



IHS Markit™

# Environmental regulations and future fleet development

IMSF / April 2018

Dalibor Gogic

# What do we now so far?

## No delay in 1 January 2020 enforcement date

“For anyone out there thinking this is not going to happen [in 2020], please put that idea to bed - it will enter into force.”

– Jeff Lantz, Director, Commercial Regulations & Standards, USCG, speaking at CMA 13 March 2018

## HFO carriage ban



## The shipping industry has four main options, and likelihood is that a combination will be implemented

1

### Install scrubbers



2

### Switch to LNG (or other alternative fuel)



3

### Switch to compliant fuel



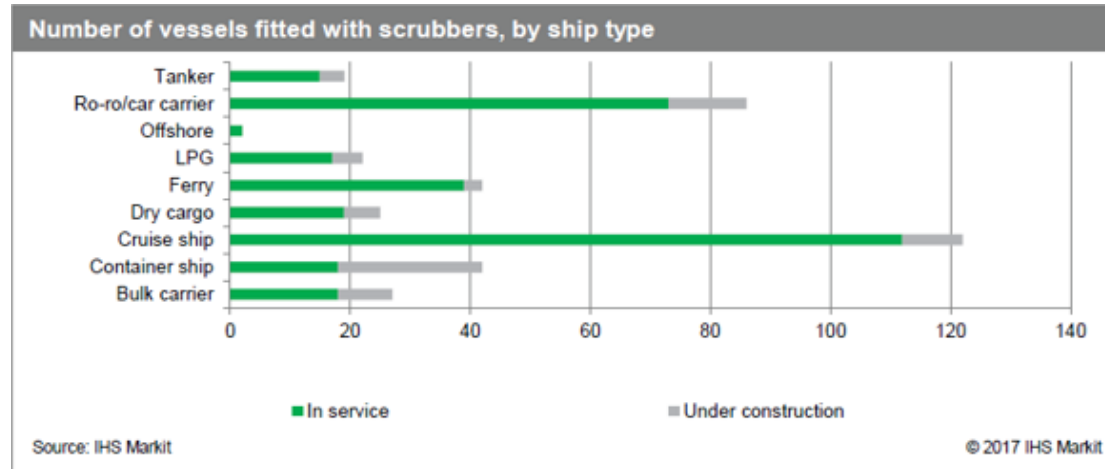
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### Non-compliance

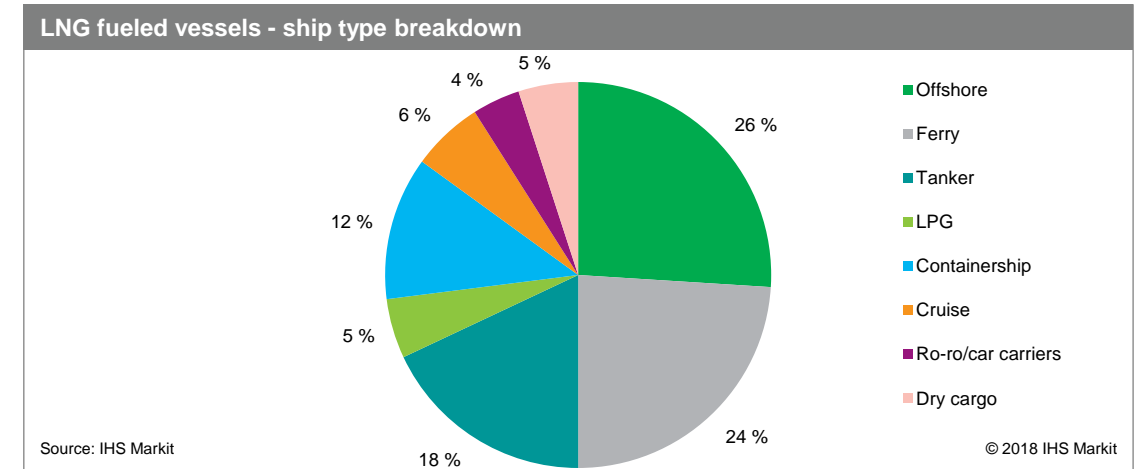


- Installation of **Exhaust Gas Cleaning Systems** (EGCS or 'scrubbers') to remove sulphur oxides from the exhaust on board.
- Switching away from high sulphur fuel oil grades to **low-sulphur fuels**, based on gasoil, low sulphur residuals, or hybrids.
- Switch to alternative fuel sources, notably **liquefied natural gas**, which requires vessel modifications.
- **Non-compliance**, either sanctioned due to acknowledged supply-side difficulties (transitional, category-based exemptions, local non-availability etc.), or grey area non-compliance (i.e. malicious intent).

## IHS Markit currently identifies 419 vessels with scrubbers installed or on order; LNG adoption as a compliance solution is limited with ~ 267 vessels currently identified with LNG capability

