

## LPG in World Markets

### Scrubbers lose sheen as LFSO-HFSO price spread narrows

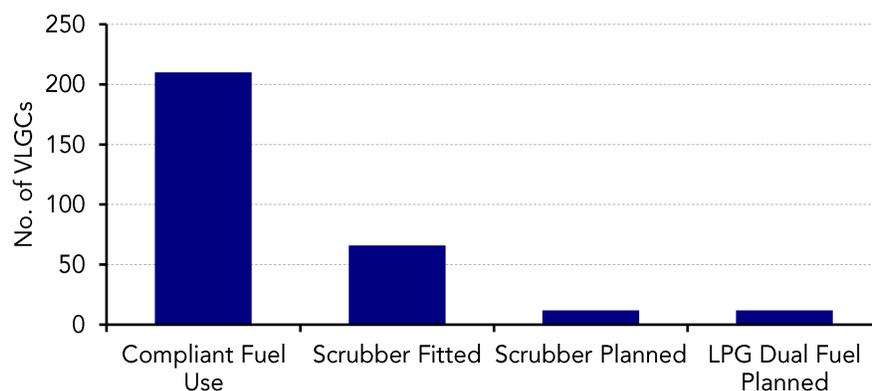
The International Maritime Organization (IMO) set the limit for sulfur in marine fuel oil used onboard ships operating outside designated emission control areas to maximum 0.5% m/m (mass by mass) in order to limit SOx emission from ships starting 2020. As a result, shipowners were left with three broad options to limit sulfur emission – switch to compliant fuel oil, install an exhaust gas cleaning system (scrubber) onboard the vessel, or switch to an alternative fuel such as LNG, LPG, ethane, methanol or ammonia.

Ship owners in different shipping segments weighed in their options, which was guided by the price spread, and an outlook for it, between high sulfur fuel oil (HSFO) and the compliant fuel oil (LSFO) and cost of implementing technology the choice and its compatibility with the vessel. In the VLGC market, likely as a result of the cargo's properties, there was also interest around the last of the three solutions, that is, using LPG as a marine fuel.

Against this background, Poten analyzed what has been the popular compliance technique in the VLGC segment so far and how is it developing in the near future. As of Aug 2020, total 66 VLGCs have been fitted, or are undergoing fitting works, with scrubbers in the current fleet of 299 vessels, according to market inputs and company announcements. Poten estimates 11 more ships will be fitted with scrubbers, while 12 vessels will be fitted with dual fuel engines designed to use LPG and marine fuels.

Thus, around 70% of the existing VLGC fleet plans to use LSFO, while 22% have been fitted with scrubbers and a further 4% planning for scrubber installation. Just around 4% of the existing fleet will be using LPG as marine fuel.

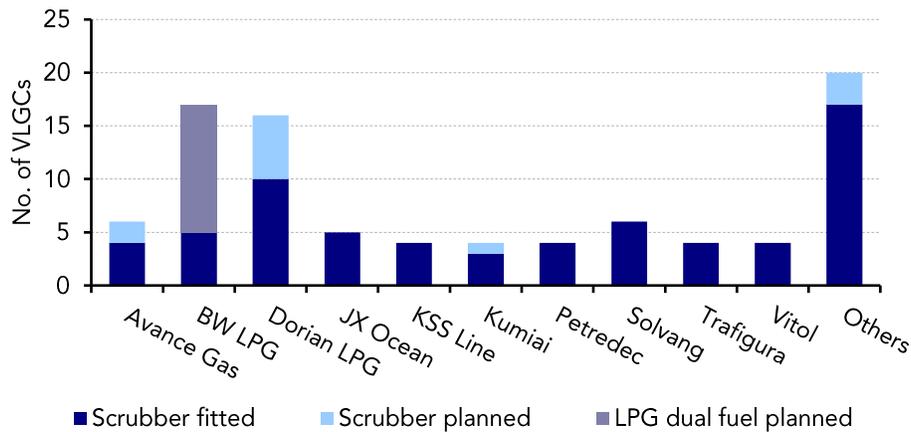
#### Emission regulation compliance choice among VLGCs



Among major owners, BW LPG plans to retrofit 12 of its VLGCs with LPG dual fuel engines. Two VLGCs owned by BW LPG are currently undergoing LPG dual fuel engine retrofitting works and two more are planned during the remainder of 2020. The owner plans to retrofit eight VLGCs with LPG dual fuel engines in 2021. BW LPG has also fitted four of its VLGCs with scrubbers, while one vessel is currently undergoing scrubber installation.

Dorian LPG has fitted 10 of its VLGCs with scrubbers and is planning to retrofit six more vessels with scrubbers. Avance Gas has already fitted four of its vessels with scrubbers and there are plans to retrofit two more vessels with scrubbers.

