
IMO 2020 Scrubber Payout Less Than One Year

Sulfur spread justifies investment.

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Data Sources for This Publication

CME Group
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Changing Economics

On Jan. 1, the International Maritime Organization implemented new fuel standards for oil-powered vessels except those equipped with exhaust scrubbers to remove pollutants. In the absence of a scrubber, IMO 2020 stipulates that ships' bunkers contain less than 0.5% sulfur. Using a scrubber allows the vessel to burn cheaper high-sulfur fuel. Last March, we calculated ship owner payout on the estimated \$2.5 million scrubber investment for a 2-million-barrel very large crude carrier, or VLCC, would take 3.1 years based on average fuel prices during the first quarter of 2019. This year, barely a month after the new regulations came into force, scrubber investment payout has shortened dramatically to less than a year. This note looks at changing sulfur spreads and scrubber payout economics that suggest the investment today is easily justified.

Narrow Spreads in 2019

Our March 2019 analysis of scrubber payout began with a description of narrowing price spreads between low- and higher-sulfur fuel oils in the wake of changing fundamental and geopolitical circumstances (see [Heavy Sour Crude Shortage Disrupts IMO 2020 Response](#)). The price premium for clean-burning 0.5% sulfur marine fuel oil over high-sulfur bunker fuel at the U.S. Gulf Coast declined steadily from nearly \$11/barrel in early January to less than \$2/barrel during the first week of March 2019. This despite the impending IMO regulation that was expected to widen the spread between low- and higher-sulfur marine bunkers as traders bet that demand for high-sulfur fuels would evaporate in the runup to the new regulation. The reversal of market sentiment followed a shortage of heavy crude that Gulf Coast refineries are configured to process, due to OPEC production cuts and lower output from Venezuela and Iran. We followed that analysis of sulfur spreads with a note on scrubber economics (see [IMO 2020 Scrubber Payout Extended by Narrow Sulfur Spreads](#)) that determined the average \$43/metric ton or \$6.62/barrel low- to high-sulfur spread during first-quarter 2019 would have left scrubber owners waiting 3.1 years for their investment to pay out.

Regulations

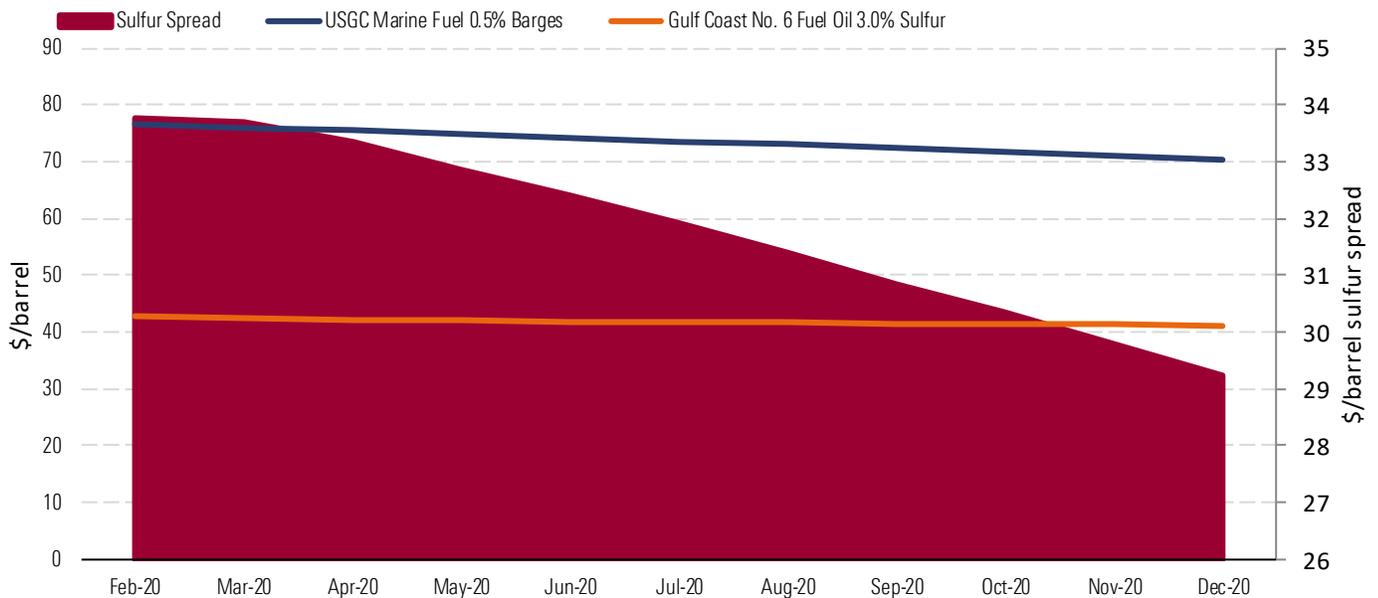
IMO 2020 is expected to dramatically alter demand for high-sulfur fuel oil and in the process upset refinery economics around the globe. As we explained in an November 2016 note (see [Marine Bunker Deadline to Benefit Refiners and Traders](#)), the IMO regulation is the culmination of a series of standards set in motion in October 2008. In June 2018, we pointed to a bearish market view of heavy fuel oil prices after 2020 reflected in lower forward curve prices at that time (see [Fuel Oil Sulfur Spreads Set to Widen Through 2020](#)). The shortage of heavy crude last year reversed that expectation, throwing a curveball at the economics of installing scrubber technology. Now that the IMO regulations are in force, compliant

