

## DOCKETED

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Trusted Intelligence

IMO Marine Fuel Regulations

2017 IEPR Commission Workshop  
Transportation Energy Supply Trends

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July 6<sup>th</sup>, 2017



# Marine Fuel – Bunkering Industry

- Over 300 million metric tons (MMT) supplied globally ever year – 250 MMT residual fuel based and 50 MMT distillate based
- World's largest bunkering ports: Singapore (48 MMT), Fujairah (20 MMT) and Rotterdam (11MMT)
- Physical supply historically major oil dominated, now a fragmented market with no physical supplier over 20 million metric tons annually
- Wholesale supply dominated by regional refiners and global cargo traders
- Largest global buyers: Container, Tanker and Bulk companies
- Apart from physical suppliers industry has a complex, but necessary, array of middleman (Traders and Brokers) involved in transactions. Such as, World Fuels and Bunker Holdings
- Limited local regulation (exception Singapore). No global regulation except via IMO back to national governments

# IMO Involvement in Bunkering Industry

- **MARPOL Annex IV 1997**: Emission regulation for vessels
- **Enforcement May 2005**: First SECA (ECA) for Baltic and North Sea with max Sulphur of 1.5%. Global sulphur cap 4.5%
- **July 2010**: ECA limit drops to 1.0%
- **January 2012**: Global sulphur cap 3.5%
- **August 2012**: North American ECA
- **January 2015**: ECA limit drops to 0.1%
- **January 2020**: Global sulphur cap drops to 0.5%

# IMO 0.5% Global Sulphur Cap

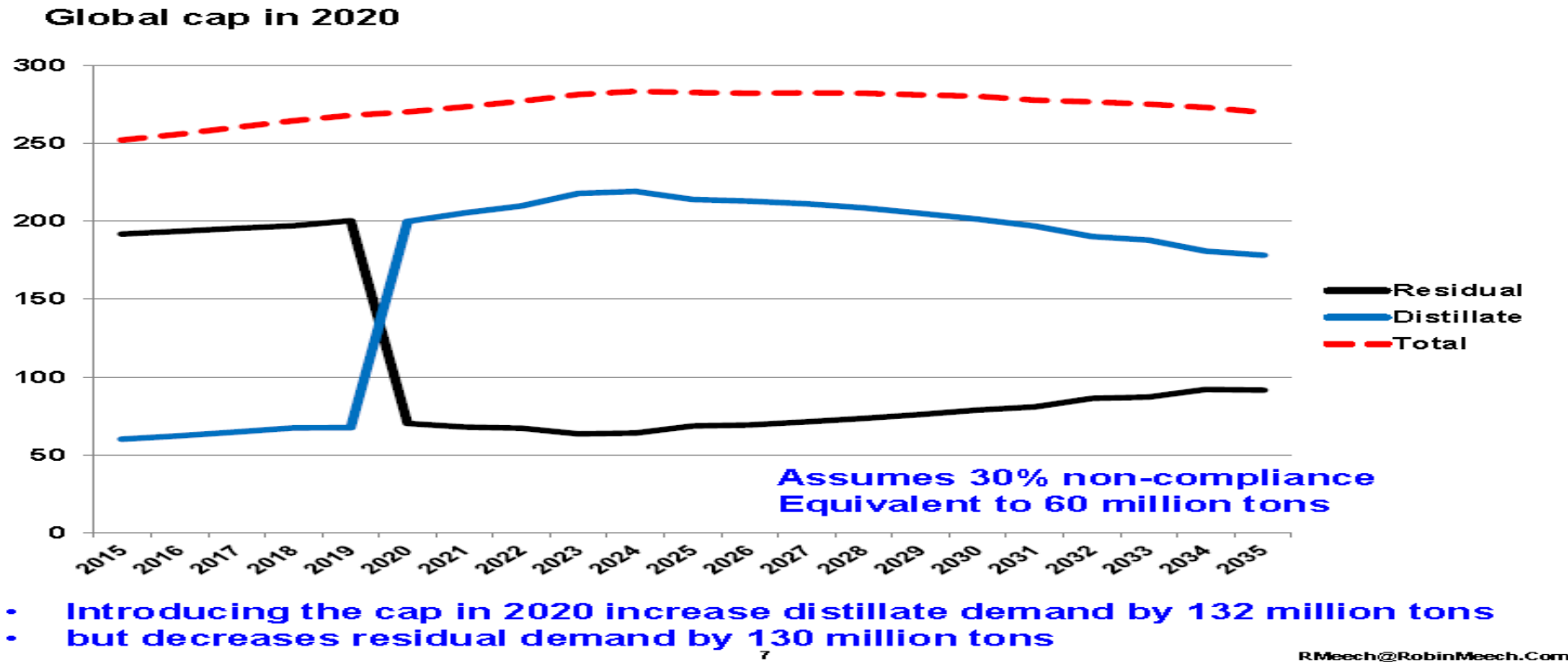
**October 27<sup>th</sup>, 2016** – IMO announces that the MEPC (Marine Environmental Protection Committee) agreed to a 0.5% global sulphur cap on Marine Fuel commencing **January 1<sup>st</sup>, 2020**



