960.0	975.0	991.0	-	1010.0
Calculated Carbon Aromaticity Index (CCAI)	-	850	-	880	-	870	-
Sulphur ^a	mass %	Statutory Requirements					
Flash Point	°C	60.0					
Hydrogen Sulphide	mg/kg	2.00					
Acid Number ^a	mg KOH/g	2.5					
Total Sediment Aged	mass %	0.10					
Carbon Residue: Micro Method	mass %	2.50	10.00	14.00	15.00	18.00	20.00
Pour Point (Upper) ^a	°C	Winter: 0, Summer: 6			30		
Water	volume %	0.30	0.50				-
Ash	mass %	0.040	0.070			0.100	0.150
Vanadium	mg/kg	50	150			350	450
Sodium	mg/kg	50	100	50			100
Aluminium plus Silicon	mg/kg	50			50	60	
The fuel shall be free from Used Lubricating Oils (ULO). A fuel shall be considered to contain ULO when either one of the given conditions is met:	mg/kg	Calcium >30 and Zinc >15; or Calcium >30 and Phosphorus >15					

0.10 ULSFO RM



2020 PERSPECTIVE MARINE FUELS



Fuel type	Demand forecast for 2020 (mill MT)
HFO (scrubbed)	36 (11%)
Max 0.10% sulphur fuels	39 (12%)
Fuels between 0.10% and 0.50% sulphur	233 (73%)
LNG	12 (4%)
Total	320 (100%)

- 0.10% 'ULSFO' DM, RM
- 0.50% 'VLSFO' DM, RM
- HSFO + EGCS
- LNG
- Methanol

Assessment of Fuel Oil Availability
Jasper Faber, Oslo, 27 April 2017

STRATAS ADVISORS
UMAS
NIMRI
PETROMARKET RESEARCH GROUP
CE Delft

- Options
- Availability
- 0.50% Quality
- Global Consistency
- Enforcement
- Cost
- Operations

Conclusions

- Improving air quality in the EU and EnC remains essential in view of health and economic benefits
- All sectors, including maritime transport and fuel supply chain, should contribute to **reducing harmful air emissions** within a low carbon and energy efficient economy.
- EU is actively preparing for 2020 consistent implementation of the 0,50% sulphur cap (with ESSF and IMO) and **also counts on the EnC**
- *Cost effective and uniform sulphur enforcement to ensure the level playing field is essential also in the EnC - technical assistance of EMSA foreseen as of 2018*





**Thank you for your attention,
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