

## MARINE FUEL GROWING ADDITIVE CHEMISTRY

Opportunities for different additive for different function



### IMO 2020 and It's Impact!!

#### IMO 2020 AT A GLANCE...

A new regulation enforcing a **0.5 global sulfur** content cap for marine fuels, down from the **current 3.5% limit**

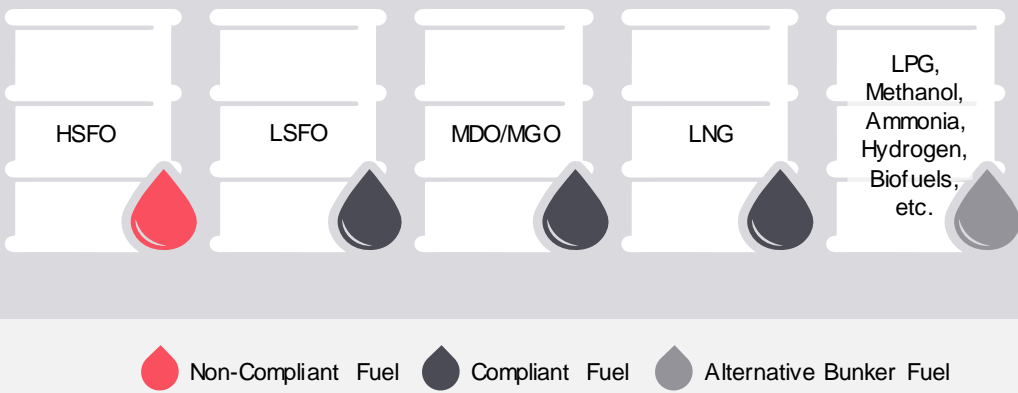


What the regulation means...	What shippers can choose to do...
<ul style="list-style-type: none"> <li>Limit for sulfur in maritime vessel fuel reduced from <b>3.5% to 0.5%</b></li> <li><b>0.10%</b> sulphur limit in the Emission Control Areas (ECA) zones</li> <li>Reduce marine sector emission in international waters by <b>80%</b></li> <li>Restrict or completely prohibit the discharge of wash water from open loop scrubbers or prohibit the use of scrubbers</li> </ul>	<ul style="list-style-type: none"> <li>Switch to IMO compliant fuels with lower sulphur content</li> <li>Install scrubbers on ships to reduce sulphur oxide emissions</li> <li>Use LNG or alternate fuels</li> </ul>



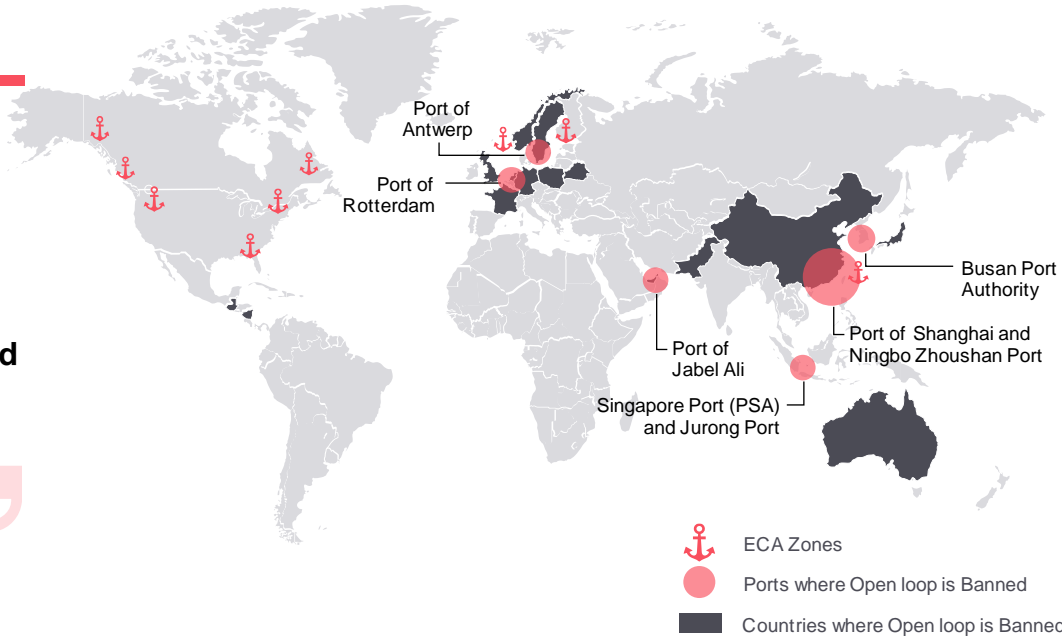
### IMPACT ON MARINE FUEL DUE TO REGULATION

IMO regulations will promote the **retrofitting option of scrubbers** (for Non-Compliant Fuel) or **usage of alternative IMO Compliant Fuel** in ships



### Regulation Assessment: ECA Zone and Global Regulations

Emission Control Areas (ECAs) are located along the coasts on a distance that can reach **200 nautical miles** or are defined on a particular geographical area.

