

IMO 2020: THE MARKET IMPACT

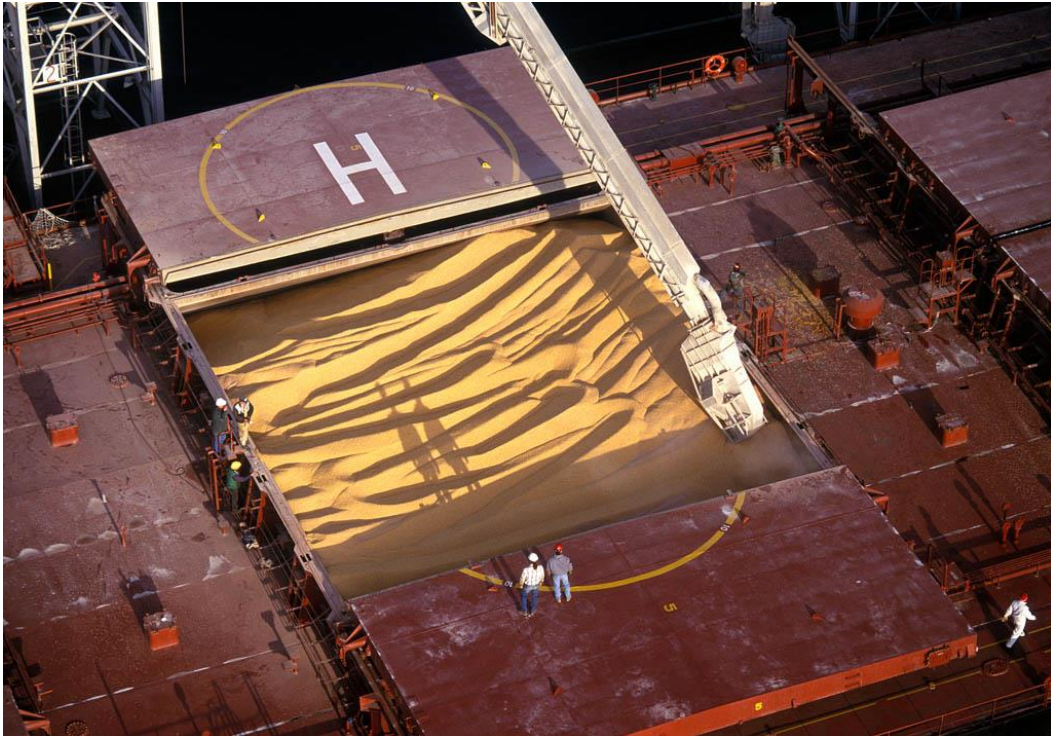
- A SHIP BROKER'S PERSPECTIVE

Dr Daniel Jessel
Howe Robinson Partners

9th October 2018

Howe Robinson Partners Overview

Howe Robinson was established in 1883 and has since grown into one of the largest privately owned shipbroking houses in the world, employing over 180 brokers across a global network of 12 offices.



Established in 1883

Our modern group holds its origins in the foundation of Howe Robinson & Co Ltd in the City of London in the 19th century, following which we build up our reputation as market leading shipbrokers over our many decades in operation.

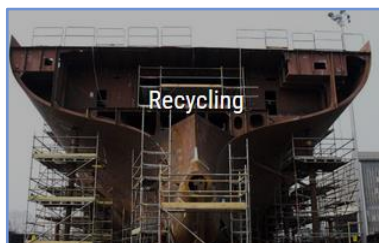
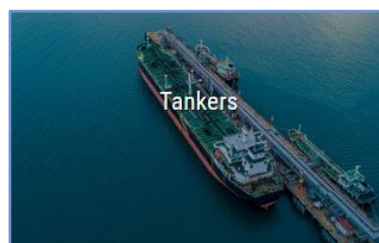
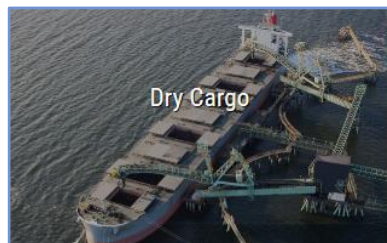
Global Network

Now operating out of 12 countries and covering all time zones, we are constantly expanding our presence world-wide in the aim of providing the best possible services to our many long-standing clients.

Our people, our strengths

With over a century of experience and in-depth understanding of the segments they operate in, our maritime professionals are constantly striving to remain market leaders, whether it be in shipbroking itself or the provision of world-class research services to our customers.

Our Services Cover All the Major Cargo Sectors



IN NUMBERS

Through our long-term strategy and commitment to provide world-class services to our clients, we have grown consistently over the last century to become one of the largest shipbroking firms in the world.