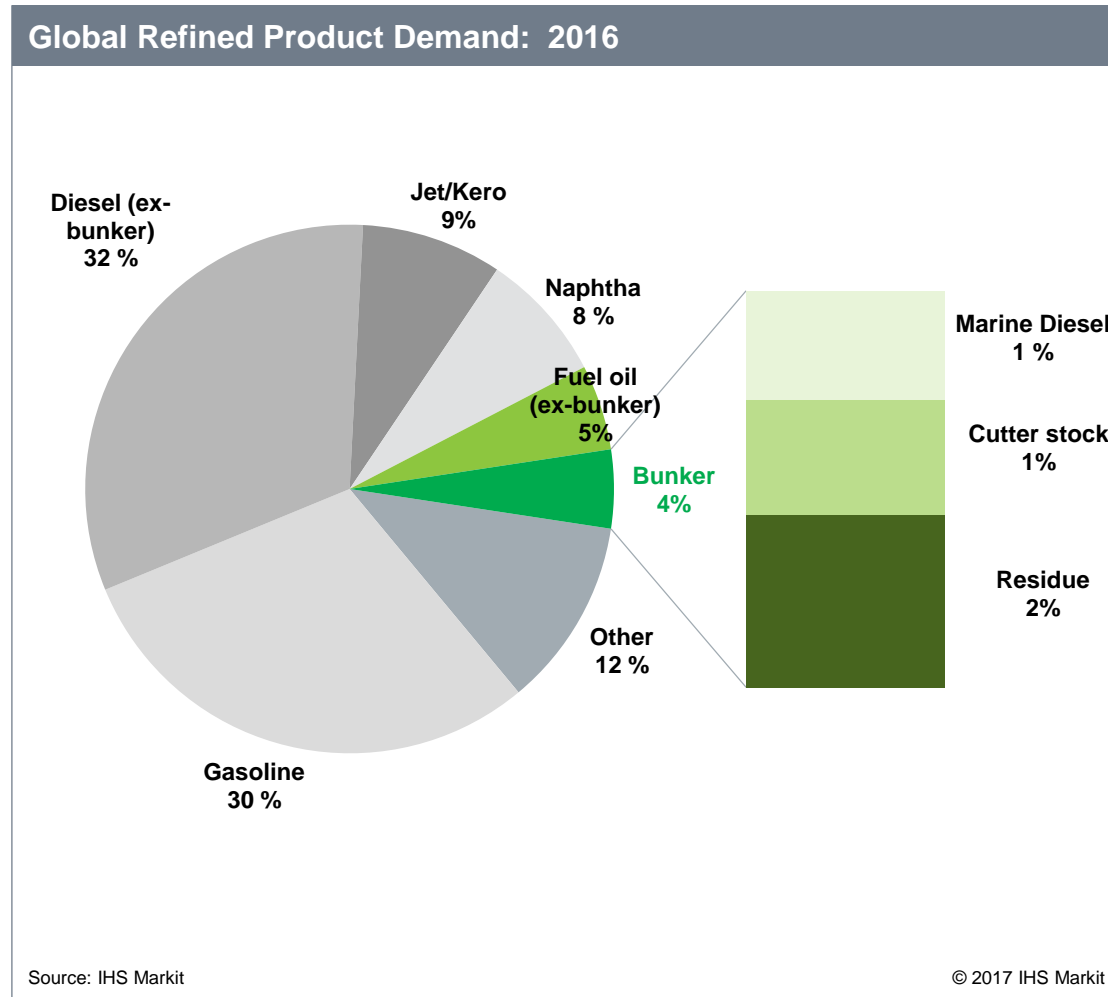


- A minority of vessels fits scrubbers on new vessels today (only 1.5% of the 2017 order book).
  - Number of orders for new container vessels did choose to fit scrubbers. This could be a precursor for future appetite from the container sector.
- Concerns remain on the carrying of caustic in the case of closed loop scrubbers and water effluent quality in the case of open loop
- Cruise ships and RoRo/Car carriers are the 2 main categories of ships which are installing scrubbers
  - This is mainly being driven by operation in ECAs but also from “green” credentials in the case of the cruise ships



- As with scrubbers, the LNG fuelled vessels are mainly operating in ECAs
  - Majority of the types of vessels are offshore ships (i.e. FPSO/FLNG) and ferries
- These are vessels that traditionally traveling short distances rather than intercontinental, but more longer-haul services are slowly becoming available
- CMA CGM's announcement on LNG-fueled mega-containers may be an important milestone that LNG could be viable for vessels operating globally in the near future
- It as yet to be seen, but they claim that they operated along the Asia-Europe service with a single LNG fill. The ships will be in operations in late 2019

## The bunker fuel sector may be small, but has the potential to have significant impact on global crude oil and refined products markets

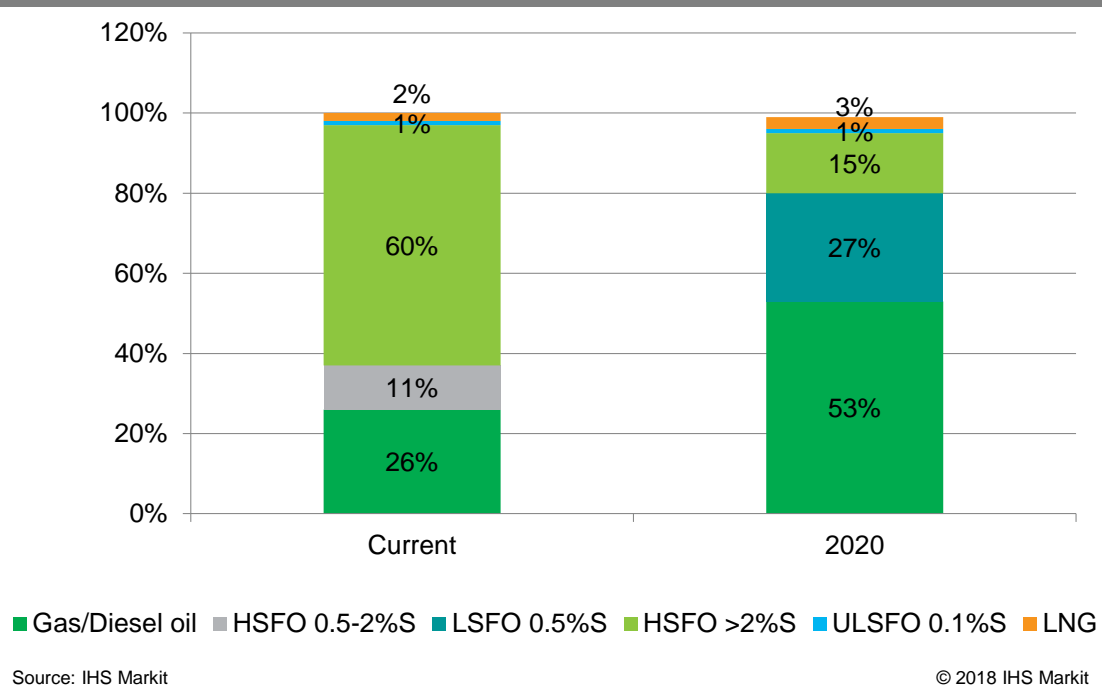


- Residual bunker fuel represents a small share of global demand for refined products, total consumption is ~200 million tonnes (~4 million b/d)
- The marine industry is the most significant demand center for high sulphur residue
- High sulphur residue is the most difficult stream to process/upgrade in refineries, due to complex molecules, high carbon content and high levels of contaminants such as nitrogen, nickel, and vanadium.
- Therefore we expect the challenge of a strong reduction in bunker fuel sulphur content to be twofold for the refining industry
  1. Producing sufficient quantities of 0.50%S bunker fuels, regardless of their composition (gasoil, residual, hybrid)
  2. Finding ways to dispose of the high sulphur residue excess that previously found a home in bunker fuel within the refining system or in new markets

# What do we expect to see

# Post 2020 IMO sulphur switch presumptions and key differentials; Switch to Marine Gasoil and large differential between LSFO and HSFO

Global Bunker balances post IMO specifications



- As expected, the new sulfur compliance will have a strong shift towards gasoil/diesel quality components (26% to 53%) while reducing the call for residue-based components.
- IHS Markit has compared the total fuel oil (FO) bunker demand, which include gasoil bunker (MGO), today versus year 2020 (IMO compliance year)
  - 0.10 % S bunkers are largely gasoil-based, while fuel oil bunkers (1.0 % S or 3.5 % S) are majority residue-based with some gasoil cutter-stock blending to meet the finished bunker fuel specifications