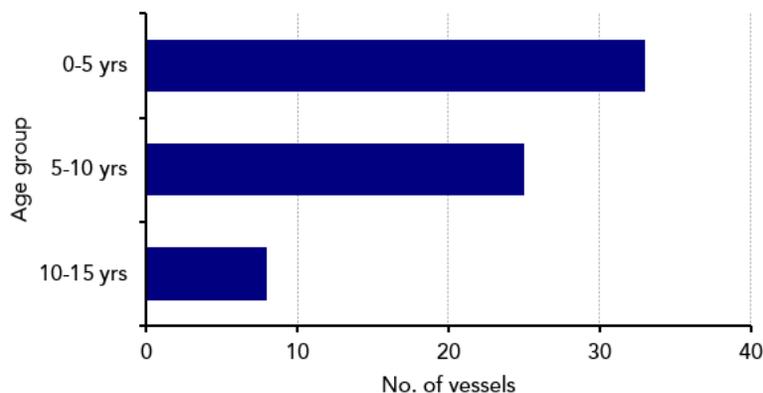
### Emission regulation preparation by shipowner



In terms of type of scrubbers, open loop scrubbers appear to be more popular. Out of 66 VLGCs that have scrubber fitted onboard the vessel, whether yard-fitted or retrofitted, 80% have open loop scrubbers. The rest are hybrid types. Out of the 12 VLGCs that are currently planning to install scrubbers, 64% will have open loop type scrubbers.

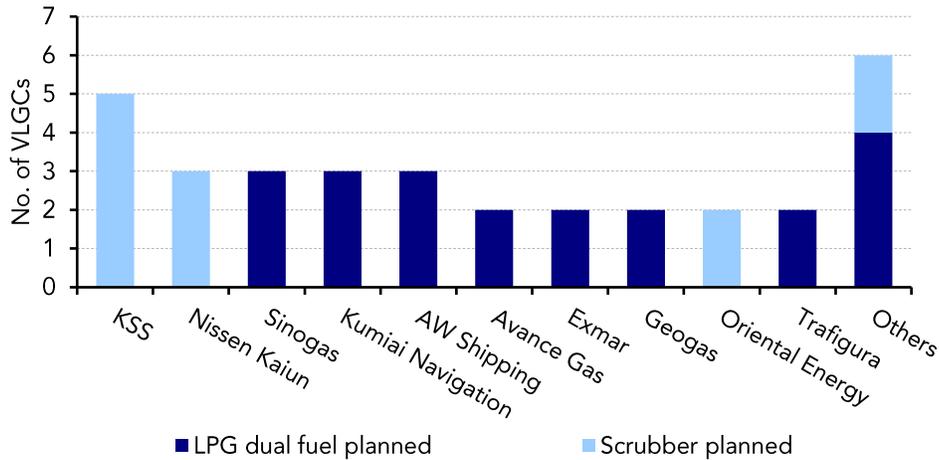
An age profile analysis of the vessels which have already been fitted with scrubbers reveals that 50% of the vessels were built during 2015-2020, while 38% are over five years of age but are less than 10 years old. The rest of the vessels were built between 2005 and 2010.

### Age profile of scrubber fitted VLGCs



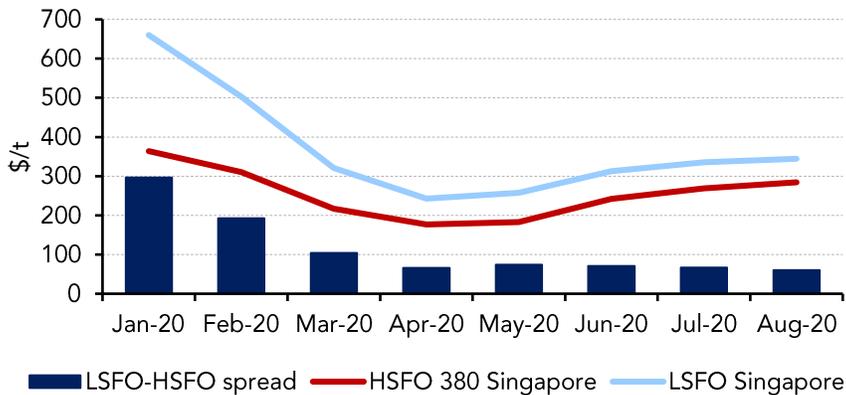
As for VLGC orderbook as of Aug 2020, dual fuel LPG engines appear to have won the race, most likely due to the narrowing gap between LSFO and HSFO, as well as due to the efficient designs put out by major shipyards. A total of 12 VLGCs out of 33 on order currently have plans to put a scrubber onboard the vessel, while 21 VLGCs will come out of the yard fitted with LPG dual fuel engines.

### VLGC orderbook: emission regulation preparation



Among shipowners in the latest orderbook for VLGCs, Sinogas, Kumiai Navigation, AW Shipping, Avance Gas, Exmar, Geogas, and Trafigura have opted for LPG dual fuel engines to meet emission regulations for its vessels on order, while KSS Line and Nissen Kaiun have preferred scrubbers for their vessels. Among other owners, Iino Lines, Wideshine, and Union Maritime have opted for LPG dual fuel engines over scrubbers.

### LSFO-HSFO price spread



Source: Reuters

Meanwhile, the price spread between LSFO and HSFO, a useful measure to calculate how much money will be saved on bunker costs, has narrowed significantly since January. The price spread between LSFO and HSFO at Singapore, a key bunker hub, plunged from a high of around \$296/t in January to just around \$60/t in August. The pandemic-related oil price crash has been the biggest reason for the narrowing spread, and forward sentiments as reflected by crude futures indicate that the price spread might not widen in the near future, which has compelled many owners to rethink their strategies for emission compliance.