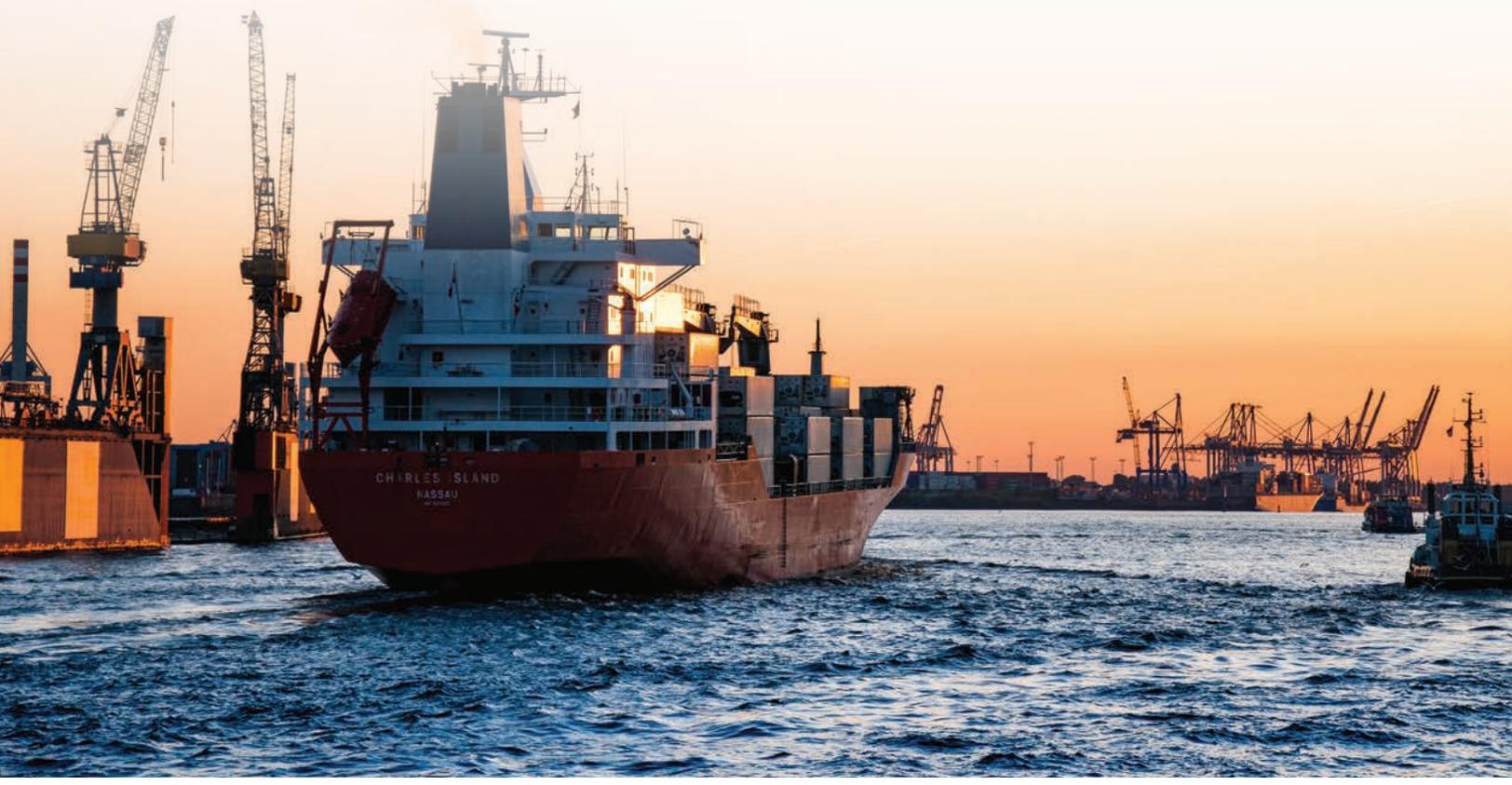


SEA CHANGE AHEAD IMO 2020

PART 1

BY TOM MURRAY

This is the first of a two-part series on IMO 2020. This Part 1 explains what IMO 2020 is, how it came about, its magnitude and implications for the shipping and refining industries, and the broader effects on world petroleum markets, including the used oil industry. Part 2 will examine the effects of IMO 2020 on specific segments of the used oil industry, including gatherers (collecting used oil), distillers (making VGO or MGO), and re-refiners (making base oil), and how participants in these segments can create or preserve value in light of upcoming market changes.



