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MARPOL ANNEX VI: Low Sulphur Fuels

ITAC Annual Forum
2019



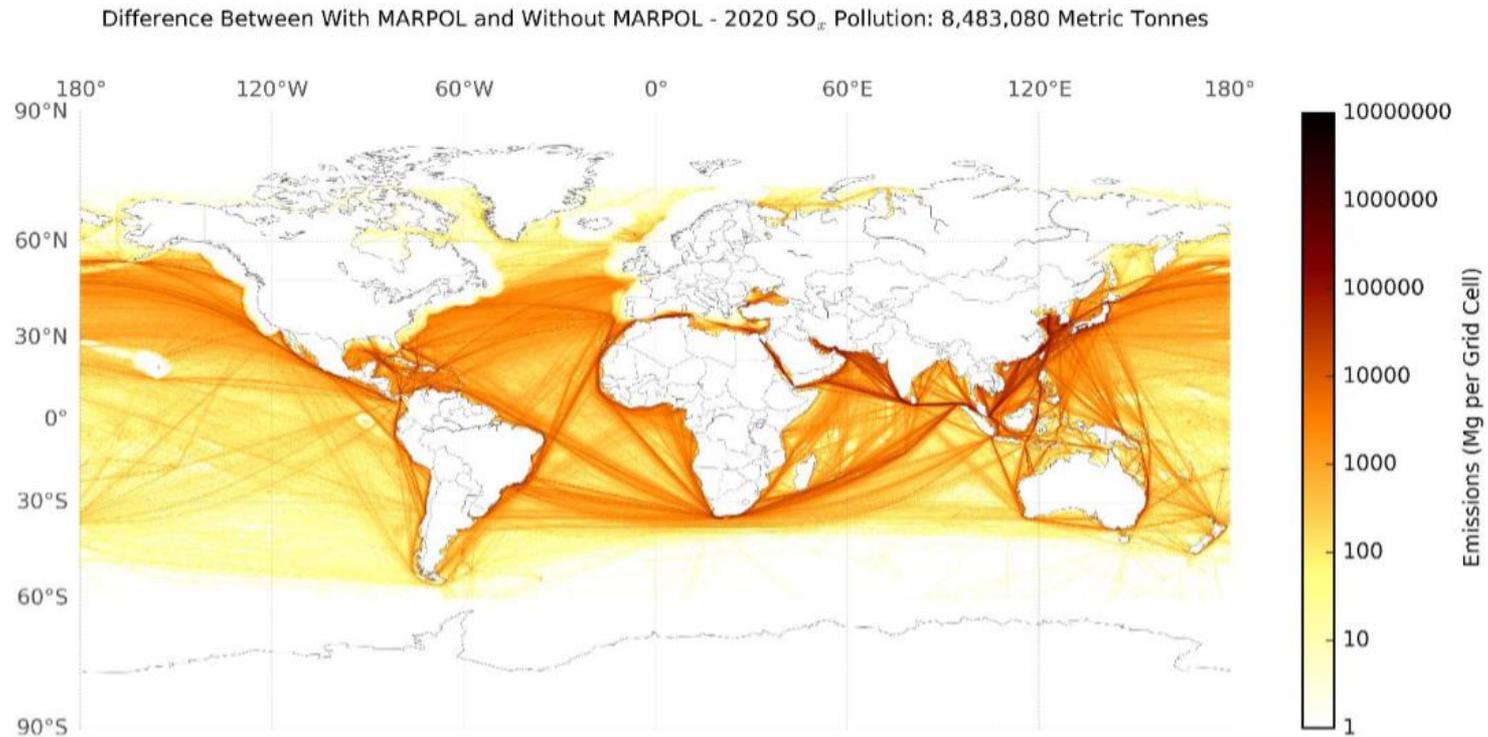
Advancing environmental
and social performance
across oil and gas