292

STAFF

170

BROKERS

12

OFFICES

135+

YEARS IN
OPERATION

Global Broker Network

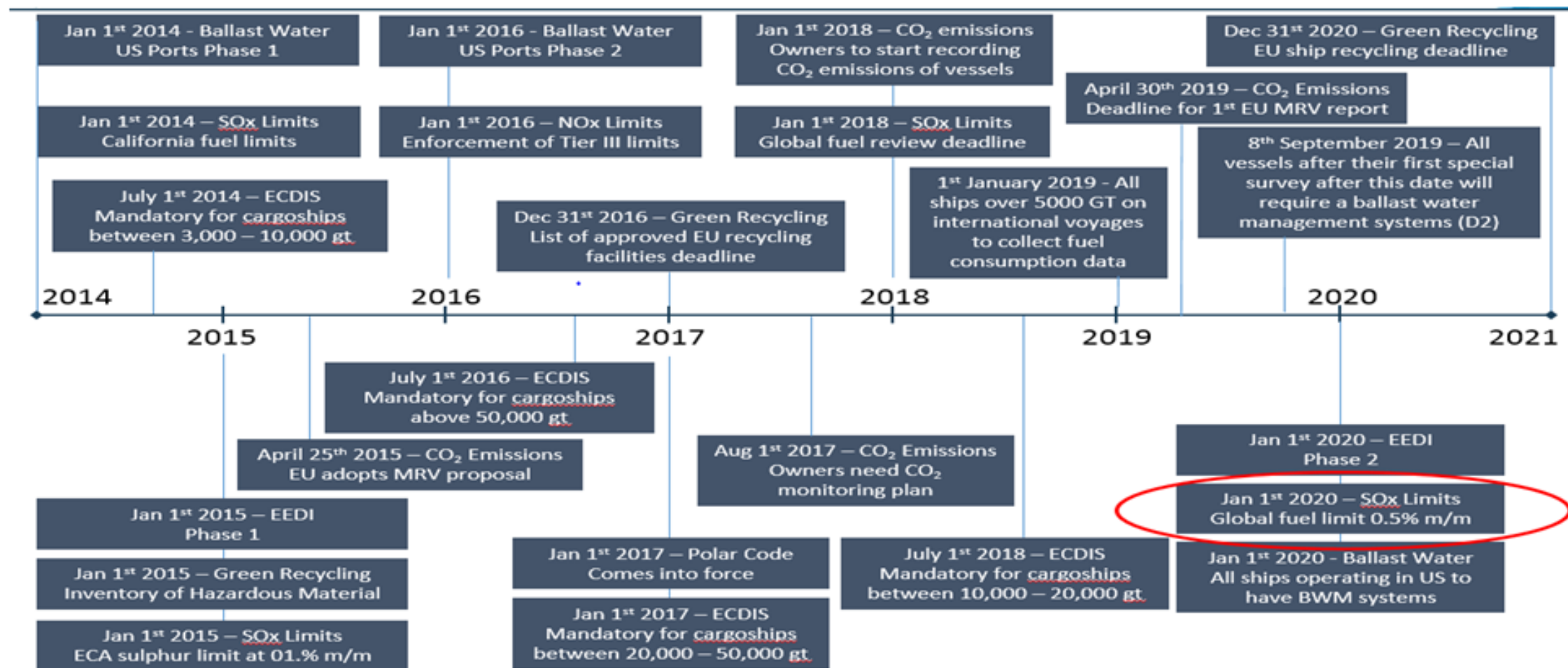
**170 brokers
in 12 offices**



Projects and Research

- Teams of research analysts based in London and Singapore.
- Providing in-depth analysis and intelligence of supply and demand and related topics central to the maritime industry.
- Production of daily news alerts, daily fixture reports, weekly, monthly and quarterly reports, tailored presentations & market updates, macro outlooks.
- Experienced in providing strategic advice to clients in the Dry Cargo, Tankers and Container sectors.
- Howe Robinson Group is a majority shareholder of Maritime Strategies International Ltd, which operates independently, specializing in econometric model-based forecasting & research, valuations and bespoke consultancy for shipping across all sectors. Maritime Strategies International: www.msiltd.com

IMO REGULATORY PRESSURE IS HAVING A MAJOR IMPACT ON ALL SHIPPING MARKETS



IMO 2020 – THE MARKET IMPACT

“The IMO has set a global limit for sulphur in fuel oil used on board ships of 0.50% m/m (mass by mass) from 1 January 2020.”

A Hugely Challenging Regulation because:

- (1) It is Global
- (2) It is the Biggest Cut (from 3.5% to 0.5%) ever Proposed (Previous cuts <1%)
- (3) It Comes into force only 36 Months after Final Approval by MEPC 71
- (4) not Stand-Alone but Part of a Raft of other IMO Regulations to Reduce the Environmental Footprint of Shipping

Effectively Shipping has 4 Possible Responses

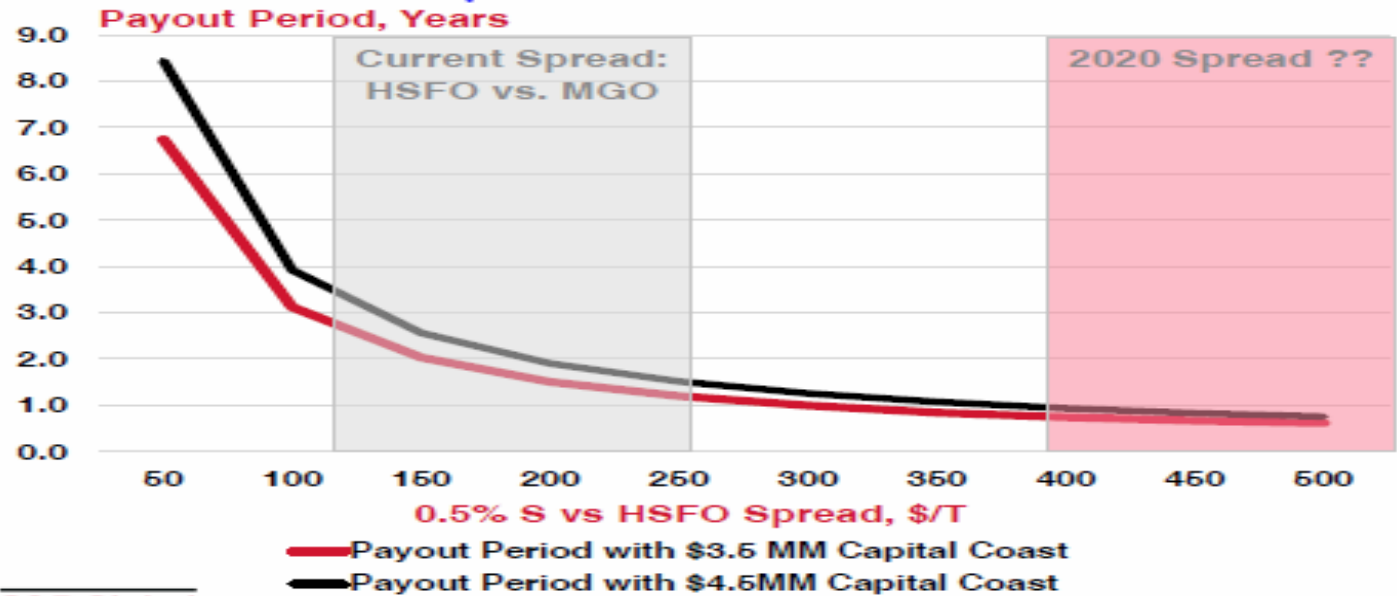
In order of their Probable Level of Adoption by 2020:

1. Switch to An Alternative Fuel – LNG the only Realistic Possibility
2. Exhaust Gas Cleaning Systems (Scrubbers)
3. Non-Compliance
4. Switch to Low Sulphur Fuel Oils (LSFO) or MDO

SCRUBBER INSTALLATION OPTION PROS

1. Hedge Against Non-Availability (eg for Tramp Trading in Small Ports with Limited Bunker Storage) &/or Large Premia for LSFO (especially in the early Years after 2020).
2. Capital Cost has come down significantly in Recent Years – eg now \$2 – 3 Mn for a Panamax sized ship.
4. Rapid Payback even at Current MGO/HSFO Price Differentials:

With tighter specs, the return on scrubbers will look very attractive in 2020, and will stay reasonable even later when spreads narrow with 2-4 year paybacks.



