Scrubbers versus distillates

As the debate rages over whether scrubbing technology or low-sulphur fuels will help shipping meet stringent emissions targets, Bunkerworld looks at both sides of the argument.

As the International Maritime Organization (IMO) faces increasing pressure to implement regulatory emission reduction measures, one issue continues to take centre stage: should the industry switch to low-sulphur distillates or continue burning fuel oil bunkers and use abatement technology to mitigate emissions?

Since the IMO cleared the way for scrubbers to be accepted as part of an internationally-sanctioned sulphur-emission reduction regime in 2008, debate has raged over which method provides the most effective solution with the least impact.

The International Association of Independent Tanker Owners INTERTANKO is one organisation championing the move to cleaner fuels, raising concerns over the cost, reliability and feasibility of scrubbers. Over the past few years, the organisation has taken numerous stands to reiterate the need for the industry to make the switch, sooner rather than later, to meet stringent emissions targets.

"The solution proposed by INTERTANKO is more reliable, although it may not be not the cheapest. If one puts environmental protection and human health first, then the INTERTANKO solution is the answer," its technical director Dragos Rauta said earlier this year.

ECA fuels

In March the United States and Canada submitted a joint application to the IMO to set up an Emission Control Area (ECA) within 200 nautical miles of the East and West Coasts. This would be a substantial expansion of the geographical area covered by sulphur restrictions, which has sharpened the debate over compliance.

Ships operating within ECAs are currently required to observe a 1.50% sulphur limit for the fuel used. The limit will fall to 1.00% in July 2010, and to 0.10% from the start of 2015.

A new organisation, the Exhaust Gas Cleaning Systems Association (EGCSA), formed by some of the sectors' leading manufacturers, came out in favour of the ECA saying that scrubbers could help shipowners meet those targets.

INTERTANKO was quick to react. "The theory of using scrubbers has always been promoted for its alleged economical advantage, namely ships continue to use dirty residual fuel because it is cheap," Rauta said. "In promoting a product, the maker will always present his product in the best light possible."

Those in favour of abatement technology, however, say that switching to cleaner fuels is not the best option.

"A switch by the shipping industry from bunker fuel to low-sulphur distillates could prolong the global recession and continue to impact on oil prices," Jorn Winkler, founder of marine technology company DK Group, told Sustainable Shipping. "Using a scrubber is the most efficient way of reducing particulate matter. All this misinformation from BIMCO and INTERTANKO is holding the industry back."

Winkler's remarks mirror those industry concerns about how the distillate market might be unable to cope with shipping's demand, should the IMO enforce low-sulphur regulations.

A study released in March by Energy Futures Inc, entitled Container Ports and Air Pollution, looked into what would happen should bunker fuel become off limits to the shipping industry for environmental reasons. The results of the study concluded that "entry of marine diesel fuel purchasers into an already stretched distillate fuel market would further strain supplies and could cause prices to escalate."

Ongoing debate to clear shipping's air.

It went onto to say that a switch of 300 million tonnes of bunker fuel per year to cleaner grades of distillate fuel would require an increase in global oil production of 900 million tonnes per year, which is greater than the entire oil production today from any country other than Saudi Arabia or Russia.

Reliability

Another area where the opposing camps seem to be at loggerheads is over the reliability of scrubbing technology onboard ships. INTERTANKO recently highlighedt their concerns that there was a lack of information on the "practicality, efficiency and reliability of scrubbing on different types and sizes of ships".

"What if the scrubber systems break down in the middle of the 200 nautical mile ECA declared by US/Canada? What would the ship do? Shut down the engine until the scrubber works again, with the associated safety risks (irrespective of weather conditions) or continue to run and thus breach MARPOL Annex VI regulations?" said Rauta.

At the Sustainable Shipping conference last year delegates heard from speakers who highlighted that scrubbers have been an accepted technology used in land based power plants since the 1930s, and is therefore a tried and tested method to remove pollutants.

UK-based sea water scrubber manufacturer Krystallon add that their designs began in 2002 with a project on MV Pride of Kent. The project was to prove that sea water scrubbing could be adapted for use on an operating marine diesel engine. Since then numerous tests have been undertaken by Krystallon and other scrubber manufacturers as the technology has developed.

Several companies have developed scrubbing technology for marine applications with test results from sea trials showing particulate matter reduction of around 80%. EGCSA said they are confident that the figure can be substantially improved with further development.

Then comes the question of a scrubbers size, the number of scrubbers needed and cost for larger vessels. According to Winkler, a scrubber can be retrofitted to any size of vessel at a reasonable cost.

"We've just done case studies of a scrubber on a 13,000 TEU vessel, which illustrates that scrubbing can be used on large scale vessels. Retrofitting a scrubber on an average size vessel like a Aframax tanker would cost around $1 million," he stated.

Compromise

One aspect that both camps appear to agree on is that changing to low-sulphur fuels is simply not enough. Rauta said recently that he agrees that changing to cleaner fuels alone will not provide the ultimate solution, but added that scrubbers do not provide the answer either.

According to Rauta, a two step approach to mitigating ship emissions must be taken: First, to switch from bunker fuel to low-sulphur distillate fuel; two, to use other technologies to clean the exhaust further.

So it seems there is no perfect answer, but while both options provide strong arguments and stand firm on their opinions, there are other considerations that must be addressed.

A recent study by the National Oceanic and Atmospheric Administration (NOAA) found that while total particle emissions diminished when burning low-sulphur fuels, the remaining particles had the potential to stay in the air longer if other pollutants were also in the atmosphere.

It is these very particles that pose a greater risk to human health and the environment. Research has suggested that particulate matter (PM) emissions from ocean-going ships could be responsible for about 60,000 deaths a year from heart and lung-related cancers.

Daniel Lack, lead author of the study, told Sustainable Shipping that more research was needed to study the effects of low-sulphur fuels.

Alternatives

Then there are the alternatives, or at least those seem more feasible than others. Natural gas was highlighted as one option by the Energy Futures Inc. study.

There are currently 52 oceangoing ships operating or on order worldwide powered by natural gas. Emissions of particulate matter (PM) decline 70%, nitrogen oxides (NOx) fall 72% and sulphur dioxide (SO2) emissions are virtually eliminated when using natural gas, the study said.

Natural gas and electricity are both said to be cheaper fuels than many of the grades of diesel and bunker fuel that are used for goods movement today.

With a number of options coming to the fore, one aspect most agree on is that a clear direction is needed. One that will have the least impact on the pockets of the operators and the environment.

"The industry needs to realise this is not a game. If you don't act now, you face going under. The IMO needs to change its language from voluntary to mandatory when dealing with technology solutions. We have to act now before thousands more die and get sick with cancer," concluded Winkler. ■

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