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In this presentation

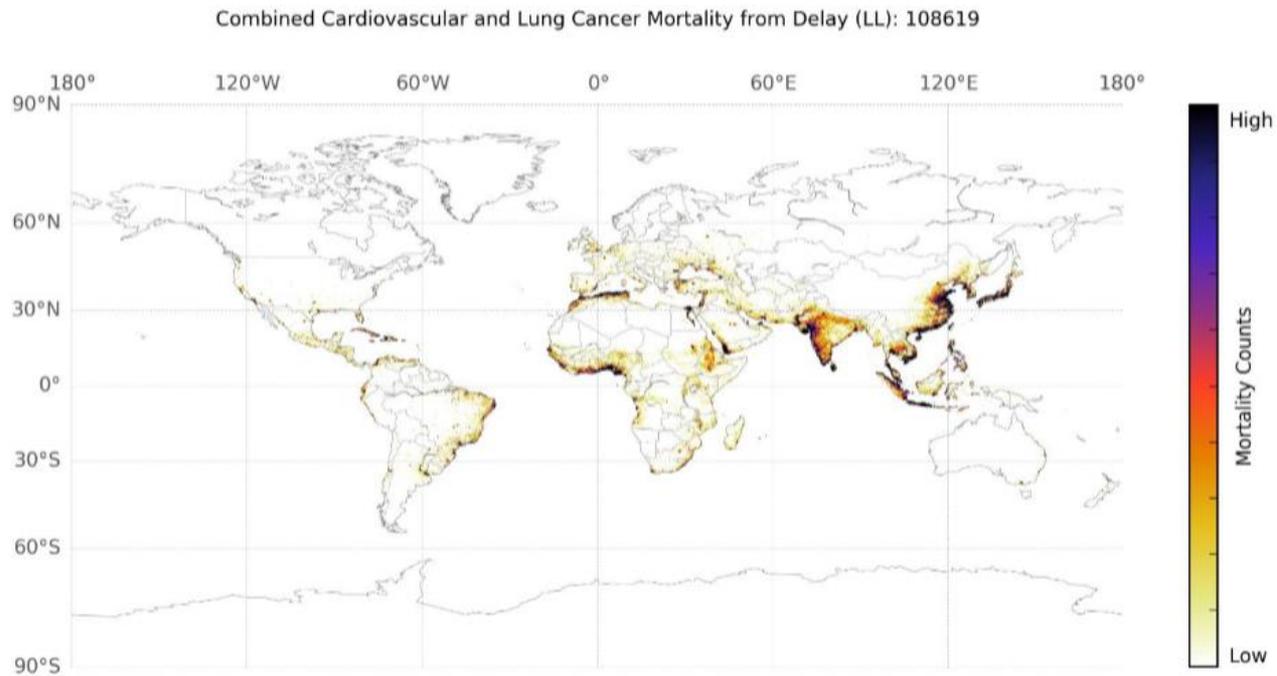
- Global Sulphur Regulation
- Refining challenges – A significant step change
- Future Marine Fuel mix
 - Safety concerns
 - Quality
 - Supplementary specification ISO PAS 23263
- Culture Change: Ground rules for mixtures of fuels
- Going forward: what's important?

Why reduce Sulphur Emissions?



