SHORTSEA 2019
EUROPEAN CONFERENCE OF THE EUROPEAN SHORTSEA NETWORK

Shortsea Shipping Days 2019

STUDIO NAVALE

European Shortsea Network

EENMA

Constantly on the alert for new developments in the Marine sector

2020 Sulphur Cap Requirement

Alternative Solutions and Techno-economical Aspects

by Alex Kouros
General Manager STUDIO NAVALE Maritime & Technical Ltd.

CERTIFIED LR ISO 9001:2015

SHORTSEA 2019
EUROPEAN CONFERENCE OF THE EUROPEAN SHORTSEA NETWORK

STUDIO NAVALE

Coming regulations address to new product lines

✓ **MARPOL Annex VI Conversions for 2020.**

- Facts
  - Shipping facilitates over 90% of world trade.
  - Air pollution from ships is not as obvious as an oil spill.
  - Ships' fuel has 10,000 times more S than road fuel.
  - Shipping accounts for 2.7% of world CO2 emissions and 14% of Sox pollutions.
  - It has a cumulative effect on overall air quality and adds to acid rains problem.
- Requirement for 0.5% S Cap on marine fuels by 2020
  - Limit SOx and NOx from exhaust gases.
  - Prohibit emission of Ozone Depleting Substances.
  - Regulates shipboard incineration.
  - Regulates emissions of Volatile Organic Compounds from Tankers.
- HFO to distillates low-sulfur fuels (impact to machineries).
- Scrubbers, exhaust gases emission cleaners.
- LNG retrofitting.

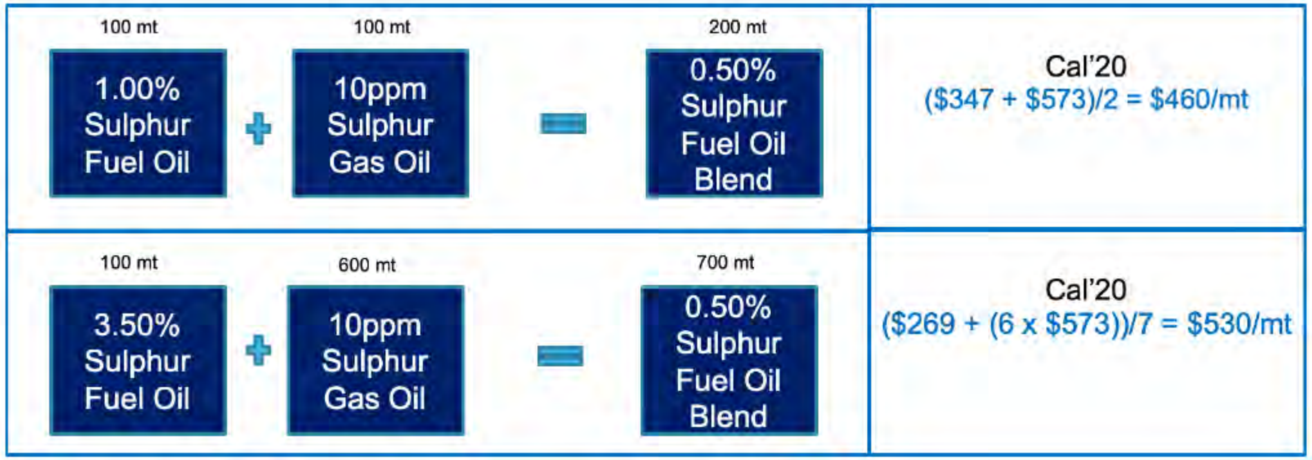
IMO will use MARPOL to reduce emissions of Sulphur, Nitrogen Oxides and Particulate Mater worldwide by 2020 or 2025.

MARPOL requires a reduction in SOx and NOx emissions worldwide.

Coming regulations address to new product lines

- ✓ **Bunker implications.**
  - Price and supply. Major question marks!
  - Availability of 3.5% S and 0.5% S.
    - 3.5% S: *Currently 4.4mio bpd of HSFO 3.5% S currently being consumed.*
    - 0.5% S: *By Jan2020 this must be replaced by 0.5% S FO (VLSFO) or other compliant bunker fuels (MGO/ MDO/LPG/LNG).*
    - *VLSFO will come from new or upgrade refineries or HSFO blended with Gas Oil (10ppm) or other Low Sulphur Oils (1%) or Low Sulphur Distillates such vacuum gas oil, condensates etc.*

- ✓ **"The Rotterdam Fuel Approach" example**
  - The price of the 0.5% S FO blend will be heavily reliant on the blending.
  - Indication only; final price still uncertain.