In the months leading up to January 2020, a profound change will affect world markets for marine fuels as demand for High Sulfur Fuel Oils (aka HSFO, such as No. 6 Oil or Bunker C) declines and demand for Very Low Sulfur Fuel Oils (VLSFO) rises in response to a regulatory change reducing the maximum sulfur content in marine fuels worldwide from 3.5% to 0.5% on 1/1/2020. The magnitude of this sea change appears massive, affecting about 4 million barrels per day (bpd) or about 4% of the total crude oil production worldwide. As of the date of this article (July 2018), virtually every type of fuel and base oil market worldwide will be affected in some way. The immense scale of the change raises questions, such as how did this change come about? Will it happen in 2020? How will shippers and refiners adjust? Will the effects be as large as current forecasts indicate? And most of all, how will this change affect me?

The regulation limiting sulfur in marine fuels worldwide to 0.5% on 1/1/2020 (commonly referred to as “IMO 2020”) was confirmed at the 70th session of the International Maritime Organization’s (IMO) Marine Environmental Protection Committee (MEPC) in October 2016. The regulatory process started in 1997 (IMO Marpol Annex VI) which created a worldwide global sulfur cap of 4.5%, later lowered to 3.5% in 2012. It also established Emission Control Areas (ECA’s) which in 2006 limited sulfur to 1.0% and in 2015 further limited sulfur content to 0.1% within proscribed distances of certain coastlines (US, Europe, China etc). Now, both IMO procedures and subsequent public statements indicate there will be no walking back IMO 2020 despite strong resistance from industry organizations claiming 1/1/2020 is just too soon. Instead efforts are moving in the opposite direction towards an outright ban in 2020 on carriage of 3.5% HSFO on any vessel not equipped with an Exhaust Gas Cleaning System (aka EGCS or “scrubber”). Efforts are even underway to reduce CO2 emissions from ships to zero by 2050! So clearly IMO 2020 is here to stay and it will happen on 1/1/2020. Affected participants are now left struggling with what to actually do about it?



Shippers have 4 options which are, 1. Exhaust Gas Cleaning Systems (aka scrubbers), 2. Liquefied Natural Gas (LNG), 3. Non-compliance (aka cheating) and 4. Compliant Fuels (such as MGO or other VLSFO). Scrubbers show quick paybacks based on current and even wider forecasted price differences between HSFO and VLSFO but they are costly to install and operate, and their weight reduces available cargo capacity. Furthermore, unless enough shippers switch to scrubbers, HSFO may be difficult to source as, in response to low demand, many terminals may no longer store HSFO or only offer HSFO at higher prices. Or alternatively, if enough shippers add scrubbers the price difference between HSFO and VLSFO will decline, thus lengthening scrubber investment paybacks. LNG is impractical to implement on most ships, does not currently offer a material cost advantage, and is difficult or impossible to source in most ports. Cheating is forecasted to range from 5% to 40% as it tilts economics dramatically in favor of the cheater. However, most shippers will comply (including the more reputable shipping companies) and there is great focus on policing cheating to ensure a level playing field amongst all competitors. This leaves switching to Compliant Fuels (eg VLSFO) as the most likely option of choice for addressing IMO 2020.

At this time, the vast majority of the 0.5% Compliant Fuel is expected to be distillates (or distillate blends), with the majority of the VLSFO being MGO, but this will be very costly. Even today (long before MGO demand increases and HSFO demand drops) MGO carries an average price premium of about 50% over HSFO fuels. Industry estimates for just the increased cost to shippers making the switch to compliant fuels is a

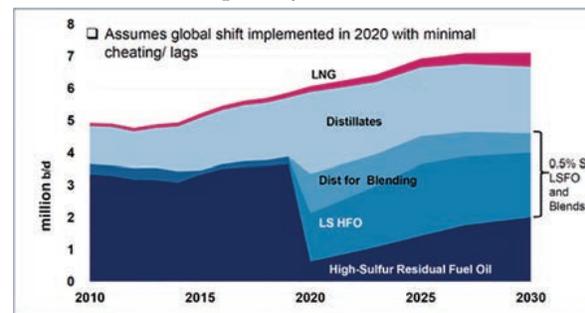
staggering \$30 billion to \$60 billion per year. Ship owners are thus struggling with their options, most notably to either pay the piper and buy VLSFO, or install scrubbers and buy HSFO. Surprisingly few so far have decided to add scrubbers. Thus the forecast is for a huge demand increase for VLSFO, and most notably MGO.