low-sulfur fuel prices have skyrocketed and heavy-sulfur bunker prices have tanked. That has widened the sulfur spread to an average \$210/MT or \$33/barrel for forward deliveries at the Gulf Coast during January 2020, according to CME Group.

Sulfur Spreads 2020

Exhibit 1 shows CME Group forward curves on Jan. 17, 2020, for U.S. Gulf Coast 3% sulfur fuel oil and Gulf Coast 0.5% sulfur barges for delivery during 2020. The shaded area represents the spread between the more expensive low-sulfur IMO 2020-compliant fuel and high-sulfur fuel oil that a ship owner with a scrubber can use. The average spread over 2020 is \$33/barrel or \$210/MT, but it narrows by about \$5/barrel during the year.

Exhibit 1 U.S. Gulf Coast Sulfur Spreads Forward Curve January 2020



Source: CME Group, Morningstar.

Scrubber Payback

Return on investment for scrubber technology is based on the premise that the IMO 2020 regulation will destroy demand for high-sulfur marine bunkers as ship owners switch to compliant low-sulfur alternatives. While installing a scrubber requires an upfront investment by ship owners, their return comes via fuel savings from continuing to use cheaper high-sulfur bunkers. For a while last year, that gamble by ship owners faced a far from certain outcome. Now the sulfur spread is wide enough to shave payback to less than a year for a VLCC tanker.

Our analysis is based on several assumptions. First a typical scrubber installation for a VLCC with a capacity of 2 million barrels costs \$2.5 million. Second, we estimated typical VLCC fuel use. This estimate is complicated by the age and efficiency of the vessel as well as the speed it travels. There are also

different fuel burn rates for when the vessel is full (laden) or empty (ballast) and during loading and discharge. We assumed a fairly new VLCC using 70 metric tons/day of bunker fuel at a regular speed of 15 knots when laden, 53 MT/day when in ballast, 20 MT/day when loading, 70 MT/day when discharging, and 10 MT/day when idle. Our assumptions are 45% of vessel time laden, 25% in ballast, 5% loading, 5% discharging, and 20% idle.