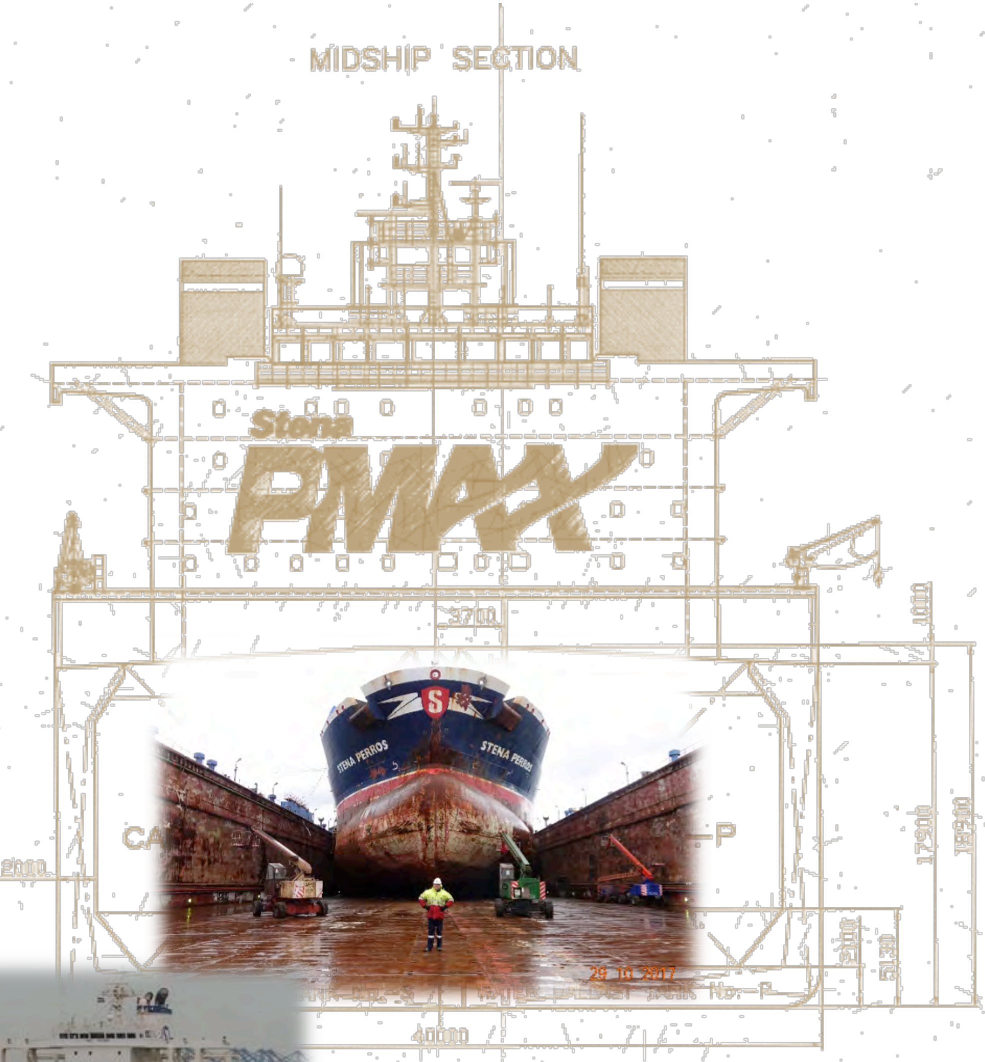


Source: Clarksons Platou

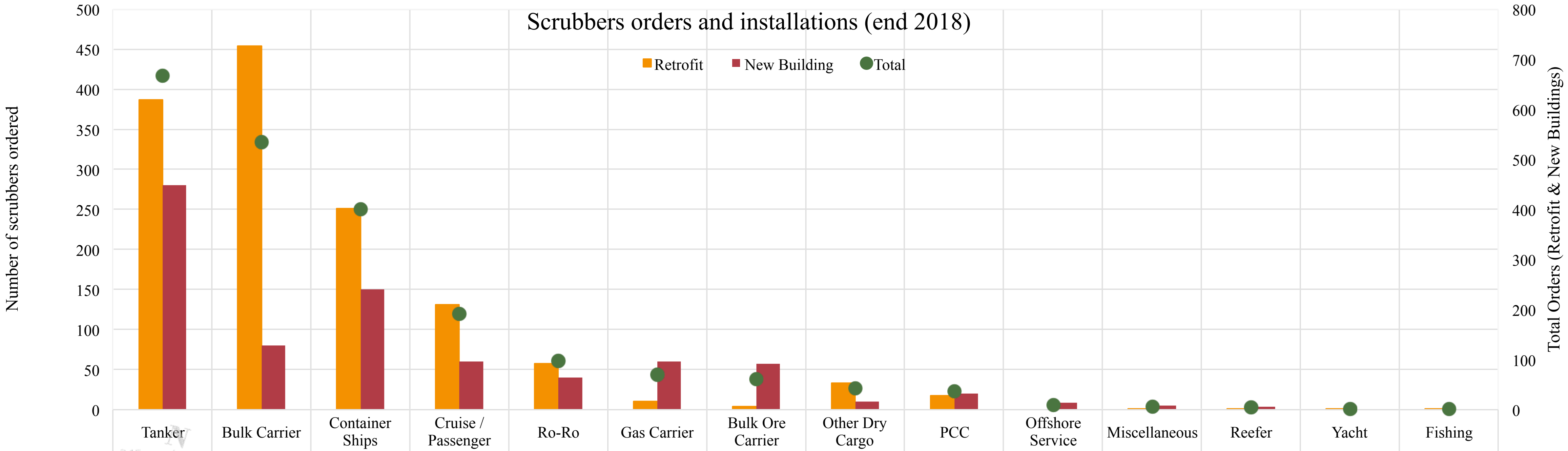
0.5% S Cap alternatives, from engineering point of view (1a/4)

✓ Scrubbers (Exhaust Gas Cleaning Systems) Adoption Trends

- It is hard to understand that many major players in shipping will refuse the use of wet scrubbing systems and will move to alternatives.
- Ship age is a restriction, due to CAPEX of a retrofit installation. Whatever elder than 15 years old is a great question mark!
- By the start of 2020 we may see to fulfill scrubber installations:
  - VLCCs about 20% of the fleet.
  - BC Capers about 15% of the fleet.
  - Containers (over 7500TEU) about 15% of the fleet.
  - Containers (medium size) about 10% of the fleet.
- Major shipping players seems to follow 0.5% S cap just adding new fuels.



0.5% S Cap alternatives, from engineering point of view (1b/4)