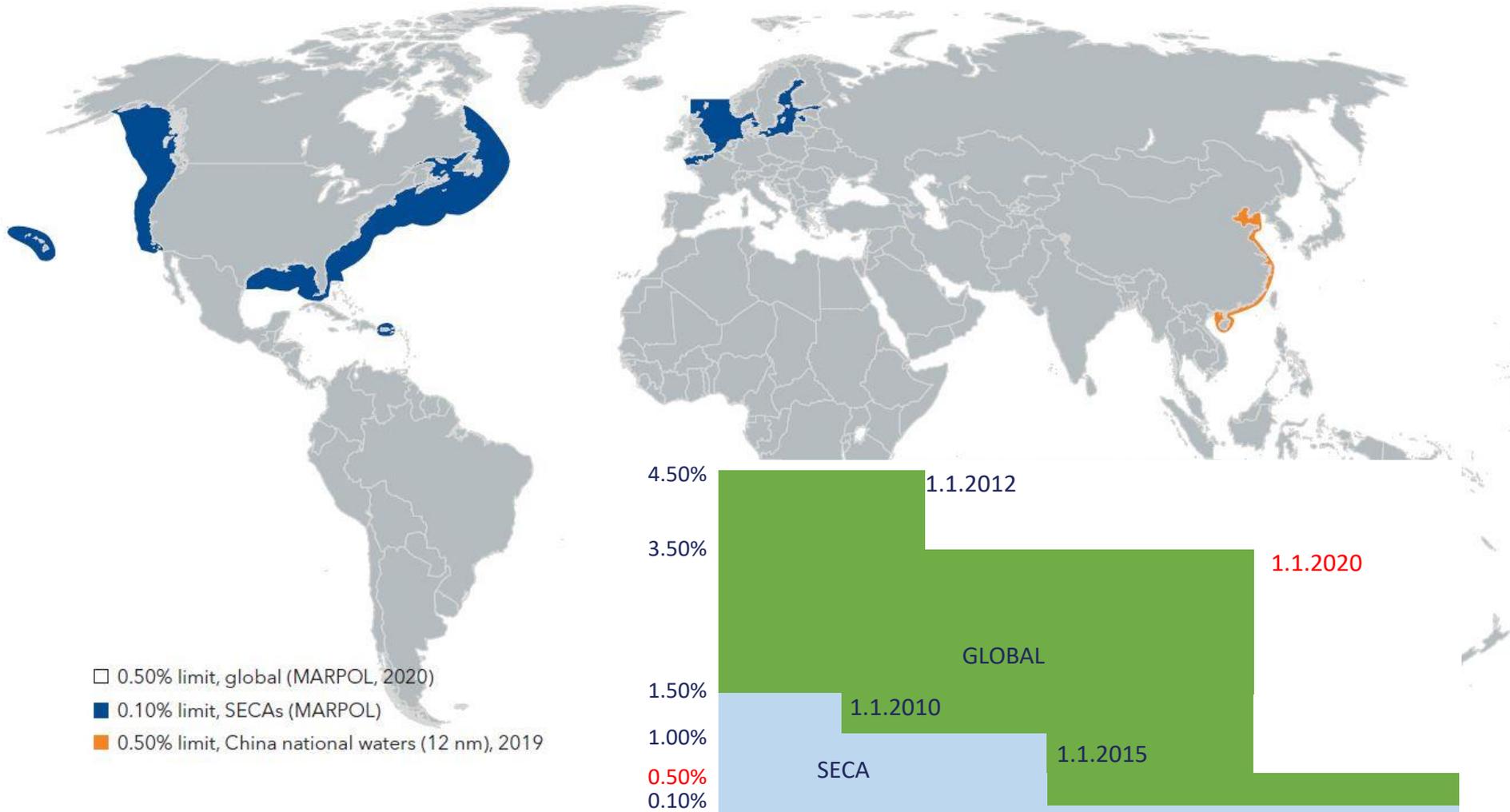
Source: MEPC 70/inf.34

Impact in 2020 on Health



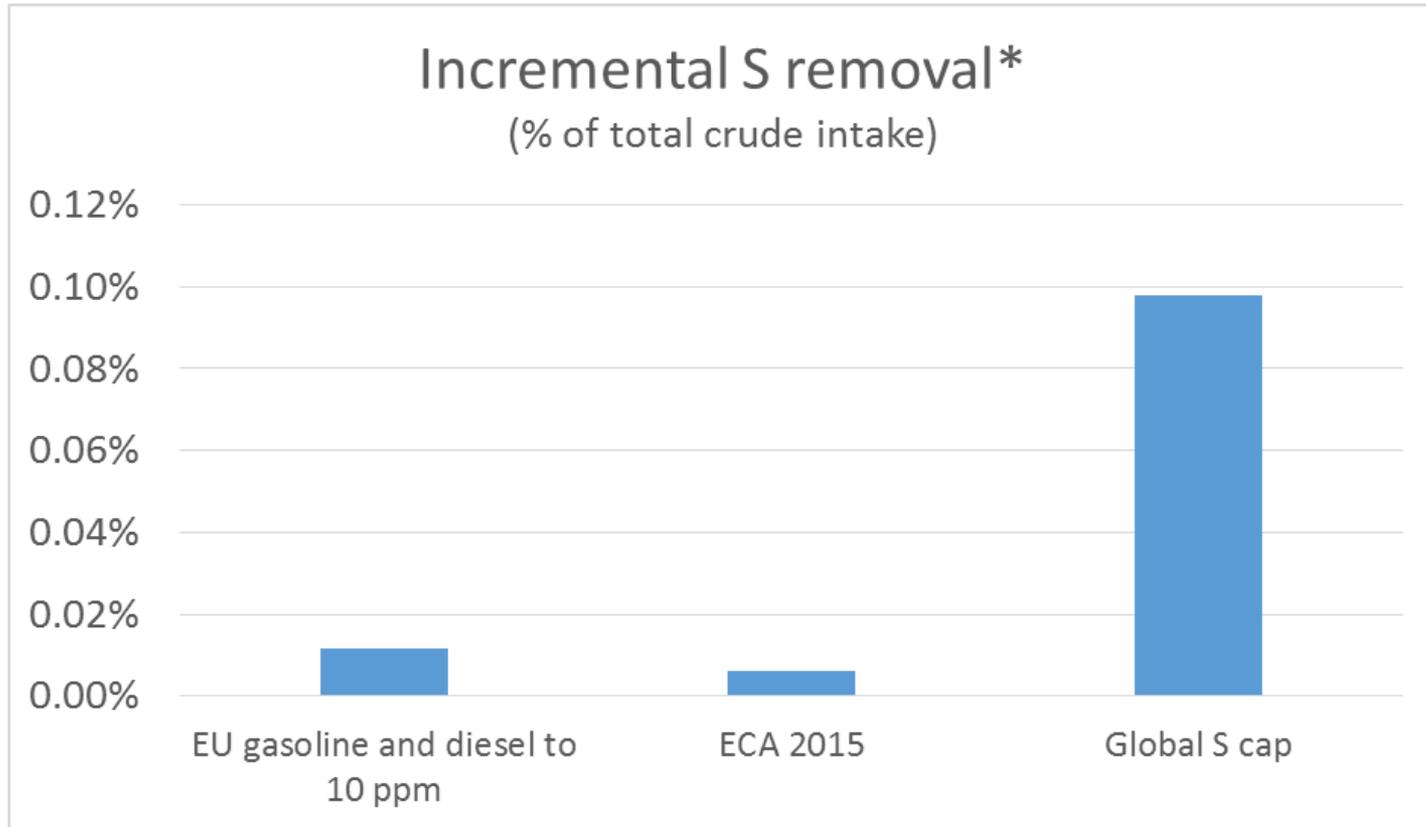
Source: MEPC 70/inf.34

IMO Regulation



Global S cap – A very significant step change

- Scope of regulatory change in S specifications



* Incremental S to be removed as elemental S, S contained in coke or S removed in waste gas SO_x abatement unit. Global S cap duty estimated based on actual average fuel oil S level of 24500 ppm (MEPC 69/5/7)

Future Marine Fuel Mix

- Fuel availability modelling studies pointed at fuel quality aspects that will need attention
 - Flash Point and Pour Point
 - Stability
 - Compatibility

- What can we expect in the real world?
