
Fuel Oil Sulfur Spreads Set to Widen Through 2020

Regulations upend bunker fuel market.

Morningstar Commodities Research

June 11, 2018

Sandy Fielden

Director, Oil and Products Research

+1 512 431-8044

sandy.fielden@morningstar.com

Data Sources for This Publication

U.S. Energy Information Administration

CME Group

To discover more about the data sources used, click [here](#).

Slam-Dunk Trade?

Changes mandated by the International Maritime Organization require all oceangoing vessels to burn fuels (known as bunkers) with a sulfur content of less than 0.5%, starting in January 2020. The regulation leaves shippers facing higher fuel costs or installing expensive scrubber technology. U.S. refiners are expected to benefit from the changes, as are shale producers. Bearish views of heavy fuel oil prices after 2020 are already reflected in today's forward curves. This note looks at the impact on U.S. refiners and discusses what could go wrong as forward curves suggest a slam-dunk trade.

Regulations

The IMO regulations coming into force in January 2020 threaten to dramatically alter demand for high-sulfur fuel oil and in the process upset refinery economics around the globe. As we explained in an October 2016 note (see "[Marine Bunker Deadline to Benefit Refiners and Traders](#)"), the IMO regulation is the culmination of a series of standards set in motion in October 2008 that have required vessels operating in certain coastal Emission Control Areas to use lower-sulfur fuel, with a maximum sulfur level of 0.1% since January 2015, while permitting the use of 3.5%-sulfur fuel oil outside the ECAs. In just 18 months' time, all vessels must transition to a new 0.5% global standard.

Worldwide

According to the International Energy Agency's 2018 five-year oil market outlook, the IMO change means that worldwide, over 3 million barrels/day of high-sulfur bunker fuel will be replaced by low-sulfur alternatives. After 2020, the IEA expect 30% of that demand to switch to new 0.5% low-sulfur fuel oil blended from existing 1% or less low-sulfur fuels and middle distillates such as ultra-low-sulfur diesel. Another 30% of bunker fuel demand will switch to marine gasoil, a middle distillate designed for ship engines, until owners are more comfortable burning low-sulfur fuel oil blends. As we pointed out in a May note (see "[Export Demand Empties Distillate Tanks](#)") increased distillate demand for low-sulfur bunker fuel and marine gasoil will increase pressure on already-tight diesel markets. The remaining 40% of the bunkers market is expected to continue using existing high-sulfur fuel blends. Some vessels will use specially installed scrubbers that treat emissions to remove sulfur and other toxins from engine exhaust but the cost of adding these is as much as \$3 million per vessel. A small number of vessels will be fitted or built to use liquefied natural gas fuel. Others will simply not comply—at least initially—taking the risk that policing on the high seas will be difficult.

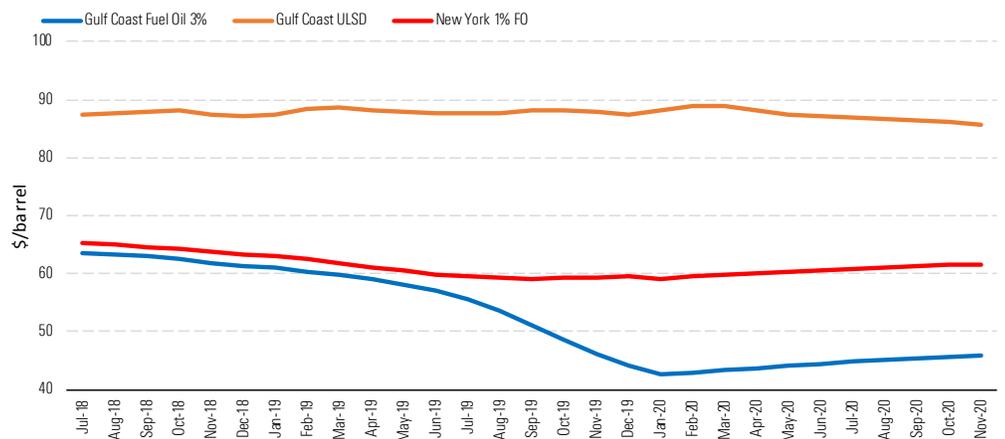
U.S. Market

U.S. production and demand for residual fuel oil has been falling consistently over the past decade as fuel-burning power plants retired due to higher fuel and regulatory costs. U.S. Energy Information Administration data show annual average domestic demand for residual fuel oil falling by 29% from 461 thousand barrels/day in 2011 to 327 mb/d in 2016 (the last full year of data available). Fuel oil demand in 2016 was met primarily from U.S. refineries that produced 418 mb/d together with imports of 205 mb/d. The U.S. exported 298 mb/d in 2016, with the largest recipient being Singapore, followed by Canada, Mexico, Panama, and the Bahamas. Domestic fuel oil demand is dominated by bunker fuels that the EIA estimates represented 83% of total sales in 2016. Electric power generation was the next-largest customer, with a 9% share, while industrial use accounted for most of the rest.