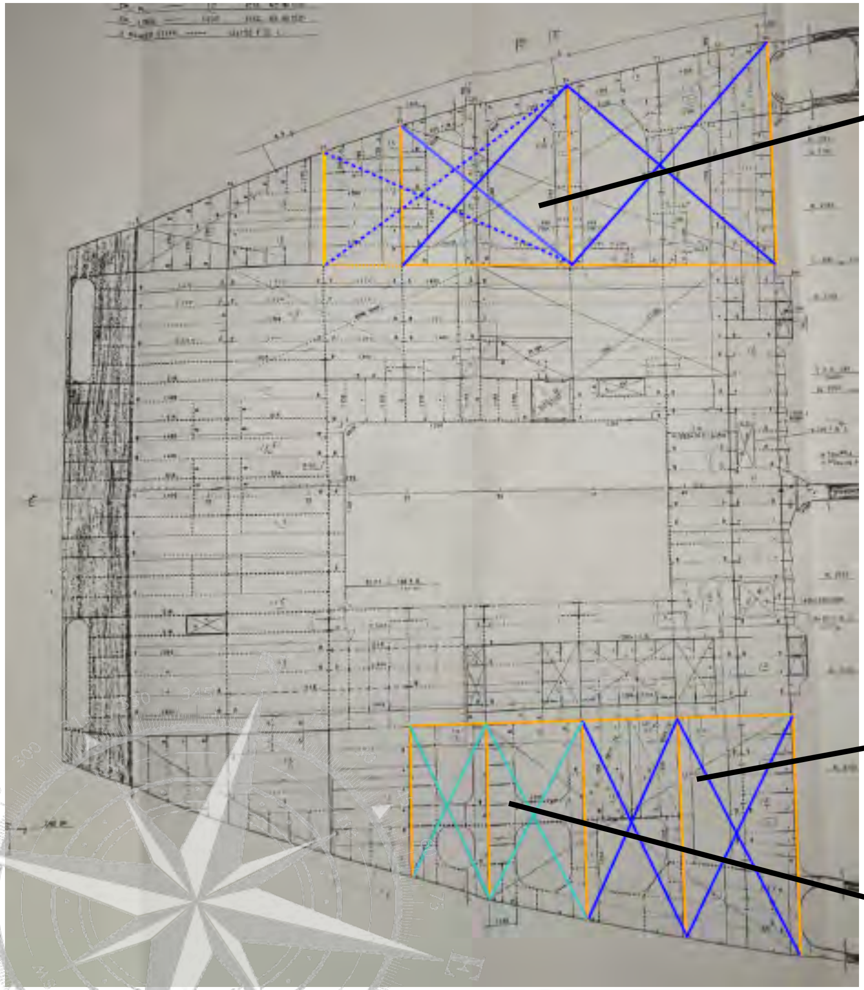
	Tanker	Bulk Carrier	Container Ships	Cruise / Passenger	Ro-Ro	Gas Carrier	Bulk Ore Carrier	Other Dry Cargo	PCC	Offshore Service	Miscellaneous	Reefer	Yacht	Fishing
Retrofit	387	454	251	131	57	10	4	33	17	0	1	1	1	1
New Building	280	80	150	60	40	60	57	10	20	9	5	4	0	0
Total	667	534	401	191	97	70	61	43	37	9	6	5	1	1

Ship Type

Constantly on the alert for new developments in the Marine sector

0.5% S Cap alternatives, from engineering point of view (2/4)

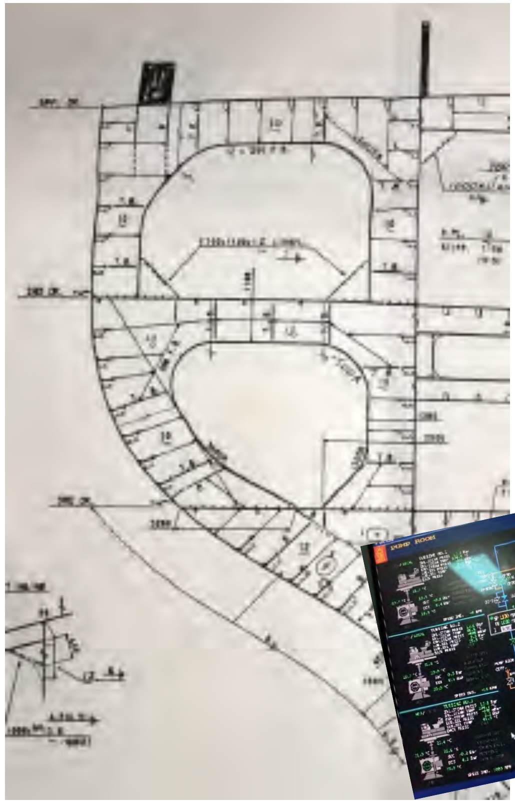
✓ Modification of existing FO Tanks.

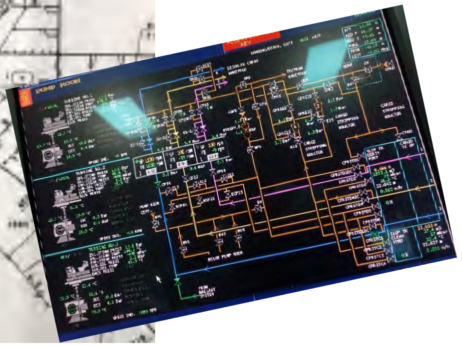


Separation of the existing FO by adding BHDs and new systems; P side two tanks instead of one

Separation of the existing FO Tanks, by adding BHDs and new systems, S side two tanks instead of one

