

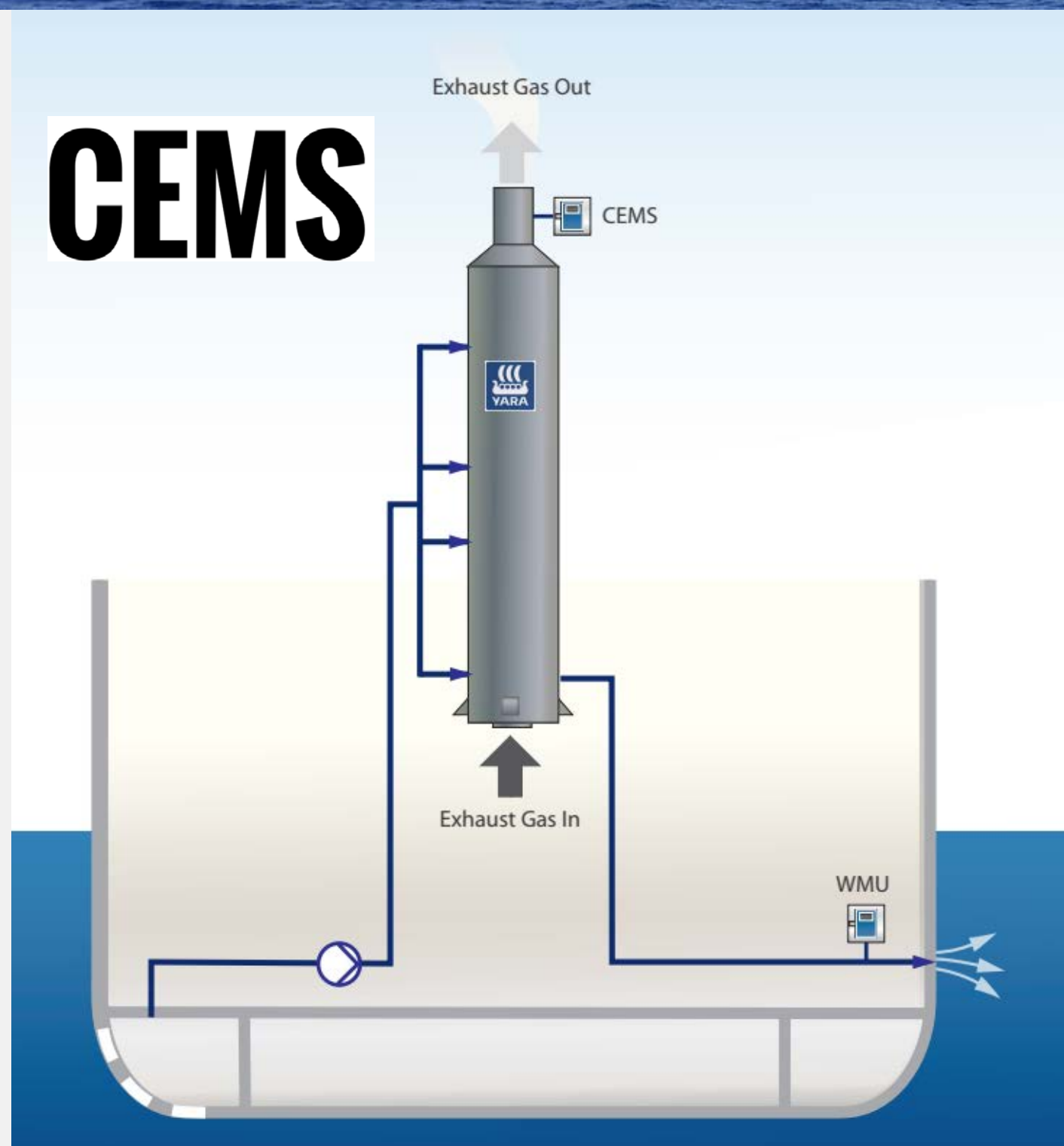
The enforcement of the global sulphur cap in maritime transport

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Enforcement schemes

Enforcement of the sulphur regulations in the high seas is challenging for the authorities. The vast area that has to be covered, the amount of ships to be inspected and the lack of an approved methodology by the IMO makes the inspection difficult far from the coast. The proposed solutions include the use airborne systems like UAVs running in micro fuel cells, solar UAVs or airplanes equipped with sniffers and optical measuring systems. A carriage ban or a continuous emission monitoring system can be very effective if legislated. Fixed monitoring stations can also be used outside ECA zones on special platforms and inspection boats are some alternative systems.

The only authority with jurisdiction in the high seas is the flag state and consequently, enforcement of the regulations is a responsibility of the flag state. However, the willingness of the flag states to enforce the regulations and pressure the ship owners is doubted. The lack of the appropriate equipment for conducting inspections is one more concern of the shipping industry.