 - 0.50% S demand will likely be met by a mix of components (distillates, low Sulphur residuals) and new fuel oil formulations as the market responds over time and new streams are introduced
 - New formulations will depend on initiatives by individual suppliers

A note on Safety

Leakage

- Changeover from HFO use to MDO / MGO

Fire

- Caused by leakage from piping, filters, pumps etc.

Explosion

- Caused by using <60 Deg. flashpoint fuel
- After a leak / fire
- Furnace explosion in boilers

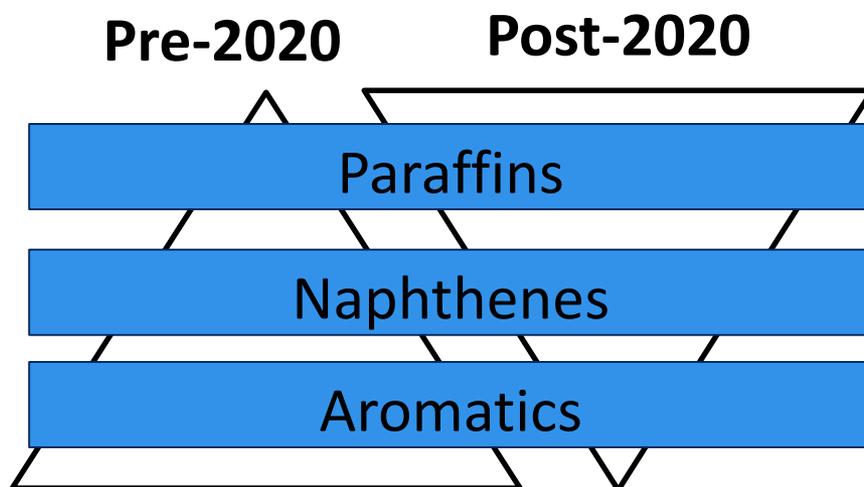
Loss of propulsion

- Gassing of the fuel system
- Blockage of fuel filters, seizing of fuel pumps
- Boiler flame failure
- High asphaltene content causing injector failure



What is different from the 0.1% ECA ?