Separation of the existing MDO Tank into two tanks

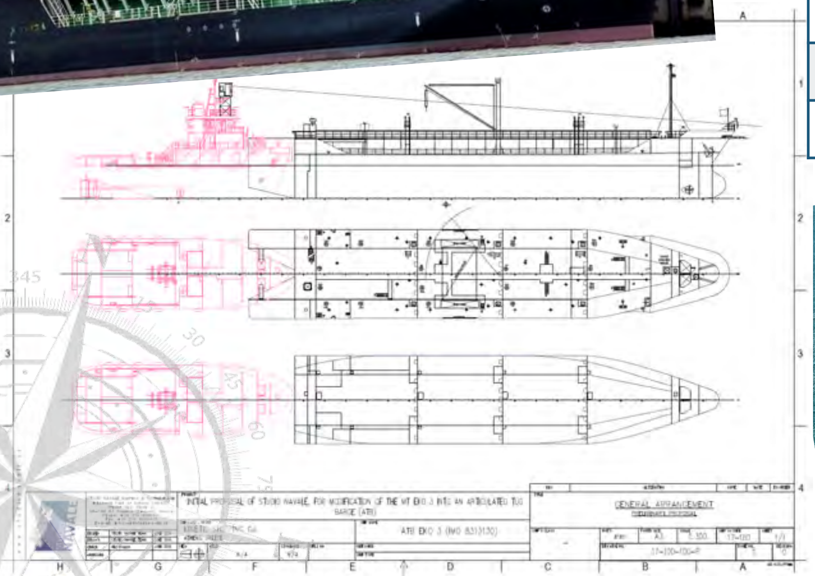




Constantly on the alert for new developments in the Marine sector

0.5% S Cap alternatives, from engineering point of view (3/4)

✓ LNG bunkering installations



Year 2013			
US$/mmBTU	Rotterdam	Houston	Tokyo
HFO	14-15	14-15	16-17
MGO	20-21	23-24	21-22
LNG	7-8	4-5	15-16