	MDWT	Approx. Scrubber Cost, \$MM
VLCC	305	3.5-5.7
Suezmax	155	2.8-5.1
Aframax	108	2.6-4.9
Panamax	72	2.1-4.2
MR Product	45	1.6-3.5

- Issues:**
- Open, Closed or Hybrid System
 - New versus retrofit
 - 9-12 month retrofit lead time

SCRUBBER INSTALLATION CONS

1. Capital Cost (\$2-10 Mn) + Inadequate Space behind Stack to Retro-fit Scrubber Tower on Small Ships
2. OPEX: Monitoring / Corrosion Control + Chemicals / Sludge Removal (Closed Loop), Consumes 1-5% Engine Power Loss of Cargo Capacity for Water Pumping Equipment / Pipework / Silencers, Sludge Tanks
3. Potential Problems if LSFO widely Adopted & HSFO Unavailable. Certain Scrubbers Forbidden in some Regions.
4. Low Build Capacity (400-600 ships p.a?) Tho' Acceleration This Year (842 Retrofits / 306 Newbuilds Ordered?)
Low Take-Up Rate in Fleet Percentage Terms: —

COMMERCIAL FLEET (> 5,000 DWT) FITTED WITH SCRUBBERS (As of Jan 1 2018 - Number of Ships)

	FLEET	With Scrubbers	Percentage
Passenger	1,202	160	13.31%
RoRo	683	56	8.20%
Other	1,212	25	2.06%
Gas	1,379	23	1.67%
Chem Tankers	3,668	26	0.71%
Gen Cargo/MPP	4,345	19	0.44%
FCCs	5,055	17	0.34%
Bulkers	11,233	22	0.20%
Oil Tankers	4,562	5	0.11%
TOTAL	33,339	353	1.06%

	Orderbook	With Scrubbers	Percentage
RoRo	14	6	42.9%
Passenger	106	21	19.8%
Other	48	9	18.8%
Gen Cargo/MPP	108	6	5.6%
FCCs	394	22	5.6%
Oil Tankers	673	32	4.8%
Bulkers	868	40	4.6%
Gas Carriers	190	4	2.1%
Chem Tankers	139	2	1.4%
TOTAL	2401	140	5.8%

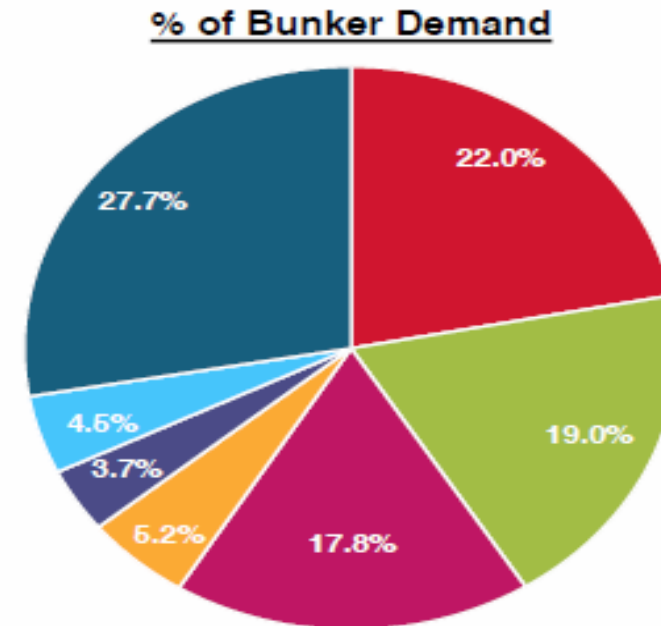
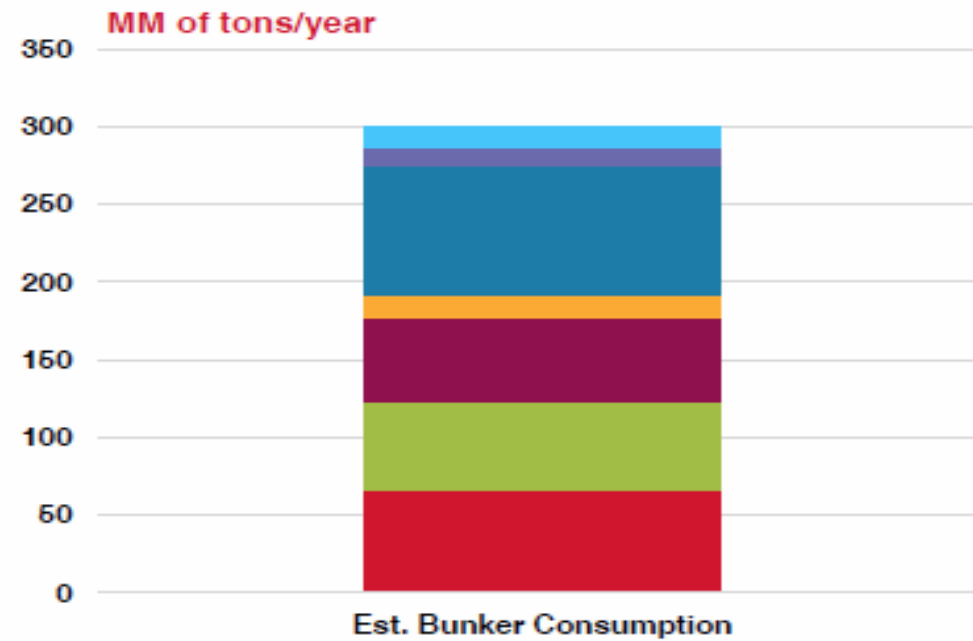
NON-COMPLIANCE OPTION

1. Responsibility for Enforcement / Sanctions / Fines:
Inside Territorial/ECA waters: Port State. Outside: Flag State
2. Of the 172 States with IMO, only 89 Signatories to Annex VI
– Remainder Not Obligated to Comply
3. Of the 89 Signatories only 28 (EU, USA, Canada) have Trained Officers /
Equipment in place.
4. Of the 35 Open Flag Registries 13 are Non-Signatories.
- Open Registries Account for 56% of Bunker Sales
5. Legal Issues if LSFO not Available:
-FONAR Exemption, Grandfathering, Implementation Delay, False BDNs ?

1. From Mar 1st 2020 IMO will Prohibit Carriage as well as Use of HSFO
2. Bunker Consumption/Sales Highly Concentrated in Terms of
- Ship Type, Ship Numbers, Geographic Region:

NON-COMPLIANCE OPTION

CONCENTRATION OF BUNKER DEMAND BY SHIP TYPE WILL FACILITATE ENFORCEMENT



■ Container
S&P Global
Platts

■ Oil Tankers

■ Dry Bulk

■ LNG/LPG

■ Other

■ Cruise

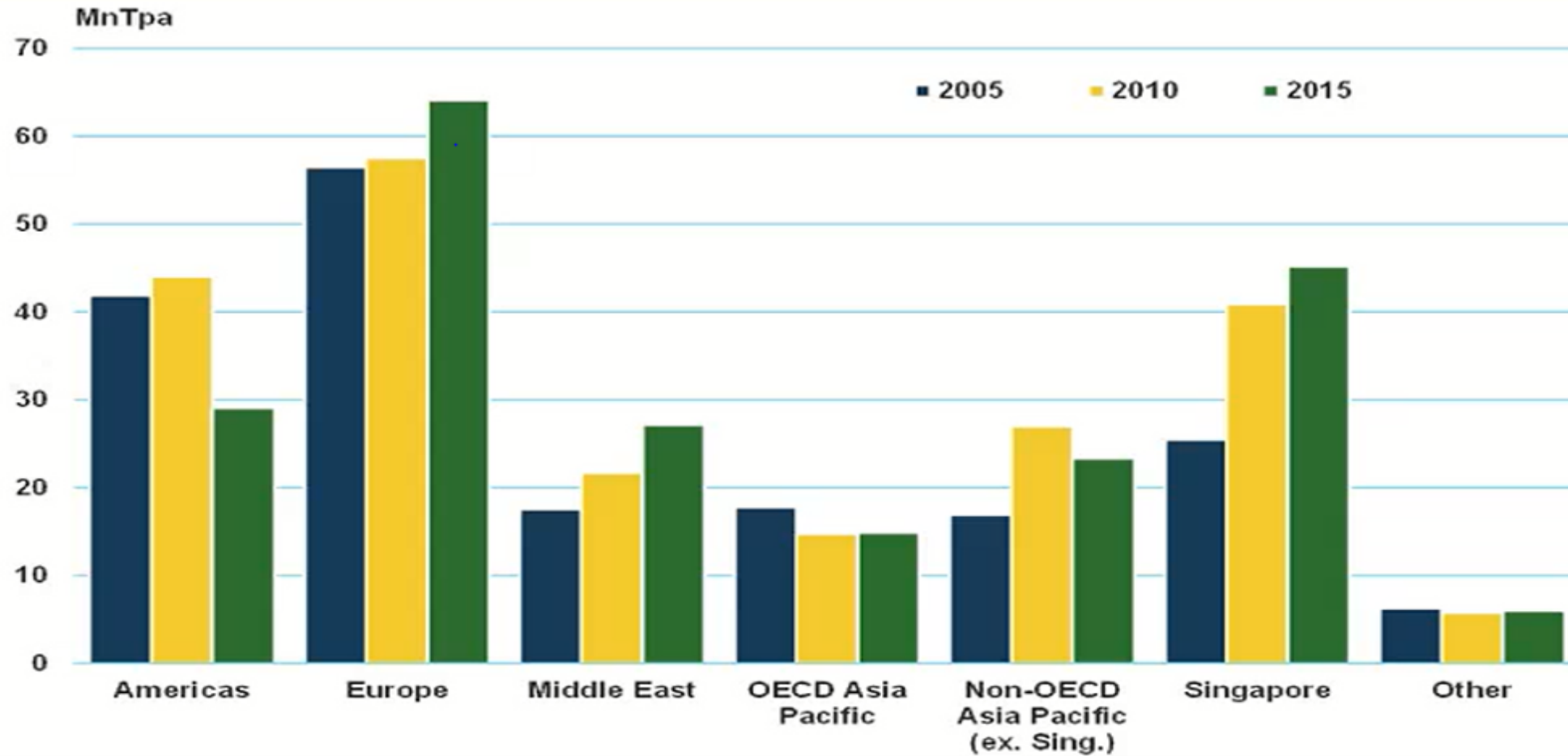
■ Ferries

Source: 2014 IMO GHG Study

59% of Bunkers are Consumed by Containerships, Tankers and Bulk Carriers

NON-COMPLIANCE OPTION

CONCENTRATION OF BUNKER DEMAND BY AREA OF SALE WILL ALSO FACILITATE ENFORCEMENT



Source: IEA, MSI

Over a Third (& a Rising Share) of Marine Bunkers Sold in Europe and Singapore

MGO, BLENDED DISTILLATES AND RESIDUAL LSFOs OPTION

Can Refiners Produce Sufficient LSFO in Time?

Some “Facts”

- Differences of Opinion Re Size of Bunker Market ranging from 200-300 Mntpy
(Depends on How Calculated & What Ships are Included)

- But Bunker Market Approximately 6-7% of Global Oil Consumption

- Global Refinery Fuel Oil Production has been on a Steadily Declining Trend:

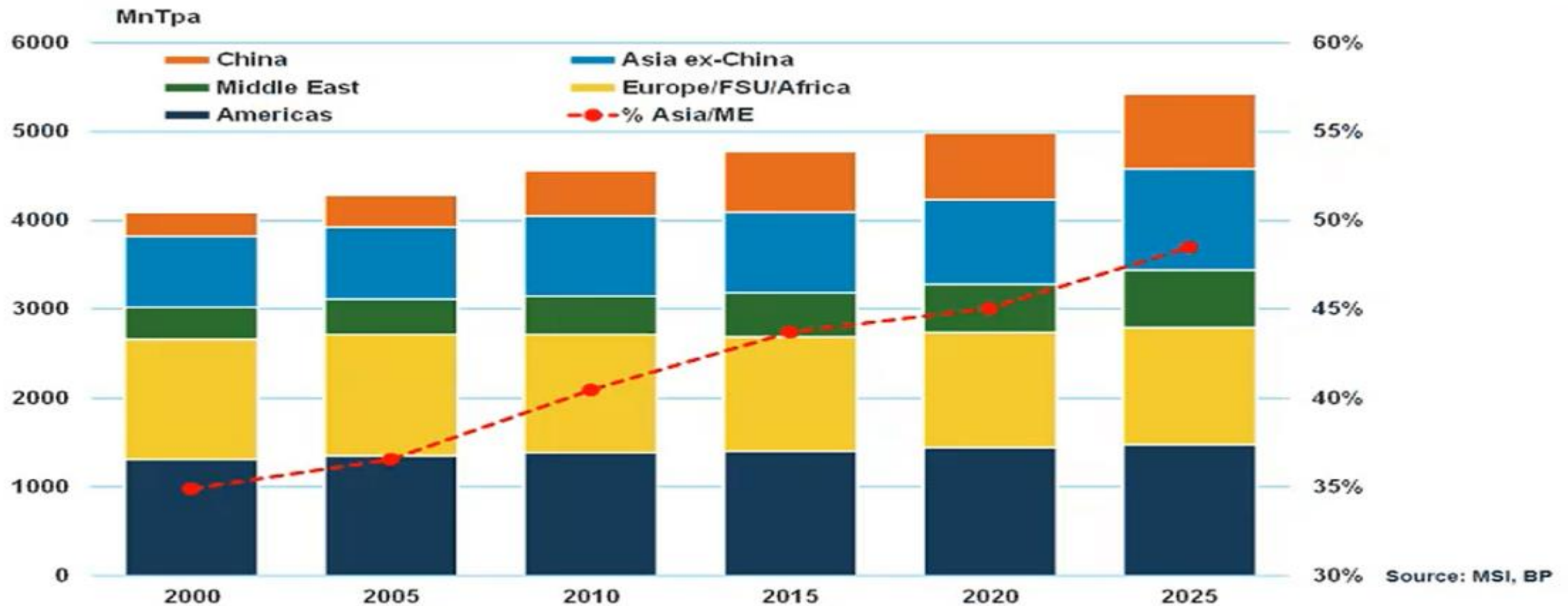
	<u>Output (Mn B/D)</u>	<u>Share of Total</u>
1990	12.3	18.4%
2000	10.2	13.3%
2010	8.7	9.8%
2017	7.7	7.8%

- Due to Declining Demand for Non-Marine Fuel Oil
- As a Result Marine Bunkers Now Account for 55-65% of Total fuel Oil Consumption

MGO, BLENDED DISTILLATES AND RESIDUAL LSFOs OPTION

Can Refiners Produce Sufficient LSFO in Time?