# IMO 0.5% Global Sulphur Cap

- No (hoped for) delay until 2025
- IMO cast aside concerns as to shortage of fuel to meet new cap
- Existing ECA's (including North American) will stay in place
- New ECA's may be introduced
- Only exception to this cap are those vessels with abatement (scrubbing technology)
- A paradigm shift for the bunkering, shipping and much of global refining

# IMO 0.5% Global Sulphur Cap – Impact on Demand



Source: Marine and Energy Consulting

# IMO 0.5% Global Sulphur Cap – Supply Solutions

How to suppliers and refiners meet the demand for 2020 compliant fuels:

- Refined 0.5% LSFO
- Blended 0.5% LSFO
- Distillate (DMA) less than 0.5%
- Supply of alternative fuels – LNG etc.

Is there going to be enough fuel? What happens to all that HSFO?



# Marine Fuel Supply Balance Post 2020 – Is There Enough Fuel?

## Rebalancing Required to Meet 2020 Bunker Specs

### Cumulative Changes by 2020 (vs. 2016)

MB/D	Increased Crude/Cond Runs	New Facilities Added						Net Supply	Demand	Long/ (Short)
		FCC	H/C	Coking	Dist. Flux Saved	VGO HDS	Resid HDS			
Runs/Capacity	3600	400	1100	900		300	300			
Mogas/Naphtha	1000	200	200	100				1400	1200	200
Middle Distillate	1200	100	600	400	100			2300	3700	(1400)
HS VGO	500	(400)	(1000)	300		(50)	(150)	(800)		
HS VR	400	0		(800)	(100)		(100)	(600)		
HS Resid/HFO	900	(300)	(1000)	(500)	(100)	(50)	(250)	(1400)	(2900)	1500
LS Resid/HFO	400		200			50	250	900	1200	(300)
Total	3400	(70)	(100)	(100)	0	0	0	3200	3200	0

#### Steps to close the imbalance:

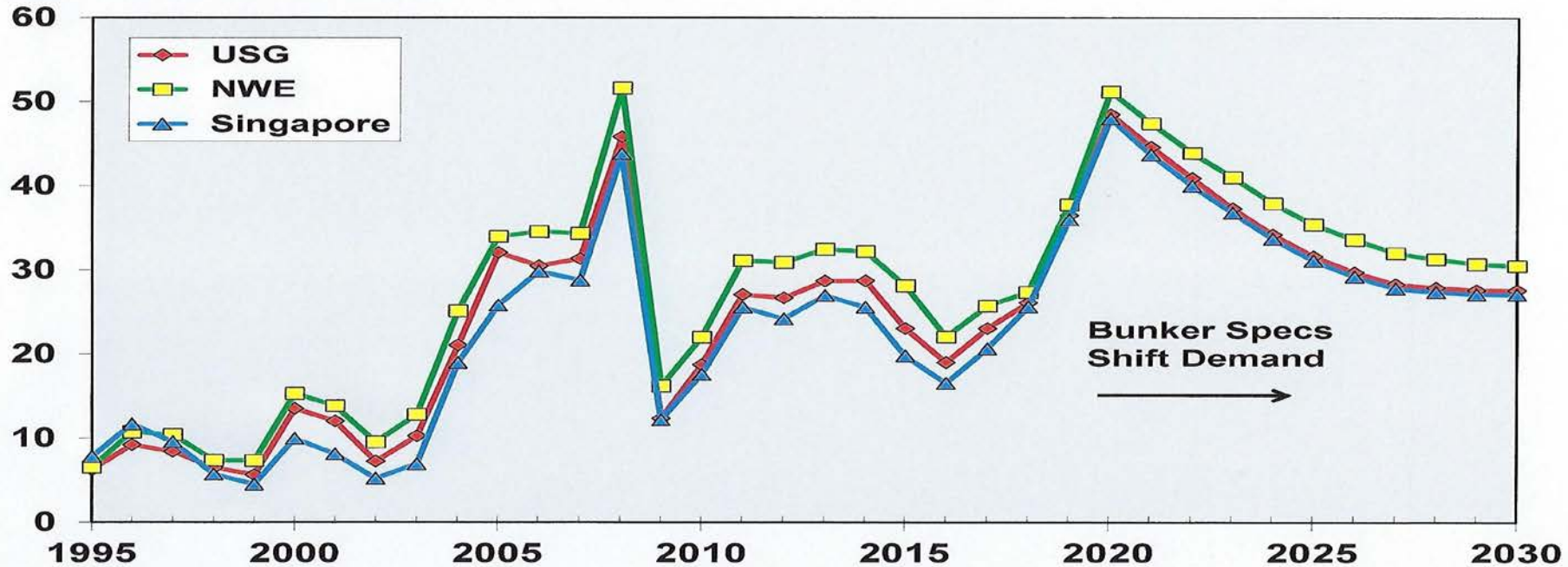
- More scrubbers in ships (7% = 400 MB/D)
- Higher utilization in existing coking (3% = 300 MB/D)
- HS/LS swap for resid FCC (maybe 300 MB/D)
- Deep cut HS vacuum tower (maybe 200+ less HS VR/more HS VGO)
- Yield shift from gasoline and naphtha (backfill naphtha with NGLs)
- Balance with more HS resid to power generation - higher runs needed if additional oil burn