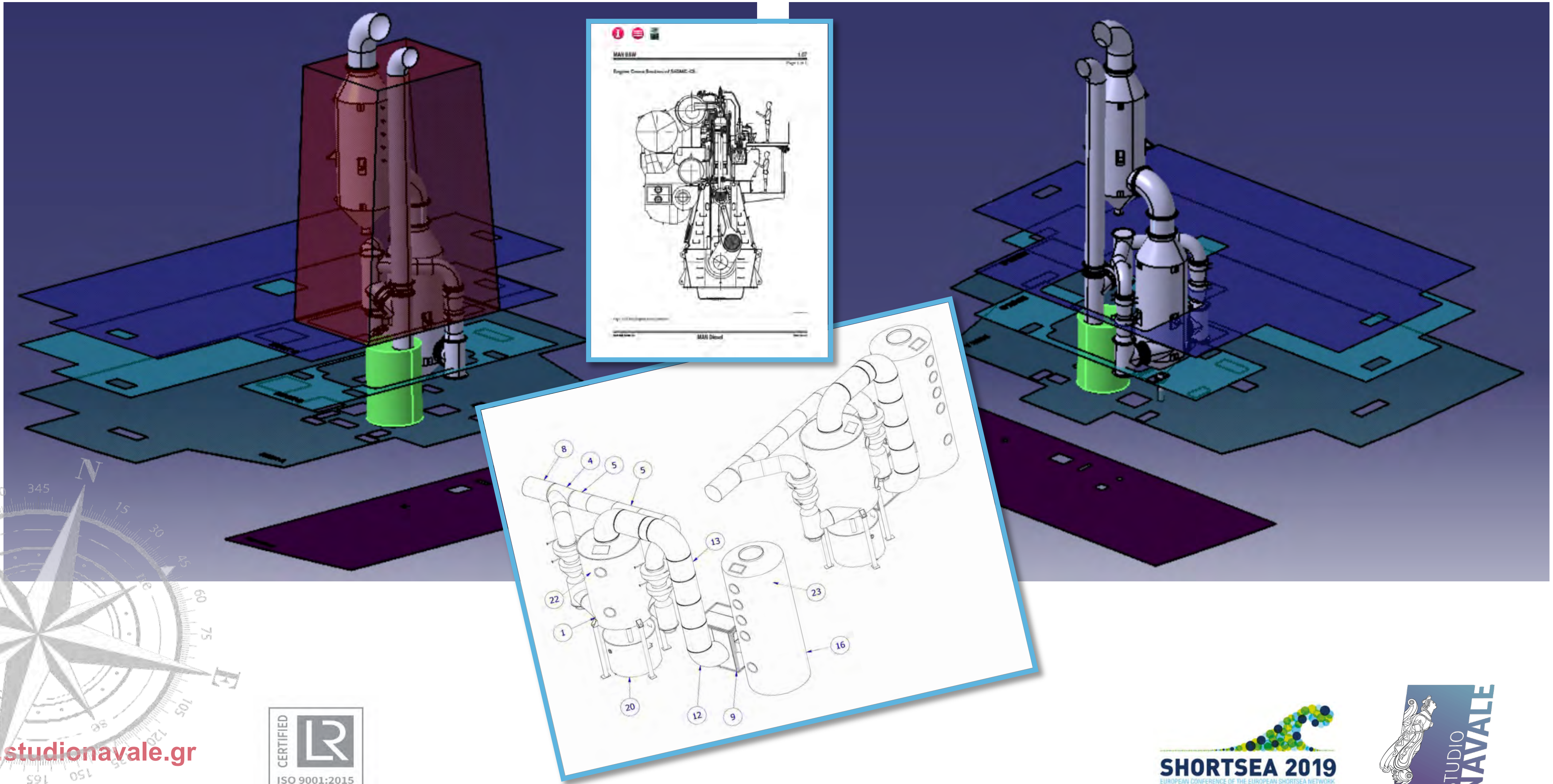
Year 2015, November

Corresponding prices for oil and natural gas after conversion to energy terms

US$/mmBTU	Rotterdam	Houston	Tokyo
HFO	5.25-6.25	5.35-6.70	6.7-7.2
MGO	10.25	11.9	10.55
LNG	6.4	2.8	7.8

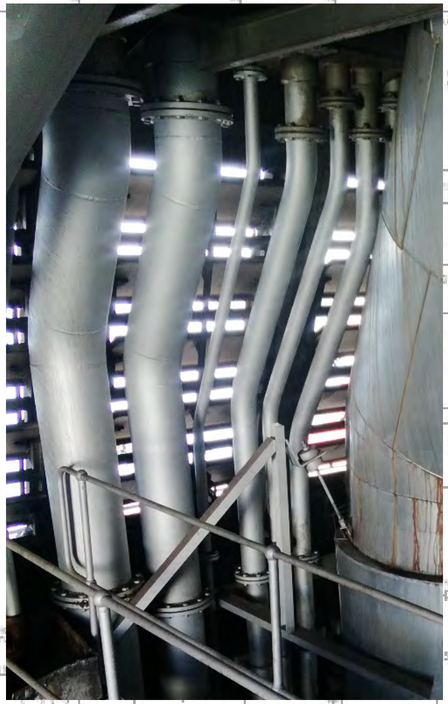
0.5% S Cap alternatives, from engineering point of view (4/4)

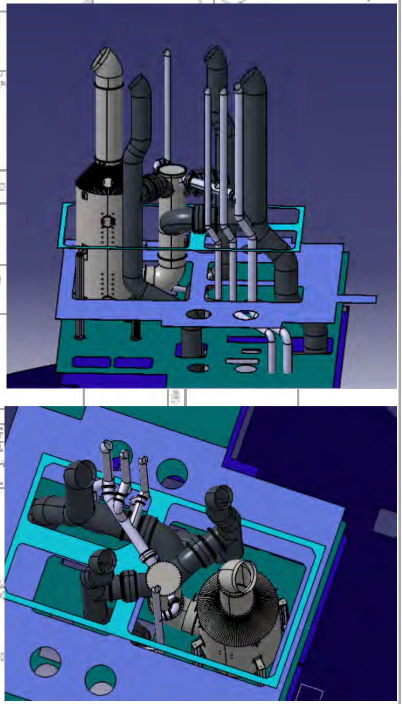
- ✓ Pioneering Fresh Water wet scrubber installations



0.5% S Cap alternatives, cost related

- ✓ **Costs**
- ✓ **Scrubber installation**
  - Current market players.
  - New fresh water wet scrubbing innovation.
- ✓ **Modification of FO/MDO Tanks**
  - Engineering-wise is a simple conversion.
  - Cleaning, Steel, Piping, Stability issues.
- ✓ **Modification to LNG fueling**
  - Conversion of the ship.
  - Managing tanks pressure.
  - Amount of space required compared to the use of FO.
  - Bunkering infrastructure availability.
  - Future price differential between FO bunkers and Natural Gas.

