

TECHNOLOGY FOR SULPHUR REDUCTION IN MARINE FUEL TO 0.5%

2020

New requirements to marine fuels – 2020

Starting from January 1, 2020, the International Maritime Organization (IMO) reduces the maximum contents of sulphur in marine fuel (bunker fuel oil) from 3.5 % to 0.5 %

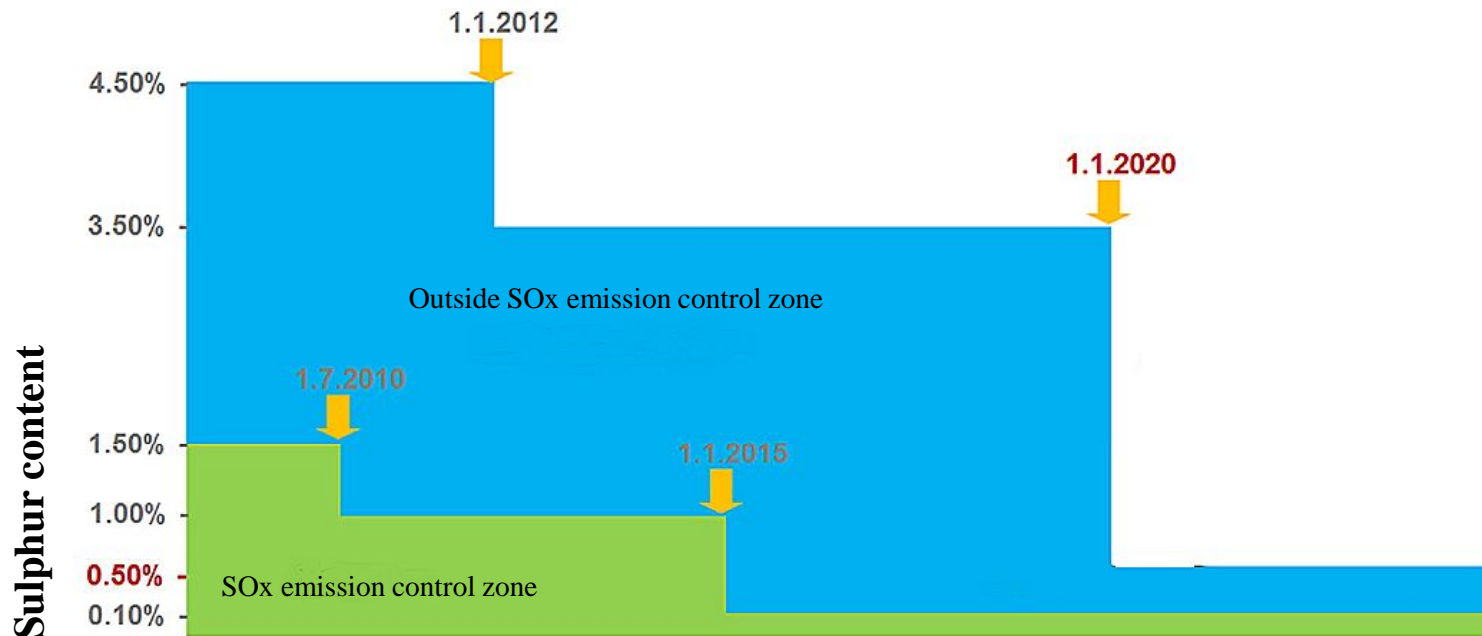


MARPOL 73/78. Annex VI to the Convention – Regulations for the Prevention of Air Pollution from Ships