IHS Price Forecast Comparison 2017 US dollars

			2019	2020
Dated Brent	FOB	\$/bbl	57.31	62.50
Dated Brent	FOB	\$/T	433.09	472.31
Gasoil 0.1%	CIF NWE	\$/T	539.7	627.2
Marine Gasoil 0.1%	CIF NWE	\$/T	516.5	600.3
Marine Bunkers 0.5%	CIF NWE	\$/T	408.7	544.3
Marine Bunkers 3.5% (MFO 380)	CIF NWE	\$/T	268.6	175.1
<b>Differentials</b>				
Marine Gasoil 0.1% minus Marine Bunkers 3.5%		\$/T	247.9	425.1
Marine Bunkers 0.5% minus Marine Bunkers 3.5%		\$/T	140.1	369.2
Marine Bunkers 0.1% minus Marine Bunkers 0.5%		\$/T	107.8	56

Source: IHS Markit © 2018 IHS Markit

- Crude, Gasoil and 0.5% bunkers price all rise; 3.5 % sulfur Marine Bunkers Price falls substantially
- Marine Bunkers 0.5% closes in on Marine Gasoil price owing to high production cost
  - Produced by blending large quantity of “gasoil” material with higher sulfur residues
  - Or from ultra-low sulfur residues that have high alternative value in refineries as upgrader feedstock



## Some rough calculations based on some rough presumptions – Larger the vessel faster ROI is expected giving a hint to possible scrubber adoption

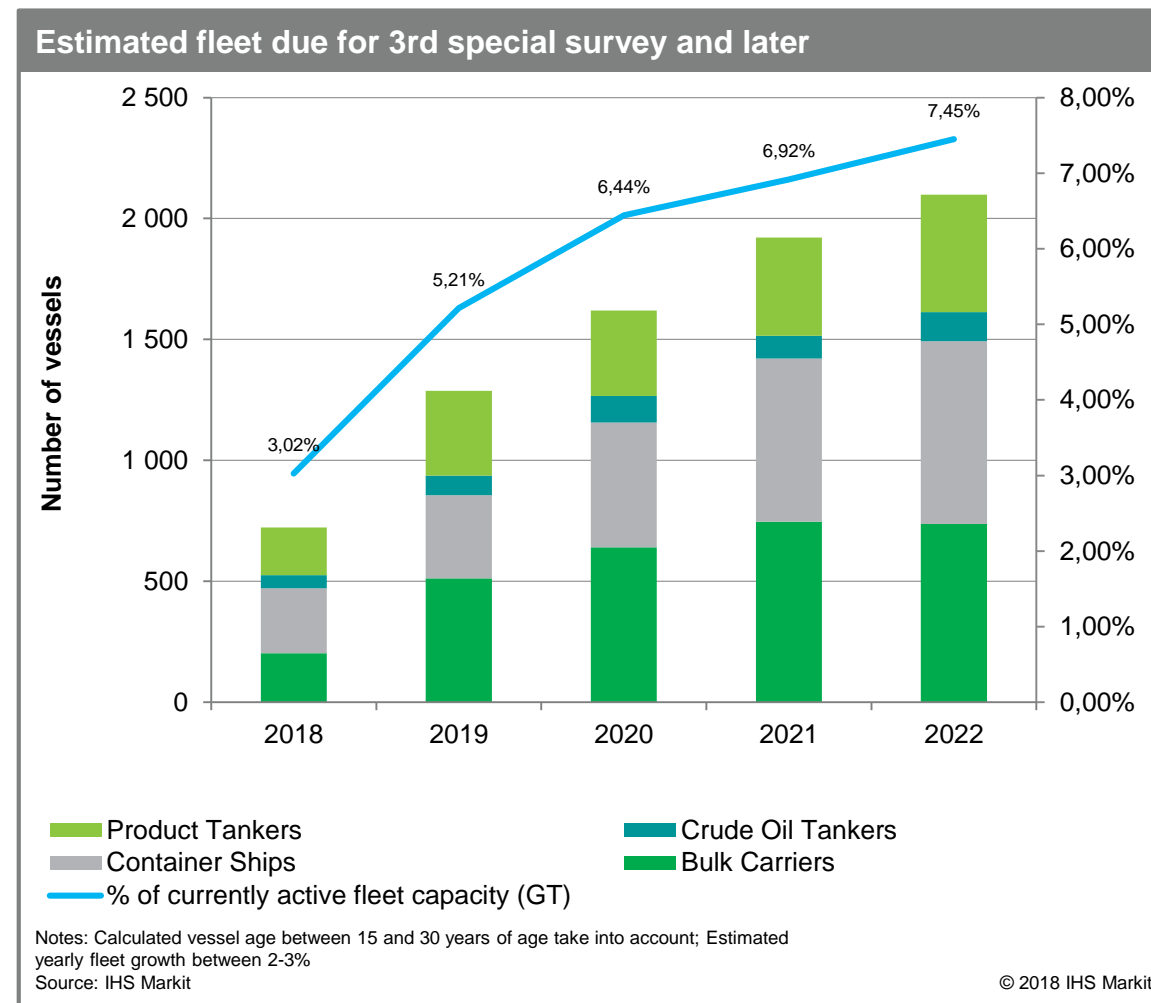
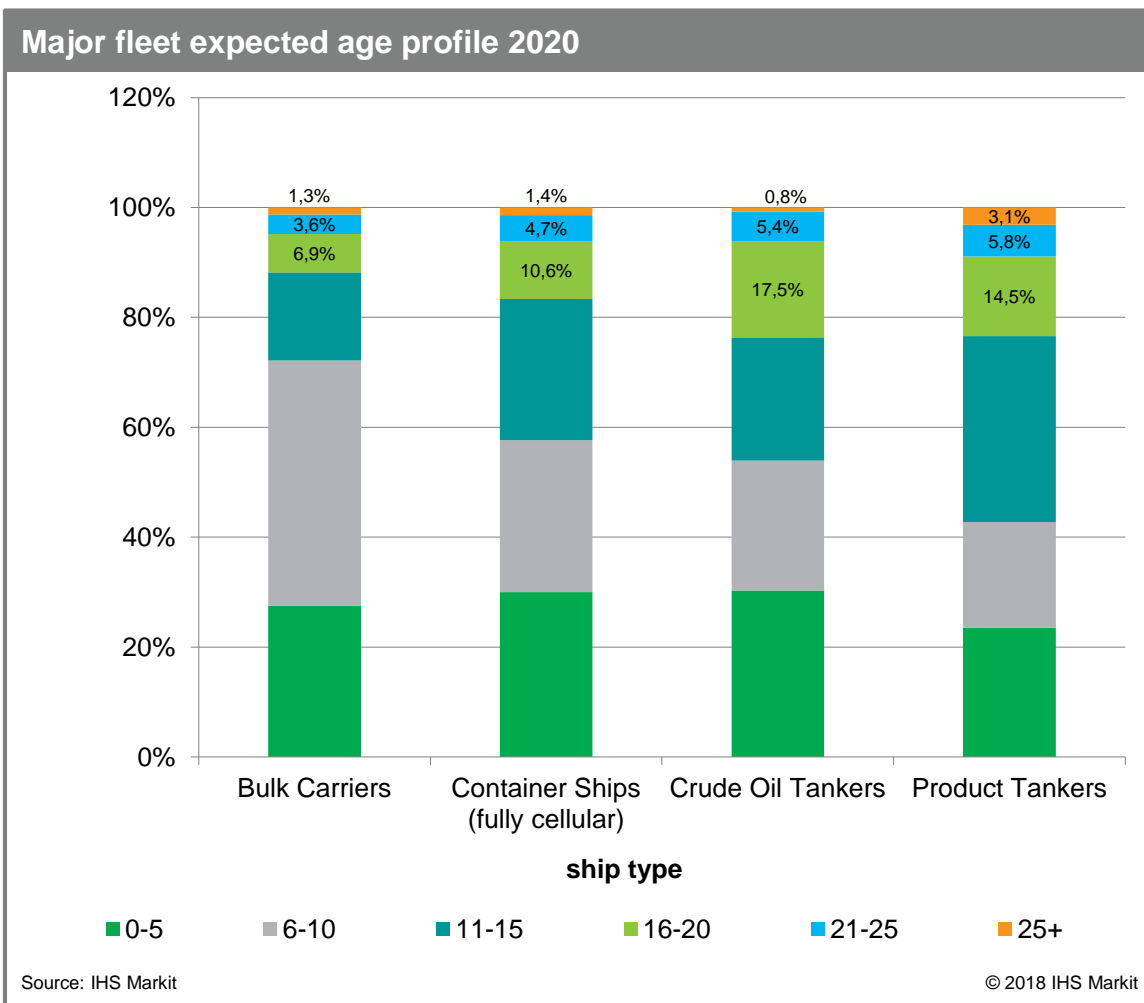
### ROI for scrubbers based on following presumptions