First-Quarter 2019

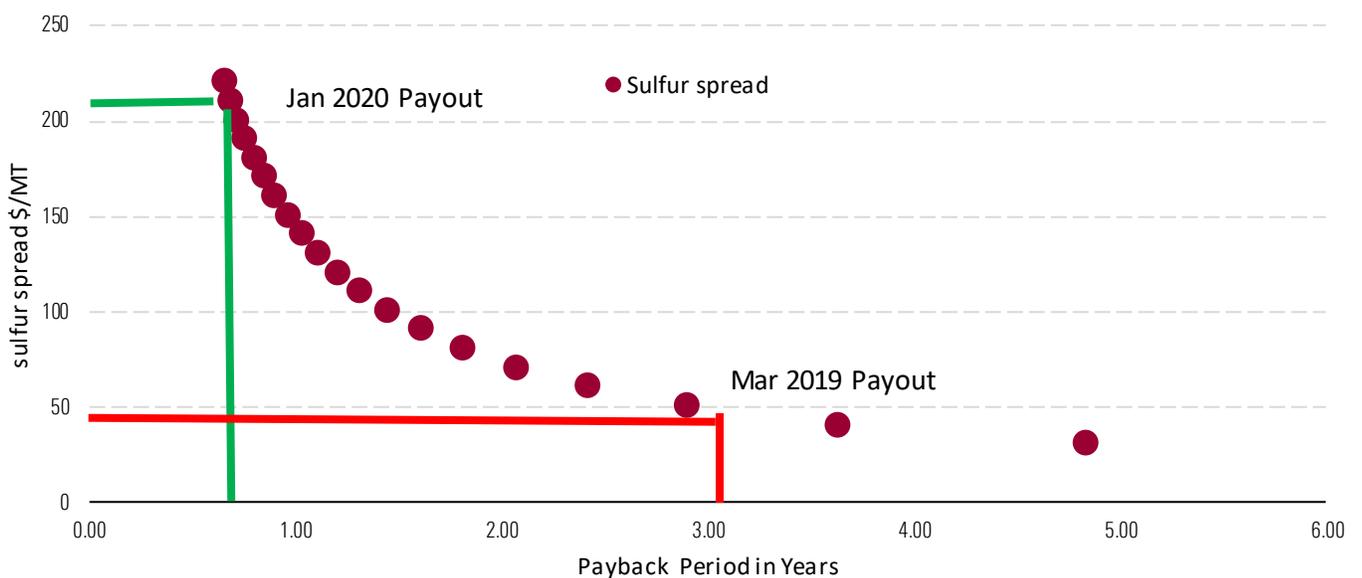
Based on these assumptions, we calculated average daily fuel consumption is 51 MT/day, or 18,706 MT/year. The spread between U.S. Gulf 3.0% marine fuel oil and 0.5% very-low-sulfur marine bunkers averaged \$43/MT between Jan. 2 and March 20, 2019. That average spread produces an annual saving using the scrubber of $\$43 * 18,706 \text{ MT}$ or $\$800,000/\text{year}$. That translates to a payback period of $\$2,500,000 / \$800,000$ or 3.1 years.

January 2020

This year in mid-January 2020, the average sulfur spread on CME Group forward curves for U.S. Gulf 3.0% marine fuel oil and 0.5% very low sulfur marine bunkers was \$210/MT. That produces an annual saving using the scrubber of $\$210 * 18,706 \text{ MT}$ or $\$3,900,000/\text{year}$. That translates to a payback period of $\$2,500,000 / \$3,900,000$ or 0.64 years.

Exhibit 2 shows a range of sulfur spreads from \$30/MT to \$220/MT and their equivalent payback periods. Lower sulfur spreads in first-quarter 2019 increased the payback period to three years. This year’s high premium for compliant bunkers has shortened the payback to under a year.

Exhibit 2 Scrubber Payout Curve for VLCC



Source: Industry Presentations, Morningstar.

Our analysis is one example using a VLCC supertanker. There are many different vessel types and sizes with different fuel consumption rates. All of these would have different scrubber payback curves. And we should also note that vessels can consume less fuel and save cost by slow sailing rather than installing scrubbers, but that reduces availability for charter earnings. Vessel owners also consider market time charter rates when determining profitability, meaning that fuel cost is not the only variable. However, every vessel is consuming fuel and has to manage those costs regardless of market charter rates.

Conclusion

Ship owners that bought scrubbers before the IMO 2020 deadline are feeling a lot better right now than they were last year when international tensions narrowed the sulfur spread. Given what happened in less than a year, though, scrubber economics are far from bulletproof and could reverse again. If too many owners scramble to purchase scrubbers, then high-sulfur fuel oil could become scarce and narrow the spread again. It is still early in the post-IMO 2020 scramble to predict long-term winners. Teething troubles delivering the compliant fuel have contributed to the current high prices that many believe are unsustainable because they exceed the cost of lighter fuels like diesel. Certainly, the IMO saga that dominated refining and shipping news last year hasn't drawn to a conclusion yet. ■■

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