By 1: Expanding Crude Runs

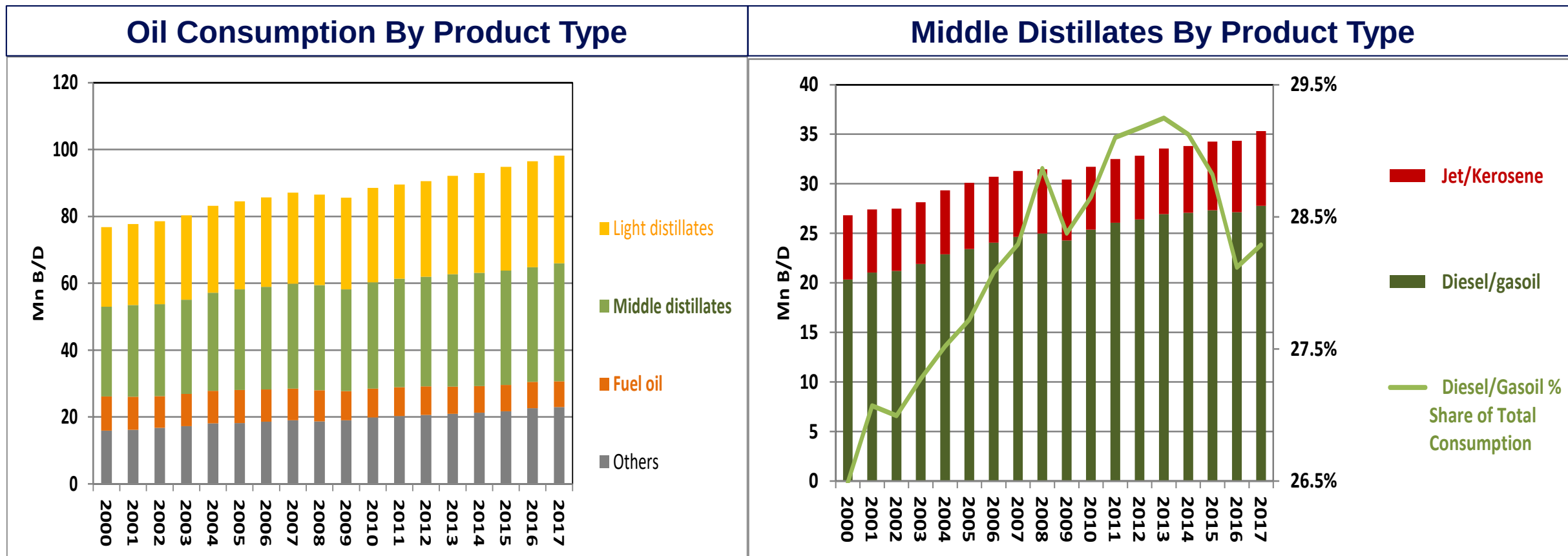


- Refining Capacity Scheduled to increase by 1% p.a. over next 2 years
- In 2017 Refining Throughput operated at 83.7% of Nominal Capacity (Compared to an average of 81.7% during last decade)

MGO, BLENDED DISTILLATES AND RESIDUAL LSFOs OPTION

Can Refiners Produce Sufficient LSFO in Time?

By 2: Increasing Diesel/Gasoil's Share of the Refinery Products Slate



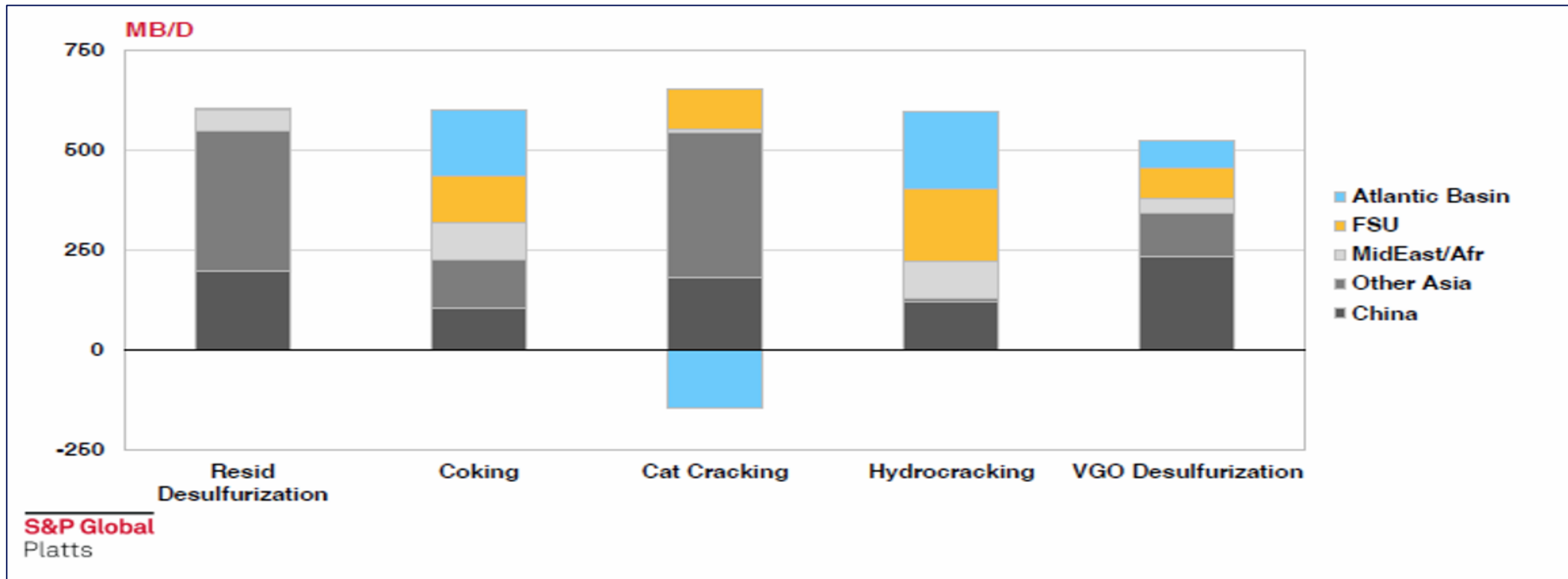
- Middle Distillates have been Gaining Share Due to Strong Demand.
- Hence Limited Flexibility to Squeeze Further Large Increases in their Share of the Product Slate

MGO, BLENDED DISTILLATES AND RESIDUAL LSFOs OPTION

Can Refiners Produce Sufficient LSFO in Time?