Vessel type	Vessel size	Consumption Tonns/day	Yearly LSFO/HSFO differential in million USD at <u>(250\$/T)</u>	Yearly LSFO/HSFO differential in million USD at <u>(369\$/T)</u>	Scrubber cost installation million USD	Estimated ROI differential <u>250\$/T</u> Years	Estimated ROI differential <u>369\$/T</u> Years
Bulkers	Large Handy	25	1.9	2.7	5-10	3.0-7.0	2.3-4.5
	Supra	33	2.5	3.6	5-10	2.5-5.0	1.6-3.2
	Panamax	35	2.6	3.8	5-10	2.4-4.7	1.6-3.1
	Capesize	60	4.5	6.6	10-12	2.5-3.0	1.3-2.5
Tankers	MR	37	2.6	3.8	5-10	2.4-4.8	1.5-3.0
	Panamax	40	3	4.4	5-10	2.0-4.0	1.3-2.6
	Aframax	50	3.8	5.5	7.5-10	2.3-3.0	1.5-2.0
	Suezmax	65	4.9	7.1	10-12	2.3-2.7	1.5-1.8
	VLCC	80	6	8.8	10-12	1.8-2.2	1.2-1.5
Container	3,000 teu	75	5.6	8.3	5-10	1.0-2.0	0.6-1.3
	5,400 teu	96	7.2	10.6	10-12	1.5-1.8	1.0-1.2
	10,000 teu	170	12.8	18.8	10-12	0.8-1.0	0.5-0.7
	15,000 teu	218	16.4	24.1	10-12	0.6-0.8	0.4-0.5