As fuel oil demand has fallen, refiners have responded by reducing average residual yields from 3.4% of the refined product slate in 2011 to 2.5% in 2016 and 2017. Fuel oil yields reflect both the quality of crude processed as well as refinery sophistication. Refineries configured to process light crude have increased throughput of shale crudes in recent years, and these contain fewer fuel oil components. Refineries configured to process heavier crudes in the U.S. typically have catalytic and coker units that break down residual fuel oil into lighter components. Refineries on the Gulf Coast are among the most sophisticated in the world, reducing their exposure to high yields of low-value residual fuel after 2020. Under these circumstances, U.S. refiners should benefit handsomely from the IMO bunker regulations.

Exhibit 1 shows current (June 2018) forward curves for Gulf Coast 3% high-sulfur fuel oil (blue line), 1% sulfur New York Harbor fuel oil (red line) and Gulf Coast ultra-low-sulfur diesel (orange line). The data show that today’s forward market expects diesel values to remain stable at between \$86 and \$89/barrel all the way out to November 2020. In contrast, during the runup to the IMO change, HSFO prices fall from \$64 in July 2018 to \$44/barrel in December 2019 then down to \$43/barrel in January 2020 before recovering to \$46/barrel by November 2020. Prices for 1% fuel oil in New York are more resilient than Gulf Coast HSFO after winter 2018-19, with the premium widening out by \$13/barrel between May and December 2019.

Exhibit 1 U.S. Diesel and Fuel Oil Prices — Forward Curves June 2018



Source: CME Group, Morningstar

The curves indicate rising margins for refiners able to upgrade high-sulfur fuel oil into lighter fuels in 2019 and 2020. Sophisticated refineries with units that can process fuel oil produced by simple atmospheric distillation will be able to process additional volumes of this cheap feedstock to increase overall throughput and production of gasoline and diesel. As a result, demand for HSFO at the U.S. Gulf will be stronger than in Europe, where refineries are typically less complex and produce more fuel oil that is used today as bunkers locally or shipped to Singapore. Demand for that European HSFO will be destroyed by the new regulations. Exhibit 2 shows how this change is affecting the forward curve for the premium of U.S. Gulf HSFO over equivalent European 3.5% fuel oil. U.S. fuel oil trades at a discount to Europe of \$1.18/barrel in August 2018, narrowing to \$0.05/barrel in December 2019 before flipping to a flat \$0.17/barrel premium in January 2020.

Exhibit 2 U.S. HSFO Premium Over Europe—Forward Curve June 2018



Source: CME Group, Morningstar

Because heavy crudes produce higher fuel oil yields, the relative value of these crudes will decline as the IMO regulation comes into force. That's because refiners that do not have secondary processing will favor lighter low-sulfur crudes that yield less fuel oil and avoid heavier high-sulfur crudes. In other words, the spread between low-sulfur "sweet" and high-sulfur "sour" crudes will widen. That's good news for U.S. producers as it increases the appeal of very low-sulfur shale grades—although some of these crudes do not have strong distillate yields. Refiners configured to process heavier crudes into lighter products will also benefit from cheaper feedstock.

What Could Go Wrong?

The impact of the IMO regulations in 2020 seem like an opportunity for traders and refiners to take advantage of a mandated change that is coming up fast with little time for investment in new refining or shipping capacity to change the outcome. Today's forward curves make bearish bets on HSFO or high-versus low-sulfur fuels look like intuitive winners. However, as always, there are catches to this trade.