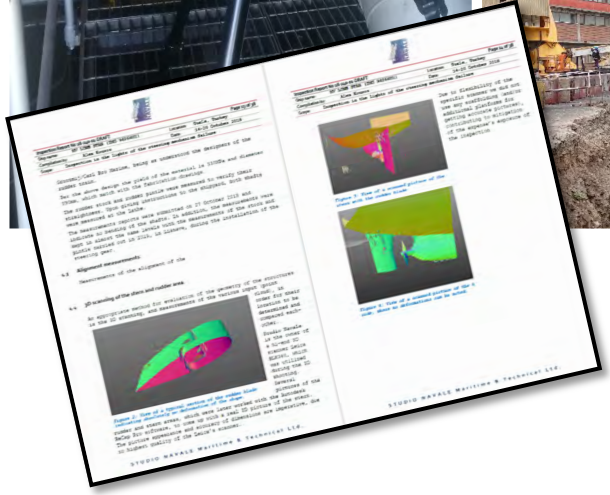




Commercial Issues

✓ **In case of scrubbing systems installations or other engineering modifications.**

- Delivery time.
- Shipyards’ slot availability.
  - The major number of the shipyards is already booked and the slot finding sometime is a quite expensive game.
- Cooperation with engineering firms.
  - Due to expansion of necessary modifications (Neopanamax requirements, Ballast Water Treatment Systems, routine dry-docking works etc.) the availability is narrow.
  - Creation of a technical pool worldwide.



CERTIFIED ISO 9001:2015

SHORTSEA 2019
EUROPEAN CONFERENCE OF THE EUROPEAN SHORTSEA NETWORK

STUDIO NAVALE

Studio Navale, some words

- ✓ A technical and consulting office focused the services to demanding projects and/or projects requiring eminent expertise and skills.
- ✓ More than of 30-year experience in ship repairs, under demanding conditions and parties involved.
- ✓ High reputation and respect within the shipping industry.
- ✓ Fully organized with highly skilled technical personnel.
- ✓ Strives to continuously up-to-date equipment and instruments.
- ✓ Availability throughout 24/7.
- ✓ Management Team with technical and commercial expertise and experience, acts as the frontline at-site.


Lloyd's Register

Certificate of Approval

This is to certify that the Management System of:

STUDIO NAVALE MARITIME & TECHNICAL LTD

Industrial Park of Schisto, 1 & 2 Street, Block 2, Perama, 188 63 Piraeus, Greece

has been approved by LRQA to the following standards:

BS EN ISO 9001:2015

Gilles Bessiere - Area Technical Manager

Issued by: Hellenic Lloyd's S.A.

for and on behalf of: Lloyd's Register Quality Assurance Limited

Current issue date: 27 September 2018
Expiry date: 26 September 2021
Certificate identity number: 10137243

Original approval(s):
ISO 9001 – 27 September 2018

Approval number(s): ISO 9001 – 00016560

The scope of this approval is applicable to:
Naval architecture, marine and industrial engineering, design and consulting services.
Provision of ship repairs management services.

UKAS MANAGEMENT SYSTEMS 001

Constantly on the alert for new developments in the Marine sector

CERTIFIED ISO 9001:2015

SHORTSEA 2019

STUDIO NAVALE

Thank you!

The reliable Greek partner in ship design and construction

T. +30 210 4000 901
F. +30 210 4000 415
Schisto Industrial Park (VIPAS),
Block 2, Street 1 & 2,
GR-188 63 Perama, Piraeus, GREECE
InfoDesk@studionavale.gr
www.studionavale.gr

CERTIFIED ISO 9001:2015

SHORTSEA 2019