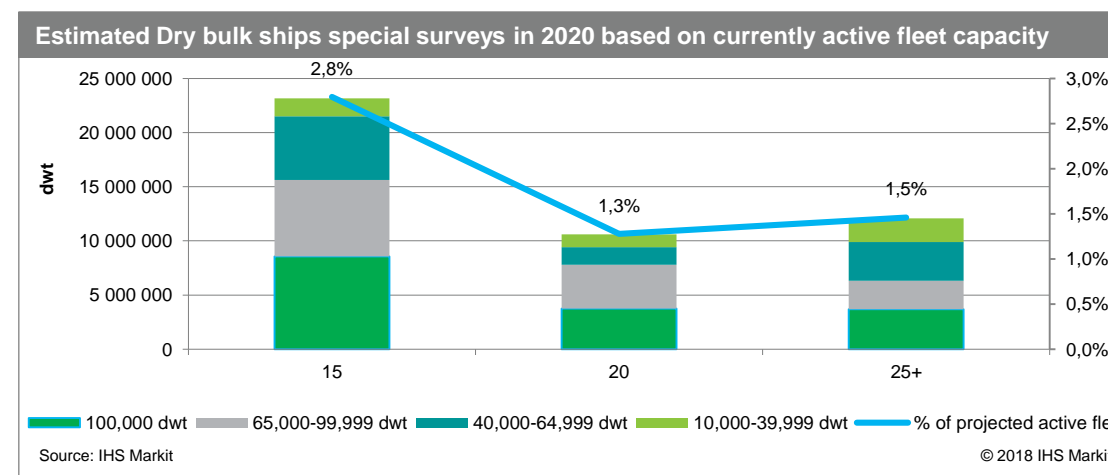
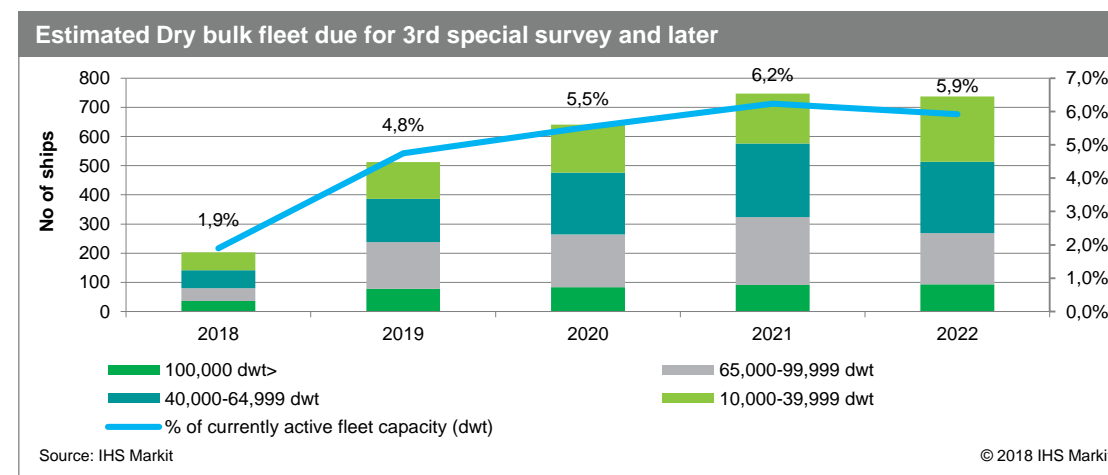
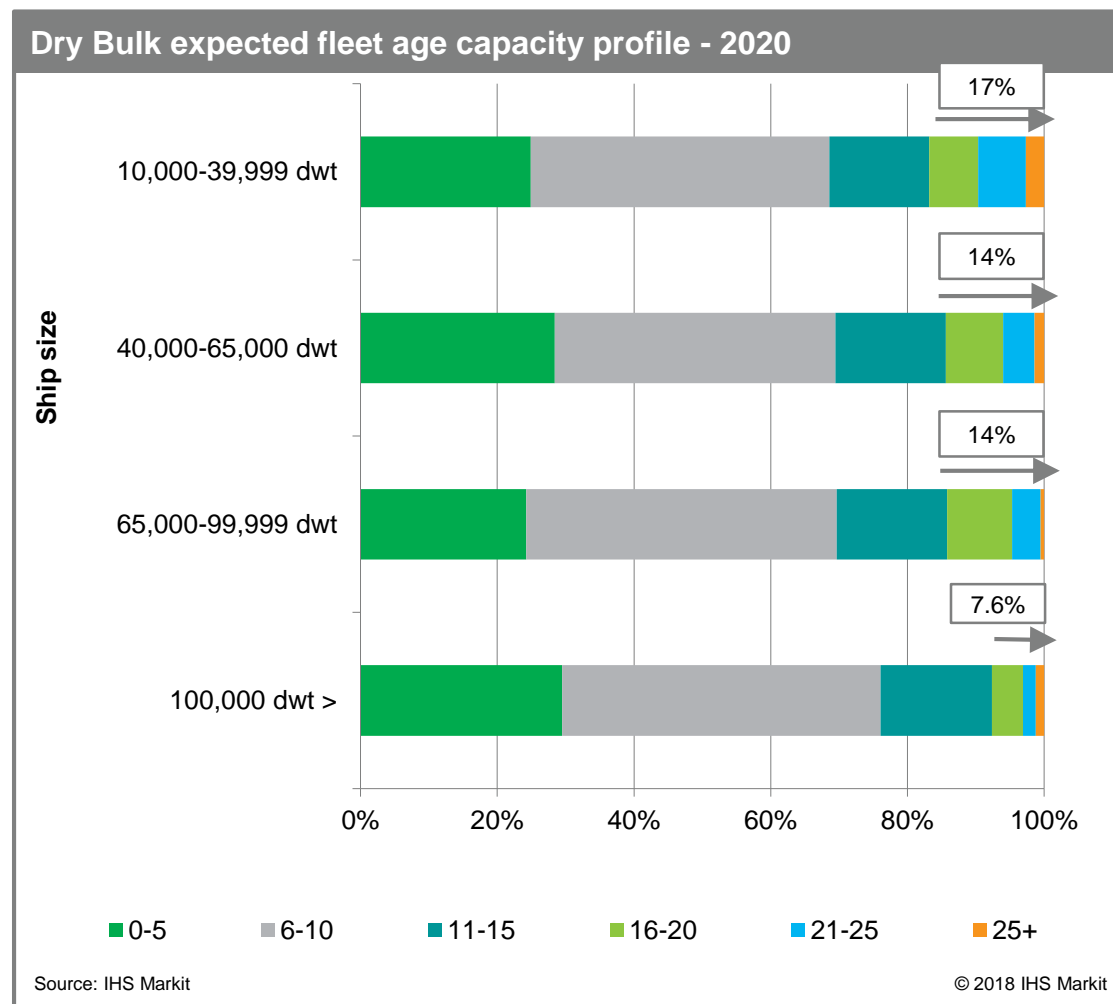
Notes: Yearly steaming at 300 days per year; Consumption numbers presumed at full operating speed/slow steaming not taken into account; Yearly scrubbers operating cost presumed at 0.5 million USD; cost of immobilization/time of charter not taken into account