By 3: De-Sulphurising Residual Fuel Oils with Residue Upgrading Technologies

Planned New Conversion Capacity

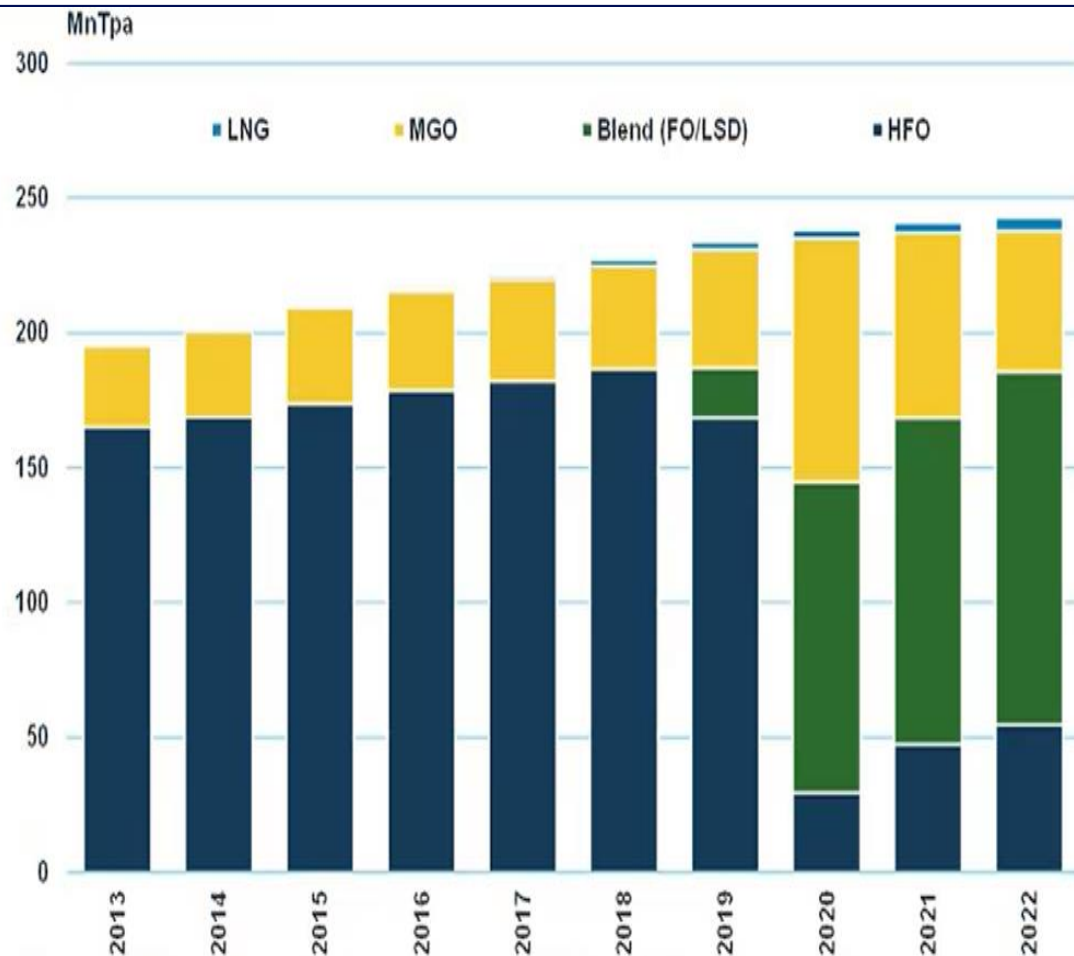


- Substantial Planned New De-Sulphurisation Capacity Located in Asia.
- But will the largely Untested New Fuels Meet Required Technical Standards

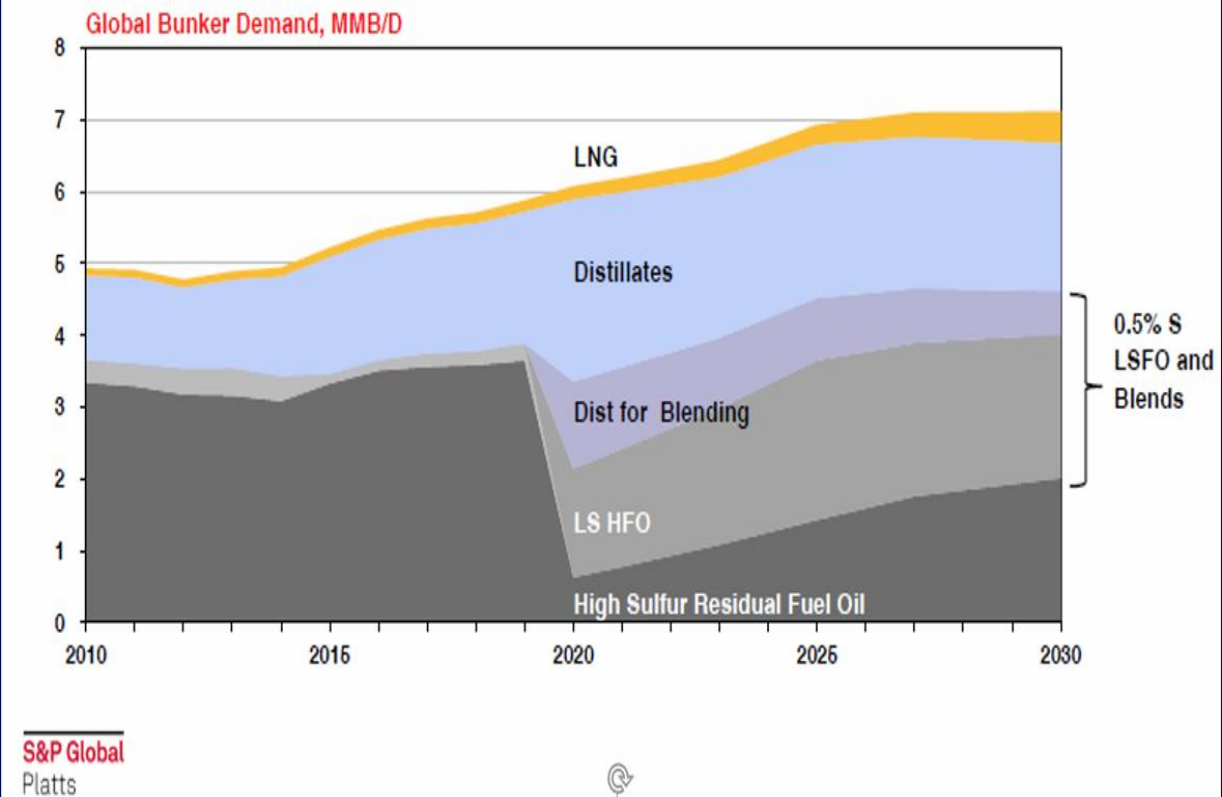
MGO, BLENDED DISTILLATES AND RESIDUAL LSFOs OPTION

Can Refiners Produce Sufficient LSFO in Time?