Refiners of crude oil are well aware of IMO 2020, but with very few exceptions have not taken action for a number of reasons, the two key ones being cost and market uncertainty. HSFO is the current “dumping ground” for the bottom of the barrel vacuum residuum left over in processing crude oil. This vacuum residuum is often blended with other streams, such as used oil and other cutter stocks, for sale as HSFO. Many complex refineries here in the US have instead tended towards carbon rejection technologies for processing vacuum residuum (eg cokers, visbreakers, deasphalters). But adding these units is very expensive and cost justifiable only in large volumes, and refiners today do not seem oriented to making the huge capital investment for marine fuels. Further complicating the economic decision is uncertainty as to whether the shipping industry will broadly adopt scrubbers or not. If it does then the wide forecasted price spreads between VLSFO and HSFO will drop, reducing returns on the heavy capital investment. Furthermore, even if carbon rejection units are installed more broadly, the products they would make would best be sold into gasoline, jet fuel, and diesel markets, which are deeper and generally more attractively priced than marine fuels. So, but for a few exceptions such as Exxon-Mobil, the refining industry is largely taking a wait-and-see position, waiting to assess the economic landscape after 2020 to see the longer-term market effects of IMO 2020 before making large scale capital investments.

So with both shippers and refiners in the aggregate each taking mostly wait-and-see positions, it is becoming increasingly certain that VLSFO, and MGO in particular, will end up filling the gap. The first chart in the column to the right shows the short and longer term affects of the shift in coming years as forecasted by S&P Global Platts Analytics. In the near term HSFO volume is forecasted to drop from about 3.5 million bpd to about 500,000 bpd, a volume decline of over 85%, with a net expected shift of about 1.4 million bpd from HSFO to VLSFO. Conversely the increase in distillate demand is forecasted to be over 1.5 million barrels per day (an almost

2x increase over current distillate demand volume), with MGO mostly being used as blend stock to make VLSFO that meets the new 0.5% sulfur specification. Over time, as more scrubbers are installed, HSFO demand is expected to increase, but even at its maximum in 2030 the forecast volume for HSFO is less than ½ the current volume. HSFO is thus forecasted to be a remarkably poor market in the coming years. Interestingly, the total volume of marine fuels is forecasted to increase from about 5.5 million bpd to over 7 million bpd in 5 years. This is a compound annual growth rate of about 5% per year, which indicates strong market growth for marine fuels.

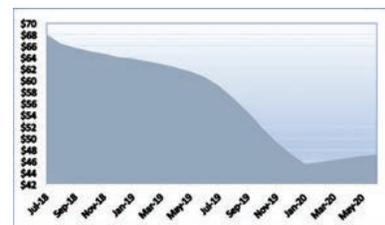
IMO 2020 Forecasted Compositional Shift in Marine Fuels (millions of barrels per day)



Source: S&P Global Platts Analytics

Along with the forecasted drop in HSFO volume, futures pricing for HSFO to January 2020 indicates a major price decline of about 33% in HSFO’s price versus current (July 2018) prices.

US Gulf Coast HSFO (Platts) Futures Quotes (dollars per barrel)



Source: CME Group, Gulf Coast HSFO (Platts) Futures Prices, July 8, 2018

But is the future decline in HSFO's price and volume certain? It is possible that scrubber installations could increase, generating more demand for HSFO than expected. Or maybe one or more less expensive technologies (than carbon rejection offers) emerges which cost effectively de-sulfurizes HSFO well below current levels. Perhaps as HSFO becomes much cheaper other markets emerge or grow, such as power or asphalt, to absorb the excess HSFO. While hope springs eternal, as of July 2018 believing future HSFO demand will be anywhere near its current levels is a risky bet. It appears very unlikely today that there will be enough demand in 2020 to prevent a major decline in both the volume and pricing of HSFO.

In times of change there is both risk and opportunity. For used oil gatherers selling RFO for use in blending to make

HSFO, the outlook appears challenging. Prudent gatherers should seek safe havens for their RFO sooner rather than later, or alternatively take action to preserve or create value for their RFO. Part 2 of this series will discuss in more detail the impact of future changes by market segment and geography, and present general strategies that can enhance or preserve value for each segment of the used oil industry.

Comments on this article are encouraged and may be directed to Tom Murray. Tom Murray has developed technologies in used oil re-refining for over 2 decades and currently offers proprietary licensed solutions for processing used oil and other feedstocks, with 4 issued patents and multiple pending patents. He may be reached at tgm@modernfuels.com or 940-300-8790. ■



Central Ohio Oil, Inc.
809 Marion Rd.
Columbus, OH 43207
614-443-1014
Customerservice@centralohiooil.com

WWW.CentralOhioOil.com

Maximizing Your Recycling & Disposal Needs

*Petroleum Impact Waters
 Antifreeze Collection
 Oil Filter Collection
 Coolant Collection
 Used Oil Collection*

*Off Spec Fuels
 Oil/Water Separation Clean-Outs
 Sludge & Sludge Pit Clean-Out
 Drum Disposal Services
 Vacuum Truck Equipment*

We have over 55 years Experience

*We are Columbus' first multi-phased
 Non-Haz. waste mgt. facility. Along
 with Columbus' first EPA Licensed &
 Permitted used oil/waste water
 Treatment Facility*