- 0.1% S fuels are mostly ISO 8217 distillates with known constituents and robust operational experience
- 0.5% S fuels are, for the most part, expected to be blends



- Little operational experience
- Some concerns about stability and compatibility with other fuels and the combustion machinery

Supplemental Standard: ISO PAS 23263

- A revision of ISO 8217:2017 was not possible before Jan 1, 2020 so ISO developed a “Publicly Available Specification” or PAS (PAS 23263)
- PAS 23263 should be used in conjunction with ISO 8217:2017 which covers marine fuel oils delivered to the market today independent of S content
- The PAS can also be used in conjunction with earlier editions of ISO 8217
- The PAS does not introduce new specifications or an additional table for 0.50 % S fuels

What does PAS 23263 do?

The PAS provides general guidance applicable to all 0.50 % S fuels, including:

- S content
 - flash point
 - kinematic viscosity
 - cold flow properties
 - ignition characteristics
 - catalyst fines
 - stability
-
- Importantly for us, Annex D of the PAS also provides considerations on commingling of fuels, information on pre-delivery compatibility testing and other test methods which can be used to evaluate stability and compatibility of fuels. This is used in the JIP document.

The PAS modelling program

- The ISO working group conducted a test program to investigate whether refinery grade test methods could inform on stability of fuels/mixtures
- These test methods relate to the ability of the fuel oil matrix to keep the asphaltenes in solution
- Limited testing predicted that 50% of the evaluated fuels/mixtures - despite their diverse formulations – would be compatible whatever the mixing ratio (TSP < 0.10%)
- Of the remaining 50%, the spot test was indicating a risk for incompatibility at a specific mixing ratio, but this was often not confirmed by elevated TSP test results.

Joint Industry Guidance

The supply and use of 0.50%-sulphur marine fuel



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JPEC



JIP Guidance 0.50% S Fuels - Participants

BIMCO

Concawe, Environmental Science for European Refining

Cruise Lines International Association (CLIA)
Institute of Marine Engineering, Science and Technology (IMarEST)

International Bunker Industry Association (IBIA)

Indian National Shipowners' Association

International Association of Independent Tanker Owners (INTERTANKO)

International Chamber of Shipping (ICS)

International Council on Combustion Engines (CIMAC)

International Organization for Standardization (ISO)

International Association of Classification Societies (IACS)

International Union of Marine Insurance (IUMI)
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Japan Petroleum Energy Centre (JPEC)

Oil Companies International Marine Forum (OCIMF)

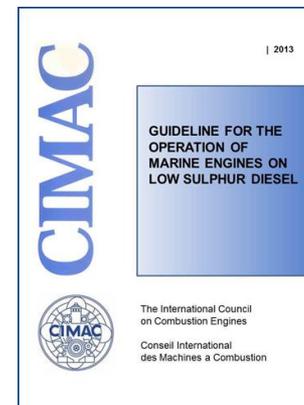
Royal Institution of Naval Architects (RINA)

Culture change as ship crews become familiar with new fuel rules (1)

- Avoid mixing bunker fuels from different sources wherever possible - especially paraffinic and aromatic blended fuels
- Store fuels separately until compatibility testing has been carried out
- Do not mix straight-run fuel oil [the product of atmospheric or vacuum distillation] with a cracked [additionally processed] one – if not possible keep the ratio to a minimum
- Do not mix fuels with greatly dissimilar densities
- Where possible choose fuels with similar viscosities *and* densities
- Do not mix a fuel oil with a marine diesel oil or marine gas oil

Culture change as ship crews become familiar with new fuel rules (2)

- Understand the product coming on board – not just the information on the BDN
- Know your tankage arrangements to help segregate fuels
- Look at heating on filters and even on distillate systems and the temperatures for heating/transfer/separation/injection
- Ship Implementation Plans and crew training will be key
- Traceability (e.g. using Blockchain) may become standard over the next few years
- We are working on two supplementary issues: static and hose testing



Going forward: what's important?

- There is a lot of interest to use this guidance as basis for the development of training materials
- We are developing an e-learning module
- Availability is market – driven and will sort itself out ... eventually. Its all about “market signals”
- The important things in the short – term are:
 - Fuel stability and compatibility
 - Ensuring that a minimum number of fuel types need to be carried on board to enable segregation
 - Preparing through the use of a Ship Implementation Plan

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Thank You



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