Consensus Forecast View: Thru' A Mixture of All 3 Approaches Refiners Probably Can Reach Target



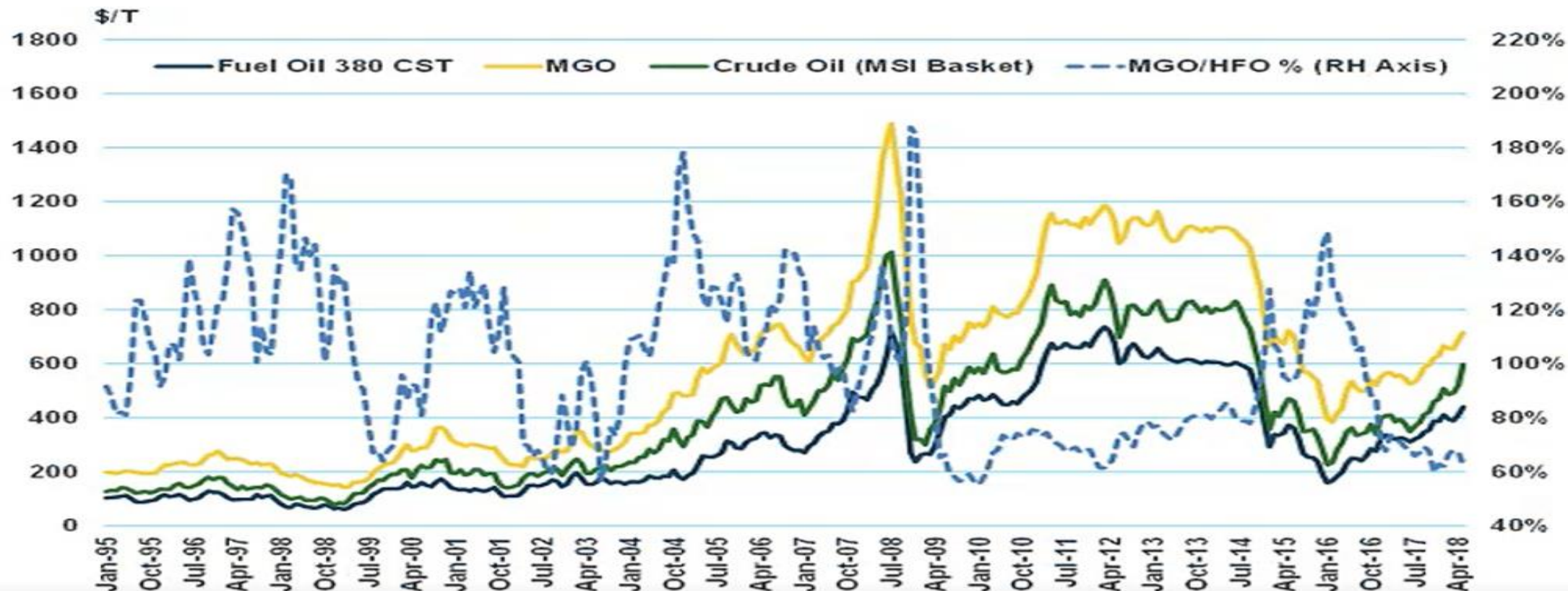
The IMO 2020 bunker fuel spec change will force 3 MMB/D of HSFO to switch to LSFO and Distillates.



OPTION 4: SWITCH TO MGO, BLENDED DISTILLATES AND RESIDUAL LSFOs

Can Refiners Produce Sufficient LSFO in Time?

But At What Price?



Premium on MGO price as a proportion of HFO has a historical floor at about 60%
Can rise to c. 150%, typically during periods of volatility in broader oil prices