# What is potential for fleet removals?

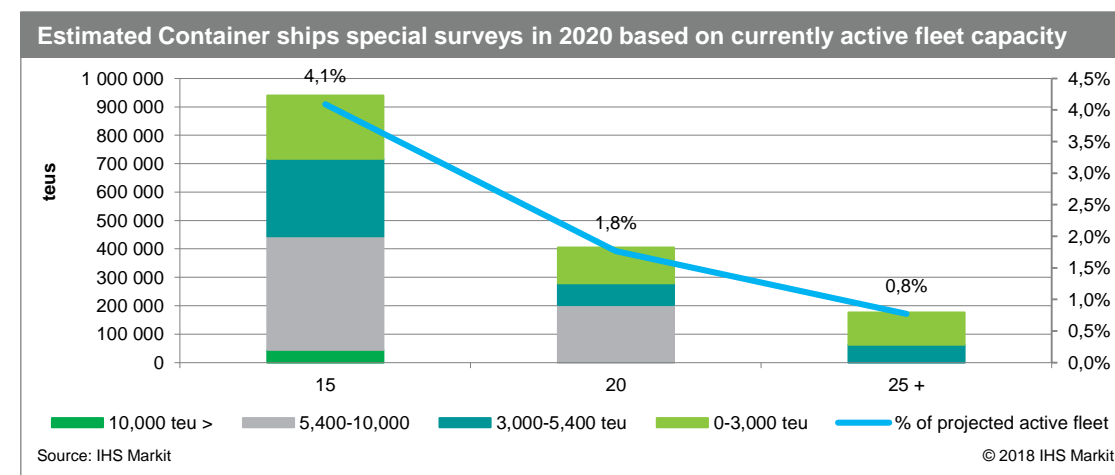
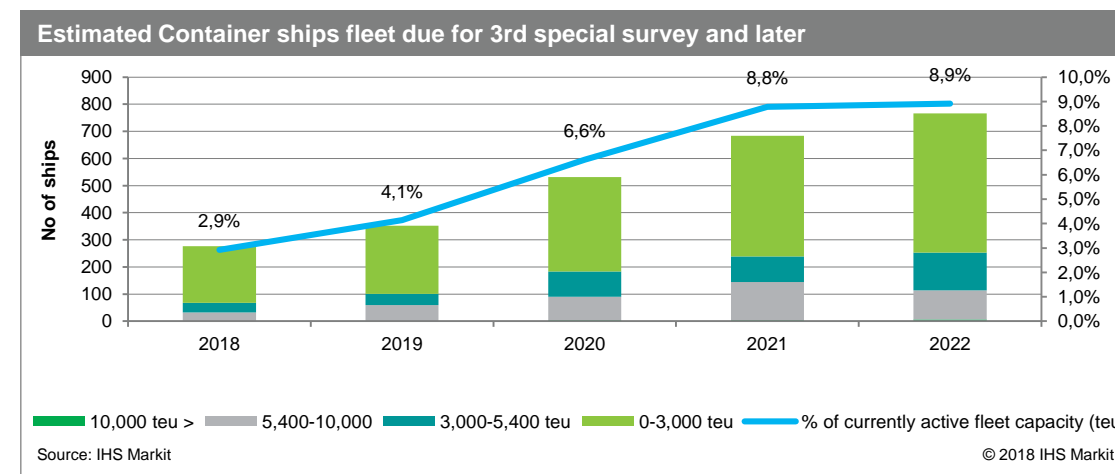
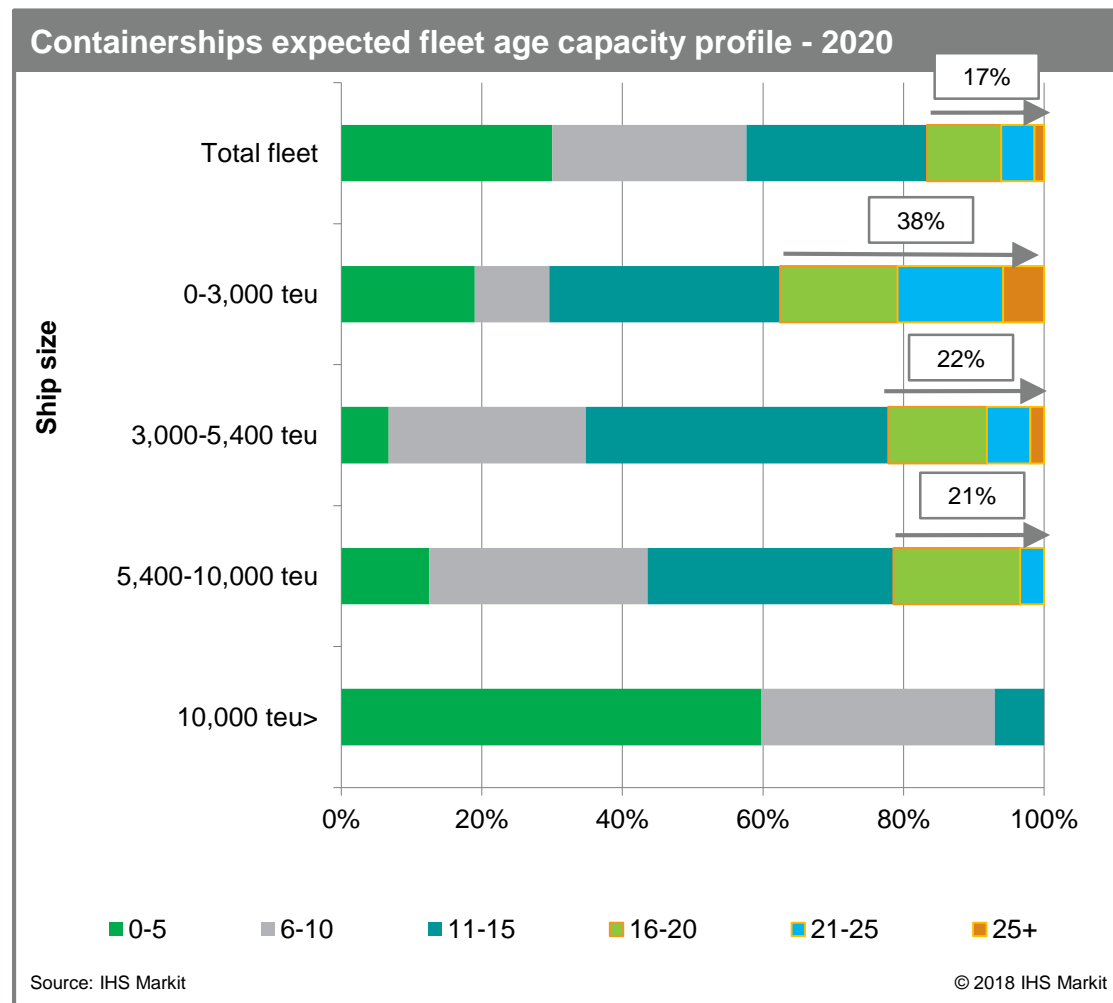
# Fleets are expected to have some potential for removals facing combination of SOx and BWT regulations – Big chunk of merchant fleet estimated due for Special Surveys adding to cost



# Dry bulk fleet - Fleet structure is expected to remain relatively young thanks to recent demolition activity, still major capacity reduction expected to be coming from larger ships