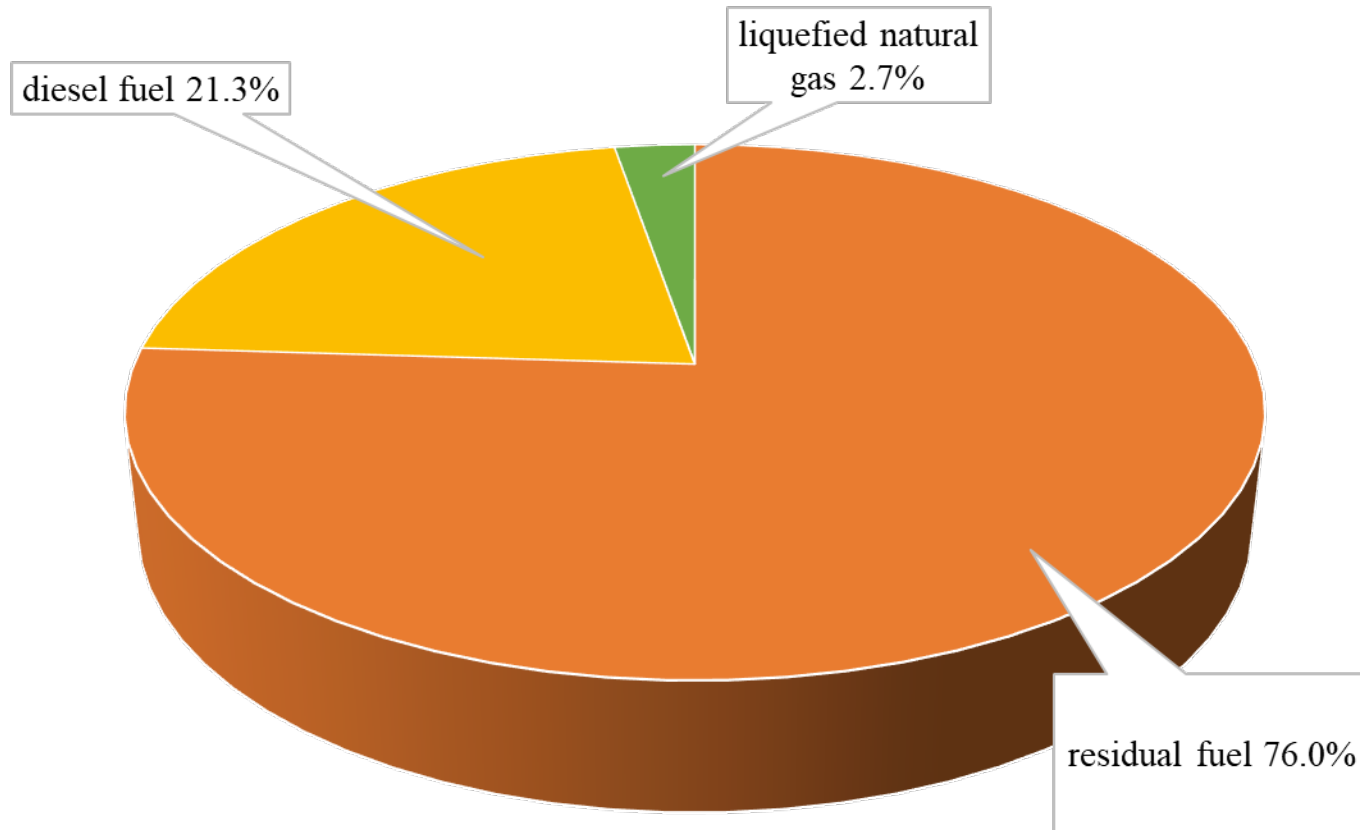
Regulation 14.

The sulphur content of any fuel oil used on board ships shall not fall beyond the following limits:

1. 4.5 % m/m before January 1, 2012
2. 3.5 % m/m on January 1, 2012
3. 0.5 % m/m on January 1, 2020, and afterwards