# Impact of Global Sulfur Cap – Price Spreads

Middle Distillate – Fuel Oil Price Spreads  
Restrained Next Couple of Years, Then Much Wider



Gasoil- HS Fuel Oil, \$/Bbl



# IMO 0.5% Global Sulphur Cap – Ship Owner Compliance

Vessel owners have four choices:

- Burn 0.5% compliant fuel at a significantly higher cost than existing 3.5% cost
- Convert engines or new builds for alternative fuels – LNG, Methanol
- Install abatement (scrubbing) technology and continue to burn max 3.5% sulphur fuel
- Non-compliance – depends on enforcement by signatories of MARPOL agreement

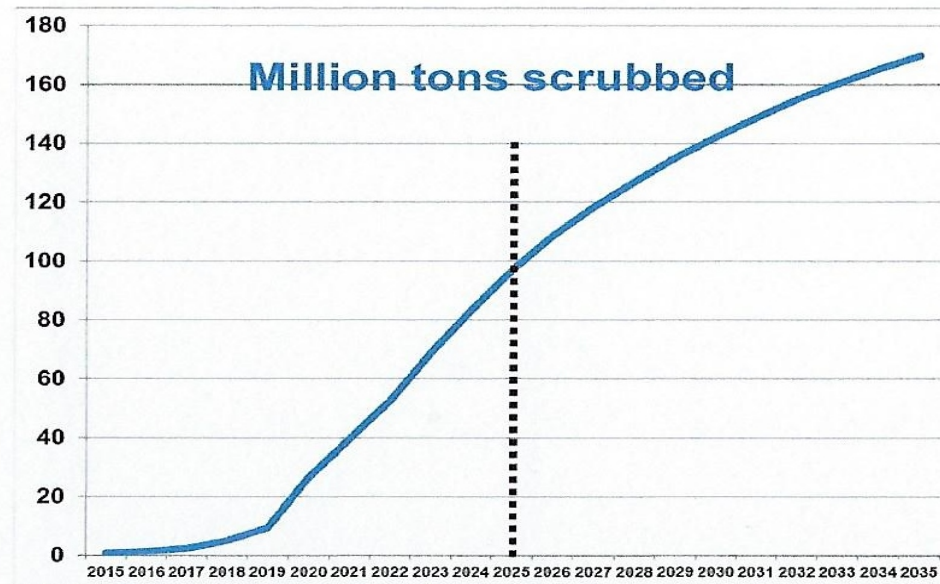
# LNG - IMO 2020 Compliance Solution

LNG a clean (but not clear) alternative

- Significant infrastructure and logistics development cost
- No clear price advantage to alternatives
- Potential as short haul solution (European Experience) and US flag solution – but economics difficult to justify
- Tote leading the charge – Jacksonville and Tacoma
- Matson building dual fuel vessels – Kanaloa Class

# Abatement (Scrubbing) Technology Solution

- Financial argument for Abatement compelling
- At current level payback for installation is 1-3 years!