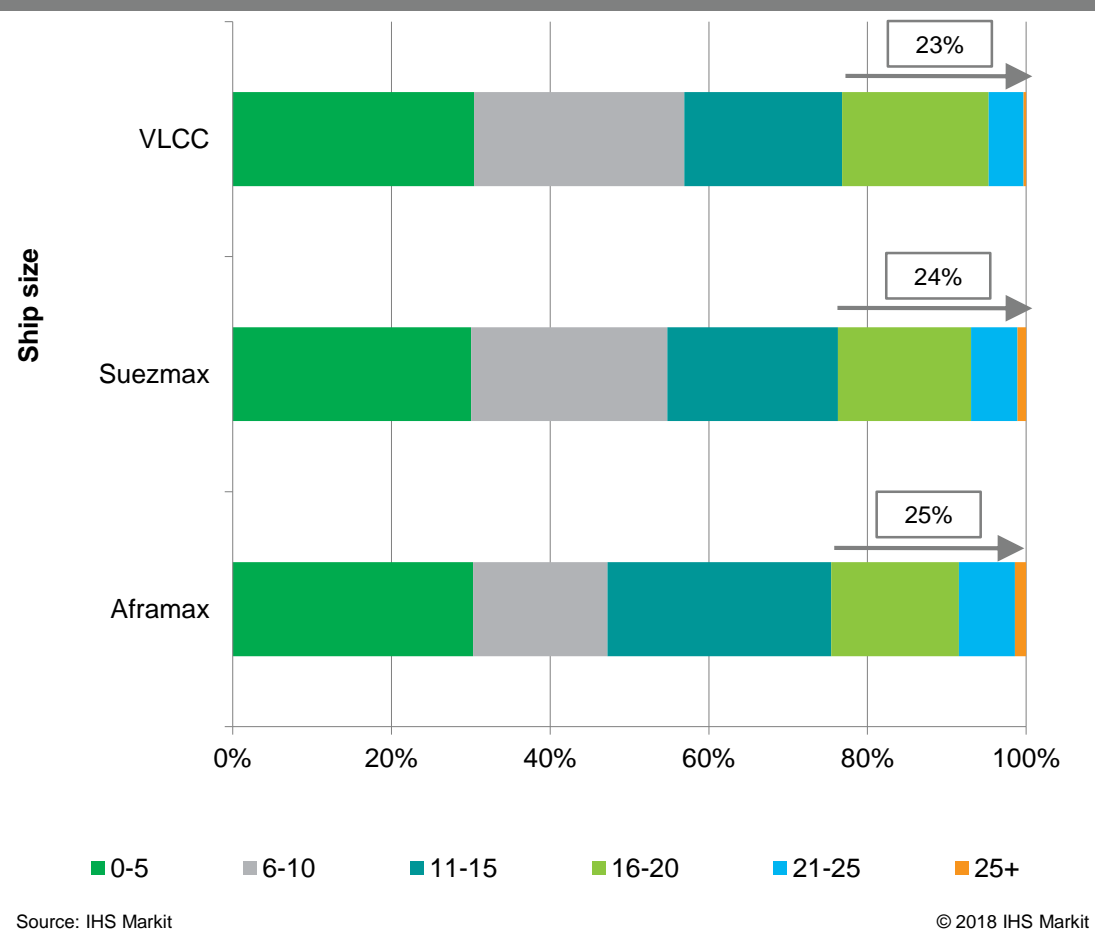


# Container fleet age structure is very young particularly among larger fleets; Fuel inefficient mid and small sizes expected to be targeted mostly by demolition

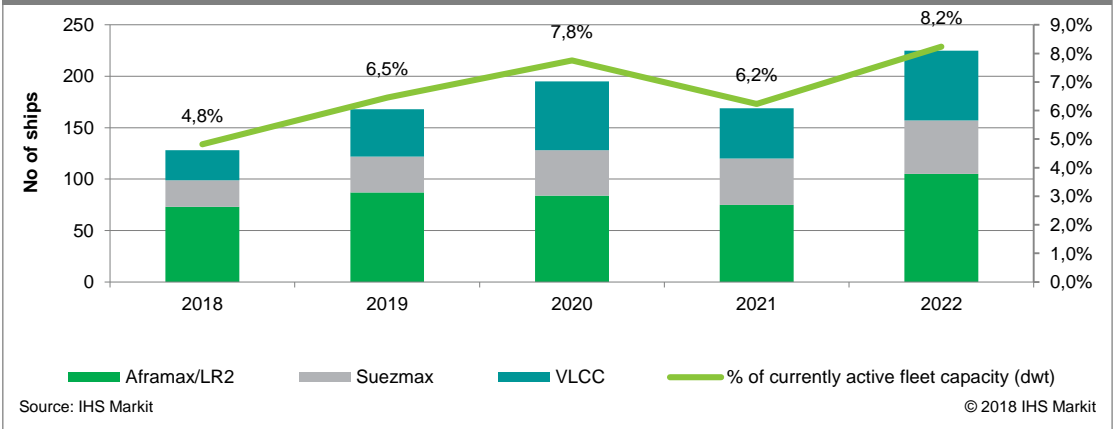


# Crude oil tankers fleets are expected to see significant capacity of ships 15 years and older, which are potential candidates for removal; potential development of two tier market

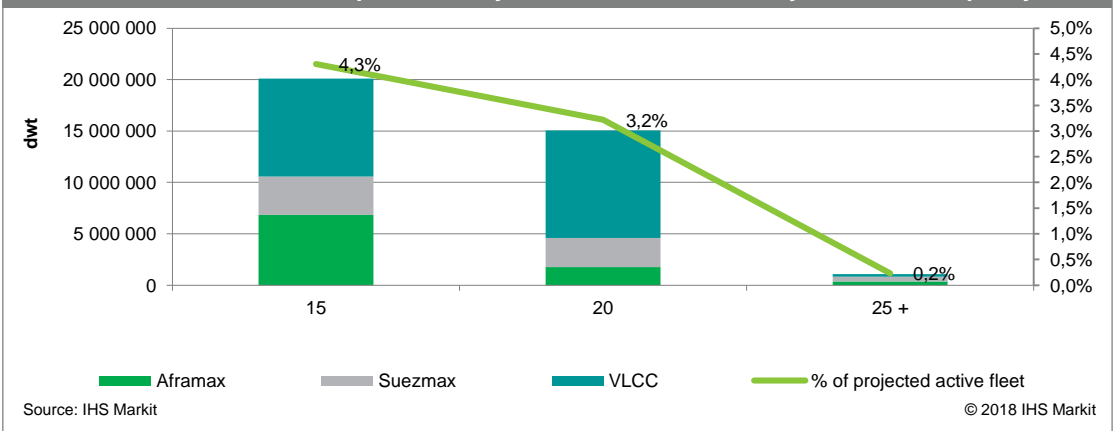
Crude oil tankers expected fleet age capacity profile - 2020