World consumption of fuel oils

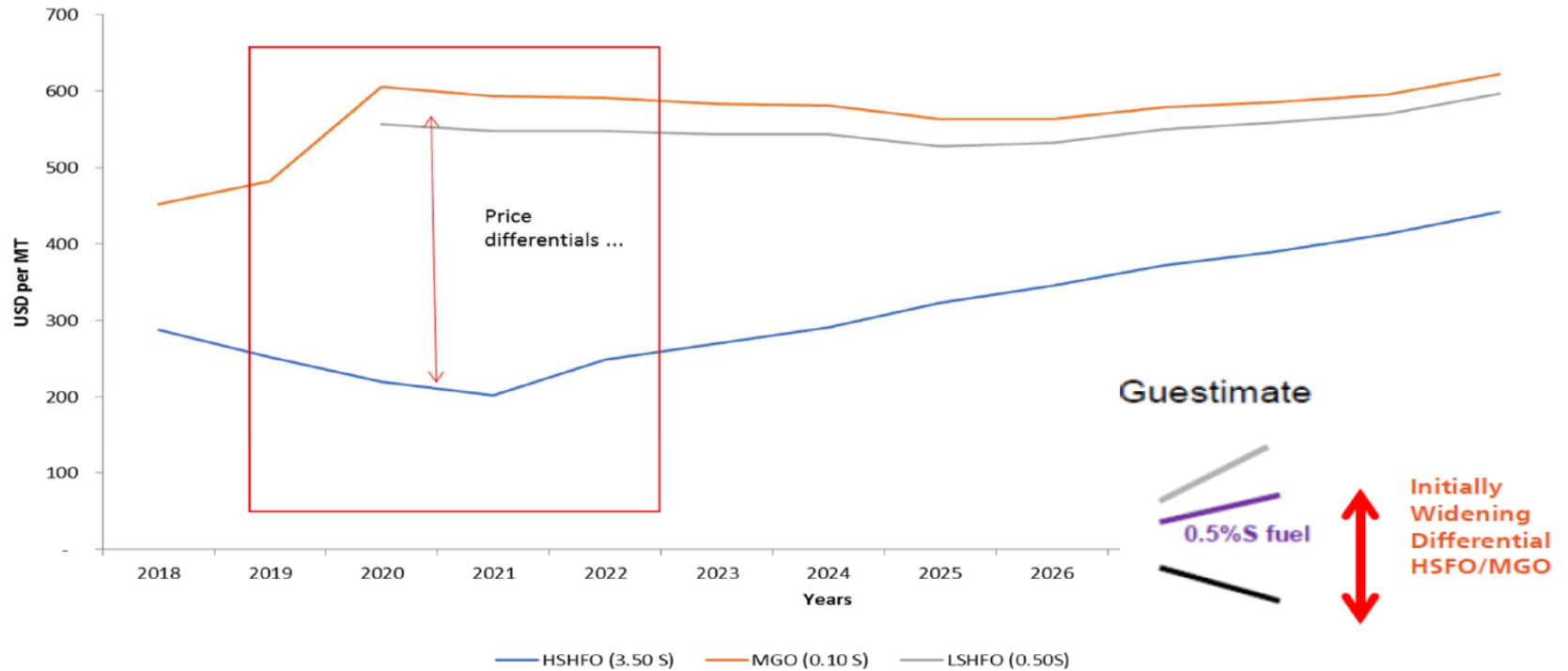


Forecast of demand for all types of fuel oil starting from 2020

International Maritime Organization's surveys

Fuel type	Demand forecast for 2020	
	million tons / year	%
Heavy oil (scrubber)	36.0	11
Fuel with sulphur content of 0.1 %	39.0	12
Fuel with sulphur content up to 0.5 %	233.0	73
Liquefied natural gas (LNG)	12.0	4
Total:	320.0	100

Forecast of prospective pricing for fuel oil with low sulphur content



Fuel oil hydro-treatment

The hydro-treatment process allows production of heavy (residual) fuel oils with sulphur content up to 0.5 %

Product yield	% wt.
Gases C ₁ -C ₄	4.0
Gasoline fraction (IBP - 200 °C)	5.0
Light gas oil (200-250 °C)	7.5
Fuel oil (250 °C - EBP)	83.5
Total	100.0

Properties	Feedstock	Hydro-treatment product
Density at 20 °C, kg/m ³	984.3	945.4
Viscosity at 50 °C, cSt	385.8	291.7
Sulfur content, % wt.	3.2	0.39
Conradson carbon residue, % wt.	10.15	5.55
Pour point, °C	+1	-1
Flash point, °C	94	148
Ash content, % wt.	0.049	0.012
Asphaltene content, % wt.	3.5	1.7