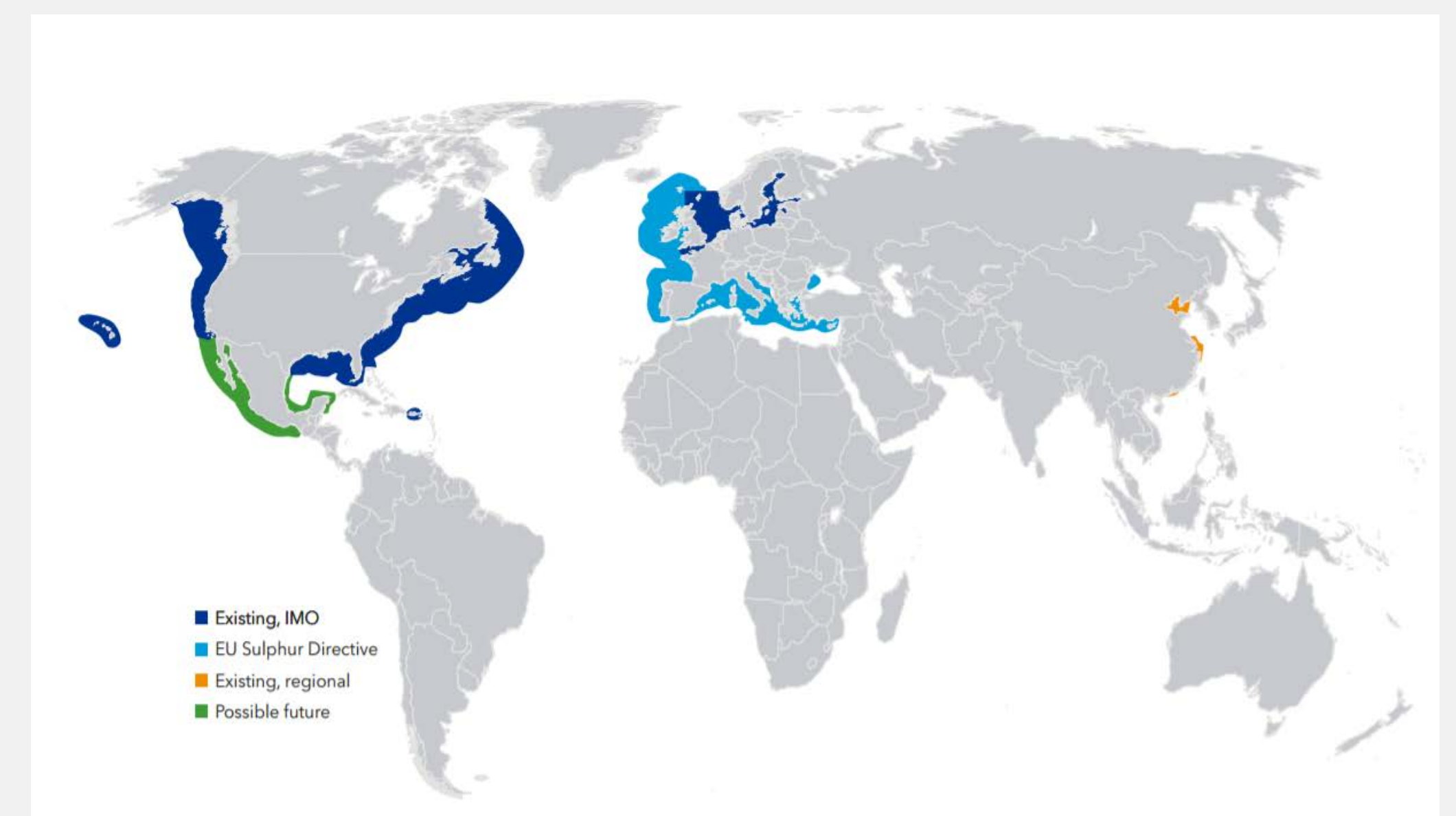
Solar drones and continuous emission monitoring systems for monitoring in the high seas

The reduction of the sulphur emissions from shipping to 0.5% was legislated by the International Maritime Organization. The regulation will apply to all ships sailing in any part of the world and will be implemented in 2020. Despite the decision, the enforcement methods have yet to be defined in order to ensure compliance and a level playing field.

Penalties

The fines imposed for the non compliance in ECA zones so far are very low compared to the profits of burning heavy fuel oil. It is more cost-effective for ship operators to pay the fines than comply with the regulations. Therefore, fines and penalties need to be reconsidered by the authorities. Fines should be adjusted according to the profits a ship operator makes by burning high sulphur fuel. The amount of fines can be calculated by the fuel consumption and the time spent at sea, burning non-compliant fuel.

A more efficient penalty proposed is detaining the ship in the port when it is caught as non-compliant. Detention in the port causes substantial losses for the ship operator and delays in the ship's schedule. Drastic measures need to be considered in order to force compliance all around the world.



Existing and possible future sulphur emission control areas, dnvgl.com

Compliance rates

Compliance in the ECA zones has been monitored successfully for the past two years. The compliance rates are between 0.6% and 18% with the most observations in the region of 4% to 7%. Enforcement in the ECA zones is facilitated by various methods and technologies that can be used close to the coast. A high level of compliance has been noticed immediately after the regulations were put in force.

The difficulty to enforce the upcoming global sulphur cap is expected to lead in low compliance rates in the high seas. Considering the price differentials in heavy fuel oil and low sulphur fuel oil and the uptake of exhaust gas cleaning systems, commonly known as scrubbers, the additional annual cost for the shipping industry from 2020 and in a ten year timeframe will be on average US\$ 24 billion. Ship owners will therefore consider burning non compliant fuel in order to remain competitive.

Country	Maximum fines
Belgium	€ 6 million
United Kingdom	£ 3 million
United States	\$ 25,000 per day
Netherlands	€ 81,000 + economic gains
Denmark	€ 50,498
Germany	€ 22,000
Lithuania	€ 14,481
Latvia	€ 2,900
Sweden	SEK 10 million

Fines should be calculated according to the corresponding profits of non-compliance