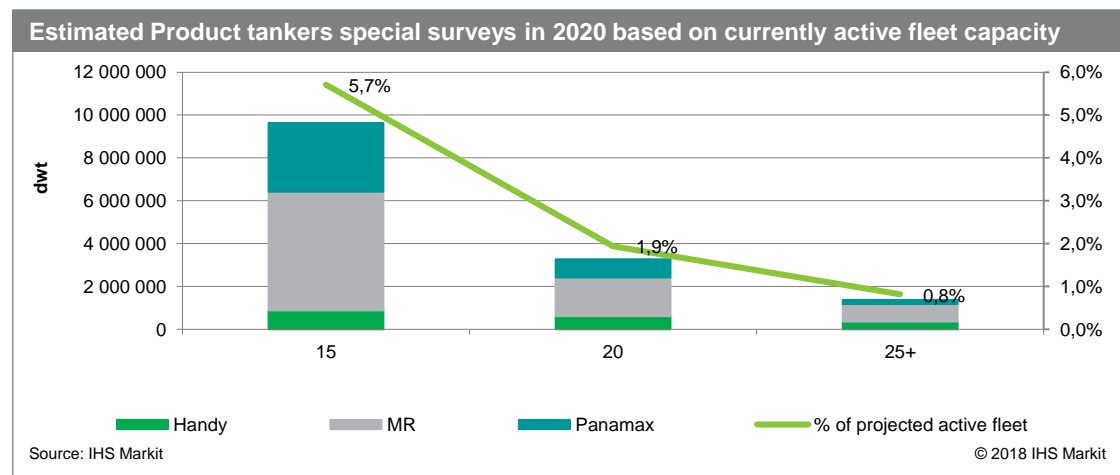
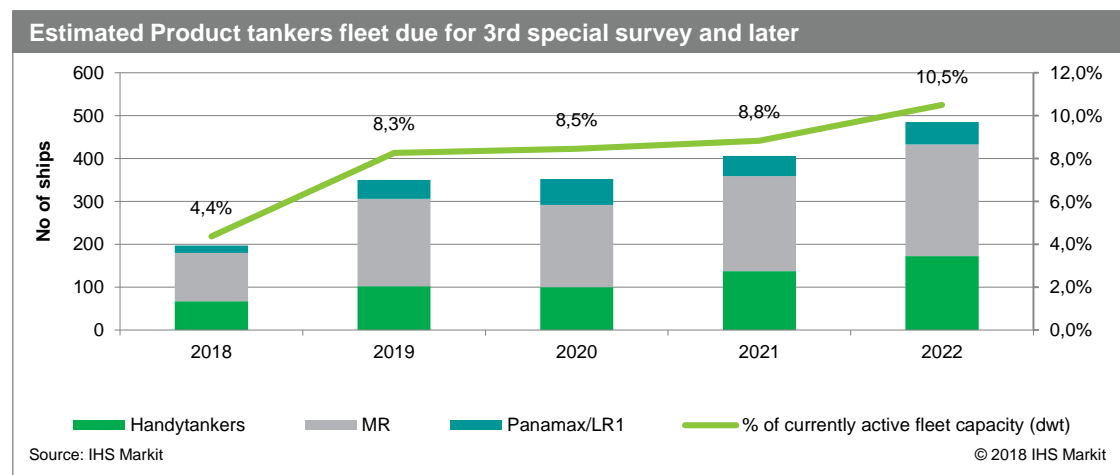
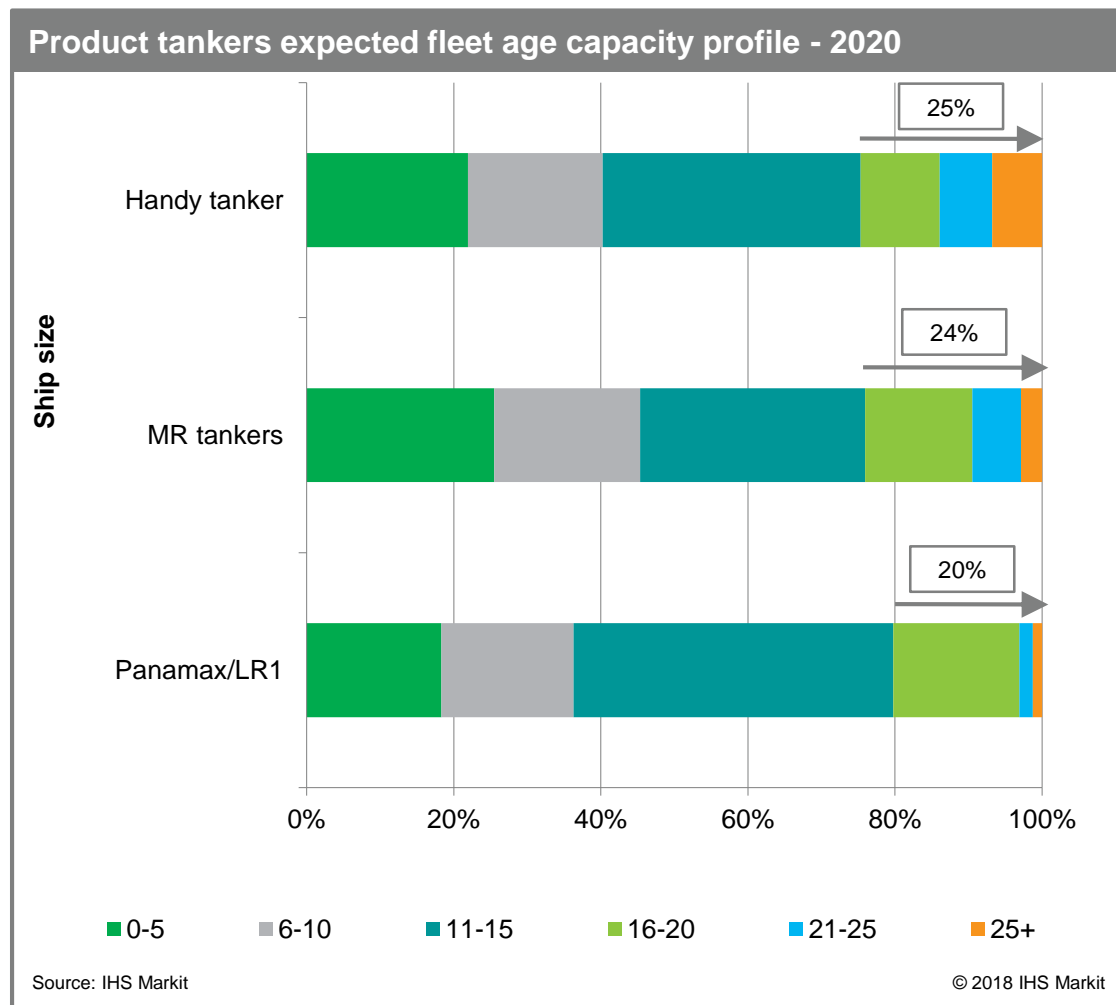
Estimated Crude oil tankers fleet due for 3rd special survey and later



Estimated Crude oil tankers special surveys 2020 based on currently active fleet capacity



# Product tanker ages structure very similar to Crude oil Tankers structure, with demolition candidates more likely coming from ships 20 years and older



## Older inefficient fleets are expected to find themselves under pressure, although some resilience may come from repaid CAPEX and finding market niches

- Switch to Marine Gasoil/LHSFO is expected post 2020 with HSFO and LSFO differential is expected to be relatively high 250\$ +, IHSMarkit estimates differential at 369\$ for 2020.
- Excess residual fuel is expected to be redirected to energy markets competing with other energy sources such as coal which is expected to negatively influence the price of HSFO.
- Based on our presumptions ROI on scrubbers varies, although it seems that it is faster for bigger fleets. If judging by that, larger fleets are expected to have scrubber technology installed.
- Shipowners face hard decisions post 2020. Although scrubber installation and retrofit in case of high differential can be repaid relatively quickly in case of big differential spread, shipowners face other costs of compliance such as BWTS and maintenance cost. On top of that with IMO expecting to further curb CO2 shipping emissions, additional requirements can be expected.
- Although there is an argument for ultimate environmental cost/cost of burning LSFO/Marine Gasoil to be passed to shippers, it seems that two markets are likely to develop. Older/less efficient tonnage is expected to find itself under pressure.
- Older fleets (15+ years) are generally expected to be phased out in the first few years of implementation. Fleets expected to find themselves under pressure are Medium and Small sized Container fleets, Large and Medium sized Dry bulk fleets, Large Crude oil tankers.



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