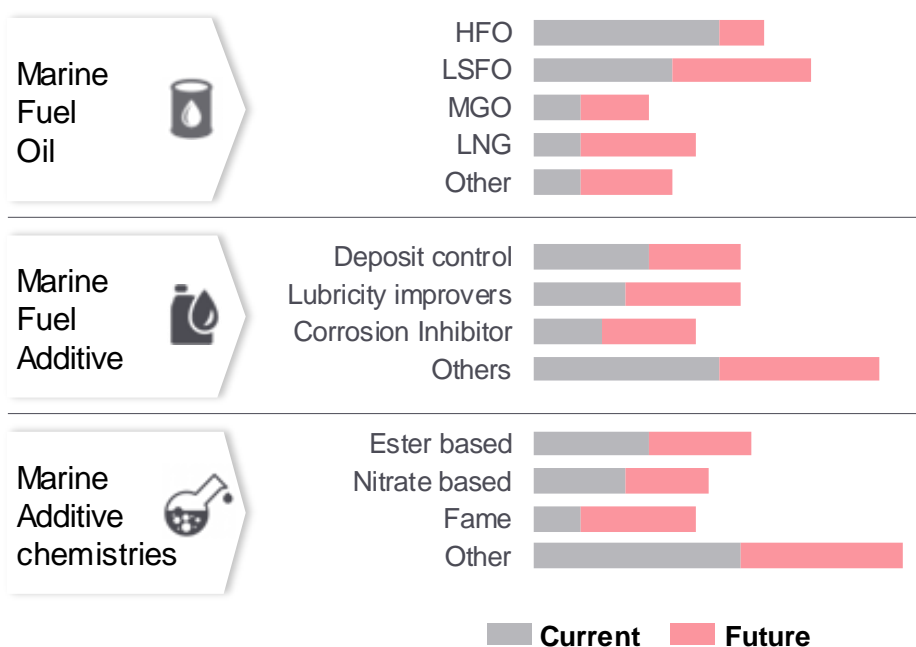
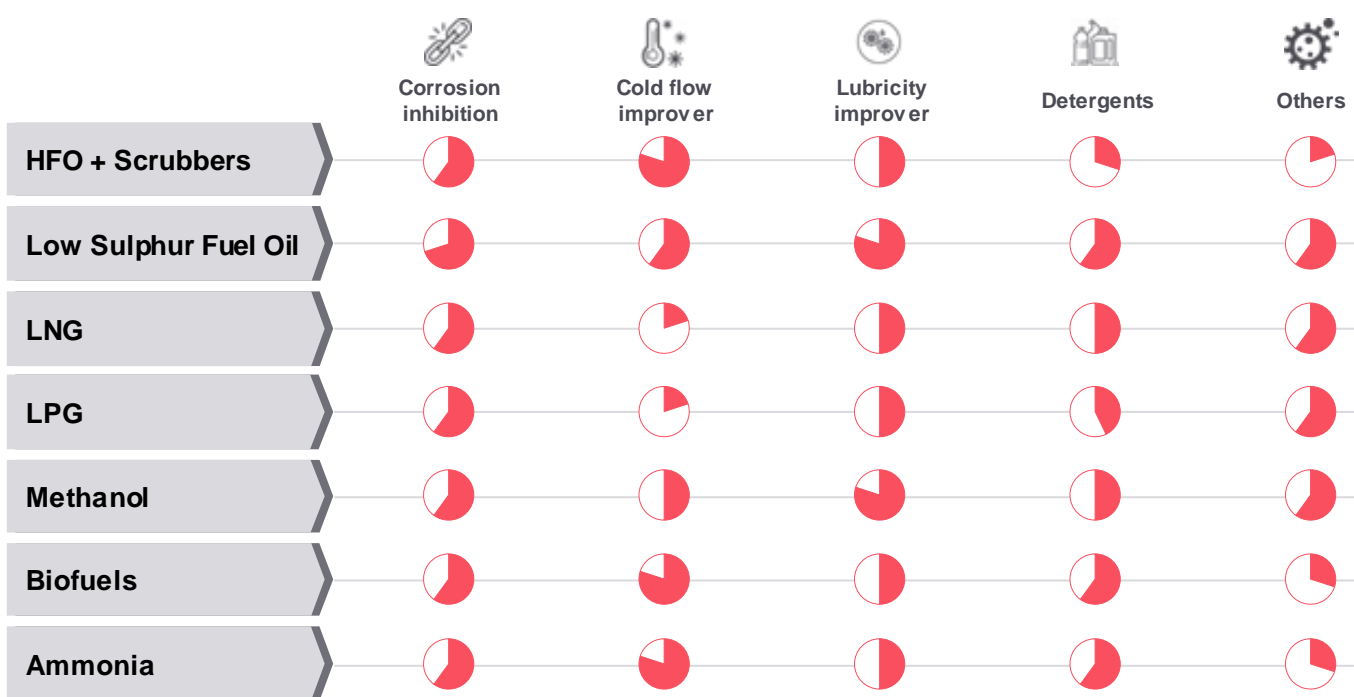


Note: \*Like Port of Antwerp and Rotterdam most of the ports in European region have banned the use of open loop systems. \*As awareness increasing most of the ports in developing countries like India, Sri Lanka, Malaysia etc. may get regulate in near future.

### Impact of Regulation on Marine Fuel, Additives and Related Chemistries

IMO regulations will promote the **retrofitting option in scrubbers** or usage of **alternative fuels** in ships which will indirectly **accelerate the growth of the metal carboxylate and ester-based chemistry** in order to inhibit the metal deposition and rust prevention.

#### COMPATIBILITY OF FUEL WITH RESPECT TO MAJOR ADDITIVES



Low sulfur fuel, LNG marine gasoil and others are expected to witness robust growth due to IMO regulation which will indirectly increase the growth opportunity for FAME and other bio-based esters.

The CAGR (2022–2026) of these fuel ranges are between **5.5% – 6.5%**

### About FutureBridge

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