The presumed low value of HSFO is based on most vessel owners adopting the regulations by buying lower-sulfur fuel blends and destroying demand for traditional bunker fuel. That assumption is based on low uptake of scrubber technology by ship owners because it is expensive to install and may not turn out to help with further regulation down the road. It is true that scrubber investment so far is lower than some expected, but it could be ramping up. A May 2018 IHS Markit report noted an increase of 90 vessels fitted or on order for retrofit over the past two months. They expect the pace of installations to increase steadily and forecast 1,300 out of 55,000 large vessels in the merchant fleet will be converted by December 2020. That's still just 2% of the market, but combined with a high rate of noncompliance, that could increase demand for HSFO unexpectedly before January 2020—reducing fuel oil discounts.

Alternatively, a wide spread after January 2020 between the prices of low-sulfur-compliant fuels and HSFO will justify the high cost of scrubber installation. Owners may balk at higher fuel costs and take the plunge to retrofit scrubbers soon after the regulations come into force. Some estimates put the fuel price spread tipping point at \$200/metric ton for scrubber installation to break even. The curves in Exhibit 1 show the July 2018 spread between ULSD and 3% fuel oil is \$23/barrel—widening to \$45/barrel by January 2020. That translates to roughly \$300/MT. The spread between Gulf Coast HSFO and New York 1% fuel is \$1.35/barrel for July 2018, widening out to \$16.6/barrel in January 2020, or \$117/MT. So the \$200/MT break-even point lies somewhere between the two spreads. Since producing 0.5% bunker oil requires a blend of low-sulfur and ULSD fuels, the actual break-even equation will depend on the price refiners charge for compliant 0.5% fuel blends. Today it is hard to estimate where that price will be in January 2020, since compliant fuel blends are only just emerging onto the market.

We believe the rapid pace of this change to bunker regulation and fuel oil markets will result in significant discounts for HSFO come January 2020, with diesel prices remaining robust before and after the IMO regulation. Any recovery in HSFO prices is unlikely before January 2020 since there's not enough time for ship owners to add significant scrubber capacity. After the rules change, the situation will be more fluid as levels of noncompliance become clearer and fuel price levels are set. ■■

About Morningstar® Commodities Research™

Morningstar Commodities Research provides independent, fundamental research differentiated by a consistent focus on the competitive dynamics in worldwide commodities markets. This joint effort between Morningstar's Research and Commodities & Energy groups leverages the expertise of Morningstar's 23 energy, utilities, basic materials, and commodities analysts as well as Morningstar's extensive data platform. Morningstar Commodities Research initially will focus on North American power and natural gas markets with plans to expand coverage of other markets worldwide.

Morningstar, Inc. is a leading provider of independent investment research in North America, Europe, Australia, and Asia. The company offers an extensive line of products and services for individuals, financial advisors, and institutions. Morningstar's Commodities & Energy group provides superior quality market data and analytical products for energy data management systems, financial and agricultural data management, historical analysis, trading, risk management, and forecasting.

For More Information

+1 800 546-9646 North America

+44 20 3194 1455 Europe

commoditydata-sales@morningstar.com



22 West Washington Street
Chicago, IL 60602 USA

©2018 Morningstar. All Rights Reserved. Unless otherwise provided in a separate agreement, you may use this report only in the country in which its original distributor is based. The information, data, analyses, and opinions presented herein do not constitute investment advice; are provided solely for informational purposes and therefore are not an offer to buy or sell a security; and are not warranted to be correct, complete, or accurate. The opinions expressed are as of the date written and are subject to change without notice. Except as otherwise required by law, Morningstar shall not be responsible for any trading decisions, damages, or other losses resulting from, or related to, the information, data, analyses, or opinions or their use. References to "Morningstar Credit Ratings" refer to ratings issued by Morningstar Credit Ratings, LLC, a credit rating agency registered with the Securities and Exchange Commission as a nationally recognized statistical rating organization ("NRSRO"). Under its NRSRO registration, Morningstar Credit Ratings issues credit ratings on financial institutions (e.g., banks), corporate issuers, and asset-backed securities. While Morningstar Credit Ratings issues credit ratings on insurance companies, those ratings are not issued under its NRSRO registration. All Morningstar credit ratings and related analysis are solely statements of opinion and not statements of fact or recommendations to purchase, hold, or sell any securities or make any other investment decisions. Morningstar credit ratings and related analysis should not be considered without an understanding and review of our methodologies, disclaimers, disclosures, and other important information found at <https://ratingagency.morningstar.com>. The information contained herein is the proprietary property of Morningstar and may not be reproduced, in whole or in part, or used in any manner, without the prior written consent of Morningstar. To license the research, call +1 312 696-6869.