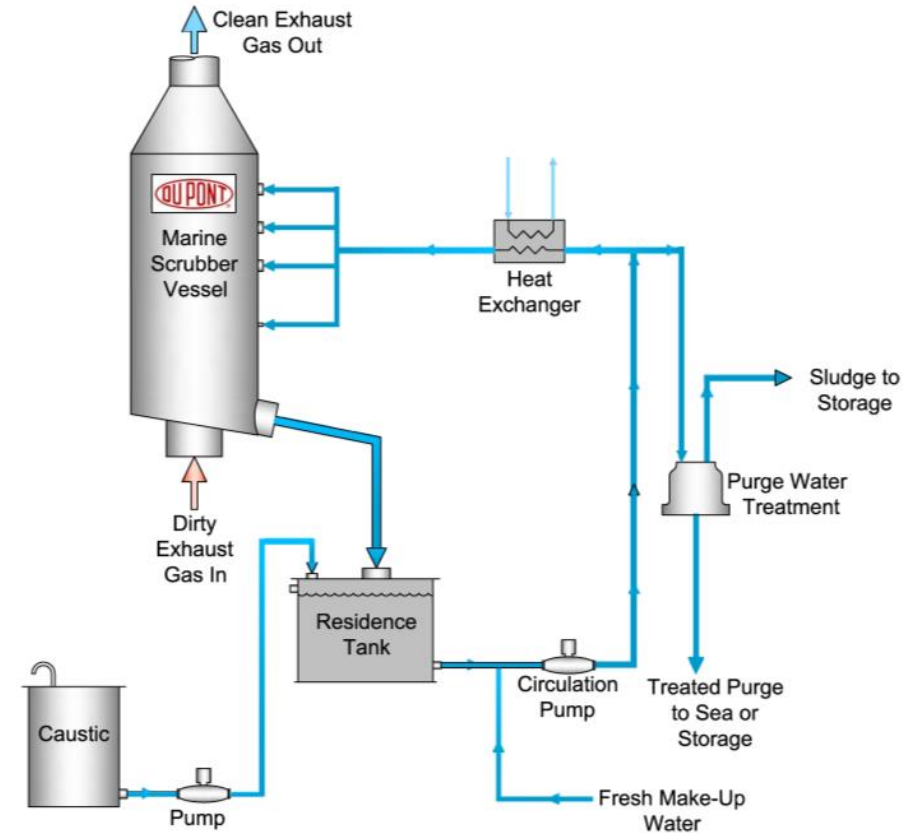


Scrubber Uptake

Source Marine and Energy Consulting

# Abatement (Scrubbing) Technology Solution

- Scrubber Solutions:
  - Open Loop
  - Closed Loop
  - Hybrid
- All Possible under current Marpol!
- Open Loop controversial due to particulates and metals
- Assumption of closed loop and shore side disposal



# What's going to happen in California?

## 2017 California Bunker Market:

- California Bunker Market – 5mmts per annum (estimated)
  - Los Angeles/Long Beach – 3.3mmts (Glencore, Aegean and Chevron)
- Chevron - Richmond the only significant producer of HSFO – sold as bunkers in SF (Oakland) and LA markets
- Market approximately 90% HSFO and 10% DMA (Distillate)
- Majority (HSFO) imported from Latin America
- West Coast of North and South America produces excess HSFO so currently price competitive. Excess HSFO is exported

# What's going to happen in California?

## 2020 California Bunker Market:

- No Coker for Chevron and no plans for refinery upgrades for west coast
  - What happens to the HSFO? Scrubbers, Power Generation and Exports?
- California - major producer of diesel but not competitive to Asia's new refineries
  - Los Angeles MGO currently more than \$50/mt above Singapore
- California refineries produce large quantities of components to blend LSFO 0.5%
- California domestic crude is an on-spec bunker fuel and can be exported!!
- US Domestic Shale crudes have a role to play in post 2020 market



# What's going to happen in California?

2020 California Bunker Market (continued):

- Demand will be satisfied by:
  - Limited LSFO 0.5% production
  - Blending of LSFO 0.5% using diesel and other components
  - MGO (DMA) supply
  - But likely market will contract in competition with Asia and will shrink by 20-40%
- Winners and Losers
  - Winners
    - Blenders – Glencore, Aegean etc.
    - Distillate cargo traders and those refiners that can increase distillate production
  - Losers
    - Chevron? Specialist small MGO suppliers?

# Summary

- IMO 2020 regulation is a game changer for bunkering, shipping and refining
- Doubts about product availability – challenging for suppliers to meet demand and buyers to purchase compliant fuel
- Confusion about product price levels – decision making delayed
- Compliance choice: Buying compliant fuel or scrubbing
- Major disruption to California bunker market – loss of demand
- Versatility and variety of blend components will sustain California bunker market

# 20|20

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