

## Wärtsilä Shipborne Scrubbers Being Installed as Retrofits and on Newbuilds

On a retrofit basis, Wärtsilä has installed about 200 scrubbers in roughly 85-90 installations. Retrofitting a vessel typically takes about eight months—six-to-seven months for Wärtsilä to deliver the equipment and two-to-four weeks to do the actual retrofitting. Bulkers and tankers are the easiest to retrofit as there is a lot of room to accommodate the system and can be done in a very cost-efficient manner. While passenger vessels are the most difficult to retrofit as it more difficult to find space for scrubbers, this is actually the biggest segment of the Wärtsilä business. The largest scrubber system (a 2 X 45 MW unit) was installed by Wärtsilä on Royal Caribbean's *Harmony of the Seas*. Shipowners tend to be most interested in installing scrubbers on cruise, Ro-Ro, and Ro-Pax vessels, particularly those which operate a great deal of time in the IMO's ECAs. While the majority of Wärtsilä scrubbers are installed via retrofits (60-65 percent), about 30-35 percent of Wärtsilä scrubbers are installed on newbuilds, according to a presentation by Sigurd S. Jenssen of Finland-based Wärtsilä Environmental Solutions at the World Fuel Oil Summit in Athens on May 20, 2016. The summit was hosted by the Public Power Corporation of Greece and organized by Axelrod Energy Projects.

For three different owners, Wärtsilä has installed scrubbers on a total of eight LPG tankers. Of those eight tankers, six have received an open-loop scrubber, one a closed-loop scrubber, and one a hybrid

scrubber. MW capacity for the eight scrubbers ranges from 9 MW - 20 MW. Two of the vessels are retrofits and six are newbuilds with the vessels ranging from 12,000 - 84,000 cum. While some of the ships operate completely in ECAs, other do not. From a technical standpoint, installations on crude or product carriers would be identical to installations on LPG carriers. Scrubbers have been used in land-based operations for years and they now have amply demonstrated their capability in the marine environment. A shipborne scrubber can allow a vessel to comply with environmental regulations while maintaining the ship's existing infrastructure.

Shipowners exhibited a strong interest in scrubbers in the run-up to the 0.1%S cap in January 2015. But some of that enthusiasm waned as bunker prices fell steeply alongside crude prices. Payback for scrubber installation is between two-to-five years, and payback can be expected to accelerate with the coming 0.5%S global cap (which could start as early as January 2020). The shipping industry has proven it can survive with residual fuels costing \$650/mt, and has recently been paying around \$238/mt for 380 cSt and \$450/mt for MGO in Rotterdam. That spread between MGO and HFO can be expected to hold steady if not increase. Operating a scrubber costs the shipowner \$15-16/hr depending on the type of ship while that same owner would pay \$600-650/hr to operate on MGO. ■