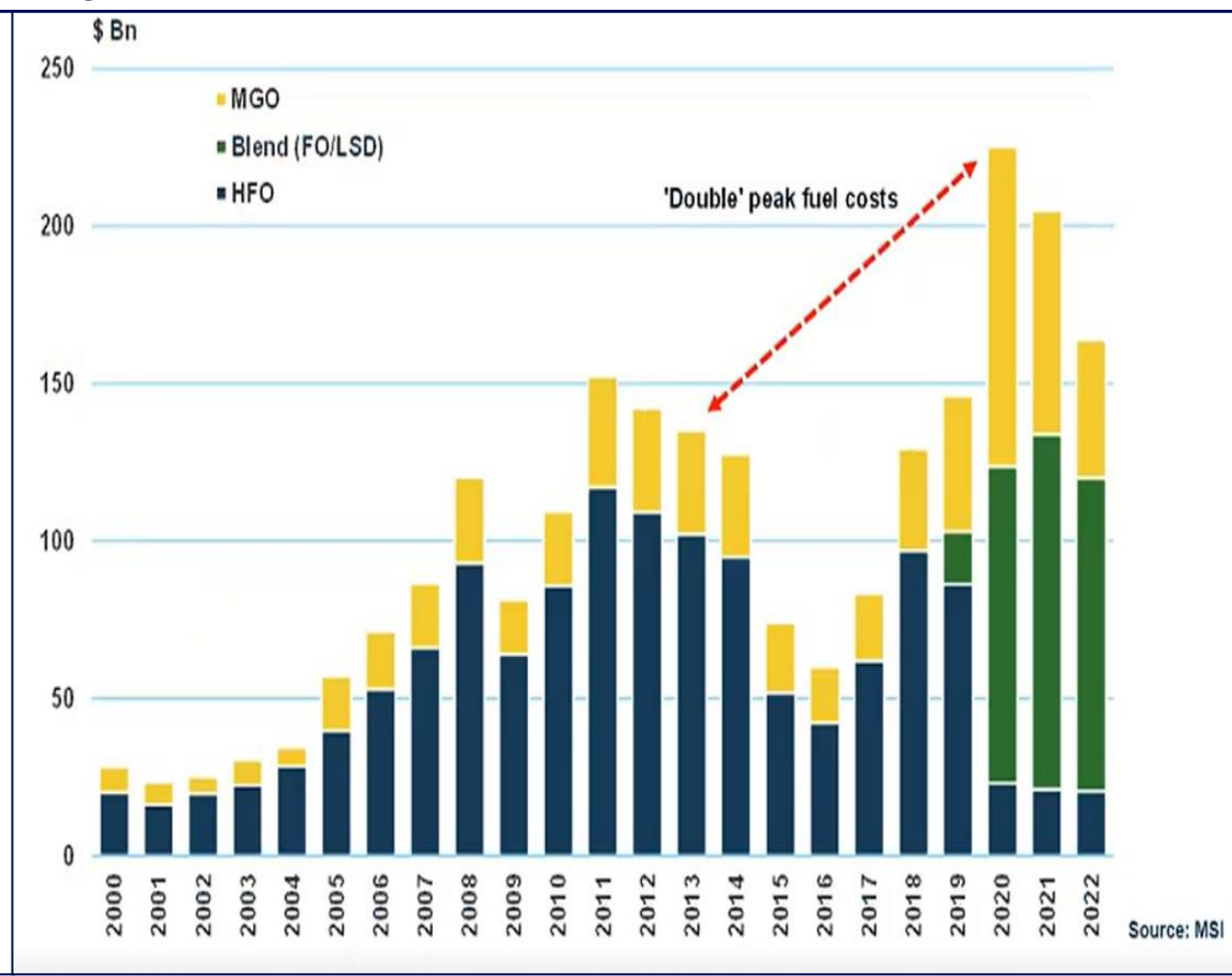
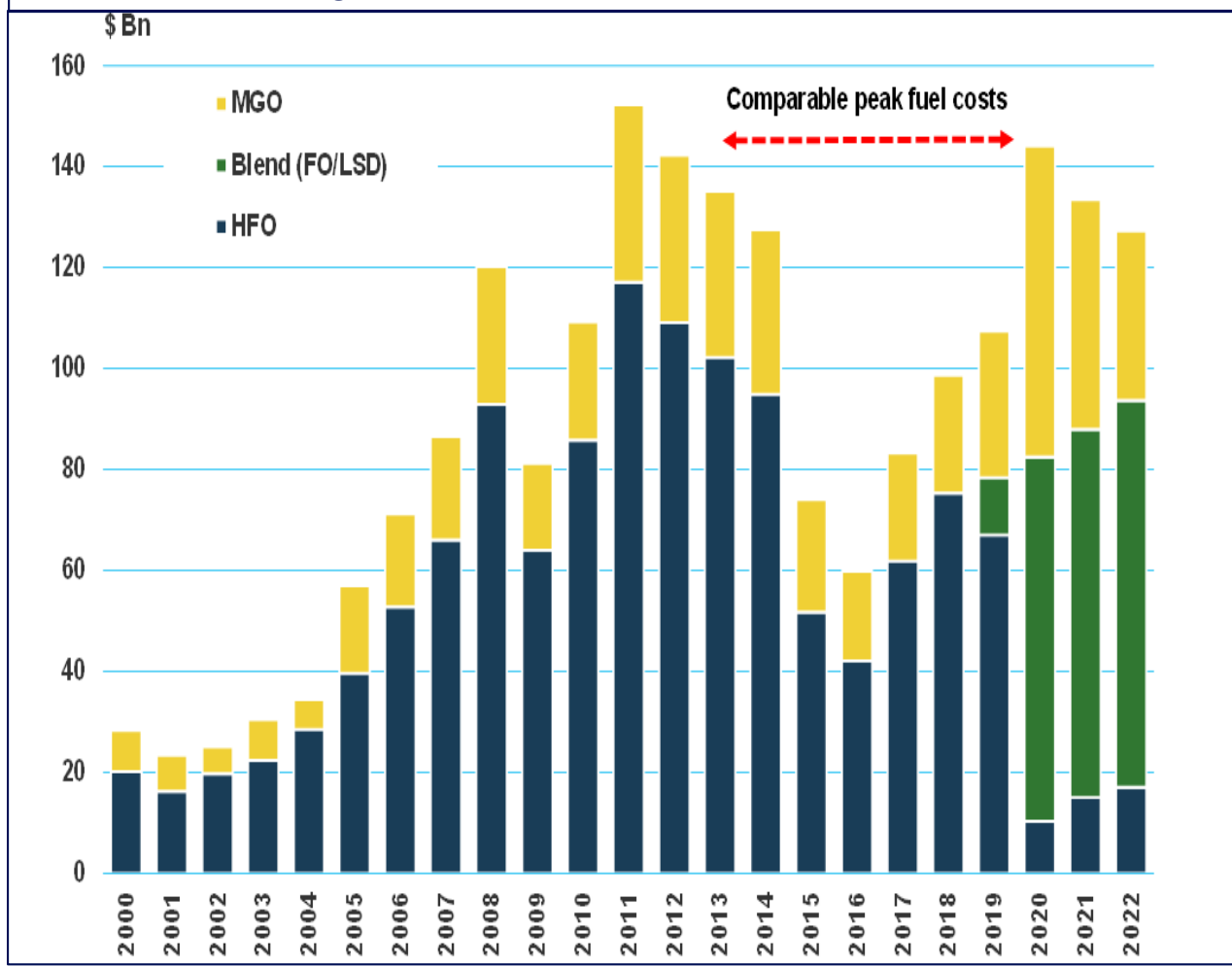
OPTION 4: SWITCH TO MGO, BLENDED DISTILLATES AND RESIDUAL LSFOs

AT WHAT PRICE?

TWO MSI FORECAST SCENARIOS (Exc LNG)

\$60/Bbl Avg Crude Forecast Price

\$100/Bbl Avg Crude Price



Assuming MGO/LSFO Premium Mark-Up Close to Historical Maximum

Source: MSI

THE IMO 2020 RACE: WHAT ARE THE ODDS?

1. The Race Has Hardly Started:

By 2020 Betting Odds for Fuel Type as a % of Global Marine Consumption:

LNG: Infinitesimal

HSFO: 10-20% of which: Non-Compliance (both Legal & Illegal) 10+% & Scrubbers < 5%

LSFO/MDO: 88-85%

2. Horses for Courses:

Longer Term No Single Winning Strategy for all Types, Sizes, Values & Ages of Ship, Trading Patterns, Average Haul Lengths, Time in ECAs, Crew Sophistication, Premia / Availability of LSFO and Future IMO legislation.

3. Likely Runners:

LNG: Newbuilds, Coastal, LNGCs, Liner FCCs on E/W Trades

Scrubbers: Passenger Ships, Medium/Large Bulkiers/Tankers/FCCs

Non-Compliance: Small / Old / Open Registry / Tramp Ships on Minor EME Trades

LSFO: Everything Else

4. Follow the Field:

Optimal solutions for an individual owner will depend on which way his direct competitors jump because this will determine what fuels / bunkering facilities become available.

5. Stakes Will Rise:

Irrespective of how the industry jumps, Fuel Costs per Tonne Mile will rise.

FRAGMENTATION OF GLOBAL SHIPPING MARKETS

1. Regional Bunker Market Fragmentation:

Outside Major Centres Unlikely that Bunker Operators will Offer Full Range of High/Low Sulphur Fuels.

2. Freight Markets:

Because Bunker Costs will Rise for most of the Fleet, How Much will be just as Important as What fuel is burned. Freight will become a Multi-Tier Market with Fuel Efficient Ships fetching Premia on Period Charters.

Vessels Using Different Fuels on Spot Trades will no Longer be Substitutes.

So Freight Markets for Vessels of the same type but Different Sizes or Different Locations may cease to be Unified.

3. Supply Fundamentals:

Higher Fuel Costs like to encourage Slower Steaming (ie reduce supply).

Fuel choices and Future Legislation will radically alter Vessel Life Expectancy and hence Scrapping and Newbuild Contracting Patterns.

4. Technical Innovation:

Longer Term, IMO Legislation will likely Stimulate Introduction of New 'Bespoke' Fuel Technologies which will fragment Shipping Markets even further.