

Tackling 2020: the impact of the IMO and how shipowners can deal with tighter sulfur limits

Shipping special report

May 2017

Jack Jordan, Editorial Lead, Bunker News

Paul Hickin, Associate Director, Oil News & Analysis



EDITOR'S NOTE

At the risk of stating the obvious, shipowners are in a tight spot. The International Maritime Organization has left them with just over three years to choose between a sharp rise in fuel bills with no guarantee of consistent quality, a huge up-front capital cost for a scrubber or a new ship, or the legal risk of ignoring the sulfur cap and hoping the law doesn't catch up with them. And hanging over everyone is the possibility of the status quo being upended again in a few years as regulators turn to addressing other types of emissions.

Shipowners will first need to have a clear view of their finances, to see if they can access the credit for a scrubber, or whether they'll be in a position to take a cut in profits from higher fuel bills in 2020 – or pass the cost on to their customers. They'll then need to assess the routes their vessels travel on, and talk to suppliers at their regular bunkering ports about the likely availability and price of their preferred fuel. They'll need to take a view on whether non-compliance will be an option for them under certain circumstances, and think about the potential reaction from their investors,

clients, regulators in their home country and the general public if they get caught. And they'll need to look at what their competitors are doing – those who find the least painful method of coping with the sulfur cap will be able to offer the lowest freight rates, and take market share from rivals.

For many shipowners the process of making this choice will be a miserable experience, coming as it does at a time of prolonged stress on the finances of much of the industry. But the upside that rarely gets discussed in shipping circles is the improvements we're likely to see in the environment in the coming years as a result – pollution campaigners estimate as many as 200,000 premature deaths may have been avoided by pushing on with the change in 2020. The process of weaning the shipping industry off a cheap fuel 3,500 times more sulfurous than road diesel was always going to be problematic, but it was an inevitable change that will be welcomed by many.



Tackling 2020: key takeaways

Sleepwalking into lower sulfur fuel

Inertia, or uncertainty, over the various options facing the shipping industry could see them adopting 0.5% sulfur fuel after the International Maritime Organization (IMO) decided to bring in a sharp cut in marine fuel sulfur limits in 2020.

Main Pro: Simplest option on the surface

Main Con: Higher fuel bills and uncertain quality

Stumping up for scrubbers

Equipping vessels with exhaust gas cleaning systems, or scrubbers, allow shipowners to continue burning fuel oil while remaining compliant with the new global sulfur cap, but stumping up as much as \$6 million in cash to install them means short-term pain for a long-term pay off in lower fuel bills.

Main Pro: Cost effective over time

Main Con: Large upfront payment for squeezed shippers

LNG a leftfield option

LNG should be cheaper than sulfur bunkers under normal circumstances, while offering significantly lower emissions giving a cushion against any future environmental rules. However, LNG bunkering is a relatively new solution and uptake is likely to be slow at first.

Main Pro: Protects against future regulation

Main Con: High costs amid unbuilt infrastructure

Non-compliance, the elephant in the room

Whisper it quietly, but non-compliance could occur among a large minority of shippers, especially given the lack of clarity on inspection and enforcement regimes for the sulfur cap after 2020.

Freight rates to skyrocket

There will be a dramatic increase in freight rates across all the shipping sectors. Bunker costs may take up 70-80% of total

voyage expenses. So, as their costs rise, shipowners will do the most natural thing – try to pass those on to their customers.

Shipping challenges ahead

S&P Global Ratings sees fragile demand and structural oversupply weighing on charter rates and the environment is likely to remain difficult. These near term risks are overshadowing the implications of the IMO regulations.

Refining revolution

PIRA, an analytics unit of S&P Global Platts, sees a sharp rise in middle distillate demand and high sulfur fuel oil to plummet in 2020. There is too tight a deadline for any more major capital investment to meet these changes.

No IMO postponement

The 0.5% global sulfur limit on bunker fuels from the start of 2020 is "highly unlikely" to face a delay, Edmund Hughes, Head of Air Pollution and Energy Efficiency at the IMO told Platts in an exclusive interview.

INTRODUCTION

Six months ago, the International Maritime Organization decided to bring in a sharp cut in marine fuel sulfur limits in 2020, rather than postponing the move any further. A century after the global fleet started its shift from burning coal to fuel oil, the shipping industry faces another profound change in its fuel consumption habits – driven this time by environmental regulation.

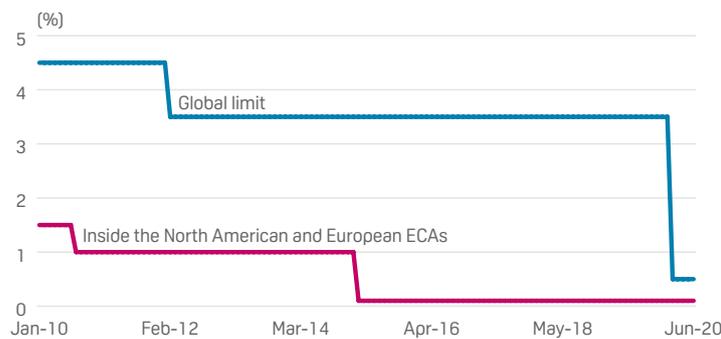
Last October the IMO decided to cut sulfur limits for bunker fuels worldwide from 3.5% to 0.5% from the start of 2020. The organization had originally agreed on 2020 as the implementation date in 2008, but allowed itself the possibility of postponing the cut by up to five years, subject to an external review on the likely availability of low sulfur fuels.

Consultancy CE Delft was chosen to carry out that review, which it published last year. It concluded that even under a more trying scenario of strong shipping demand growth and the majority of the global fleet using 0.5% sulfur bunkers, the refining sector would be able to produce sufficient 0.5% sulfur product to meet the industry’s needs.

But a rival study by EnSys Energy and Navigistics Consulting, and sponsored by shipping body BIMCO and oil industry organization IPIECA, found that although sufficient refinery nameplate capacity might be available for new 0.5% sulfur demand from shipping, effective utilization of that capacity for the shipping industry’s needs was unlikely to happen. Prices for 0.5% sulfur bunkers could rise sharply after 2020 as a result, the EnSys report said.

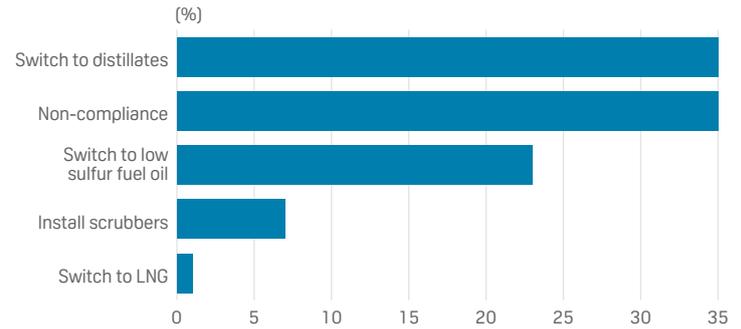
According to a study by consultancy Wood Mackenzie earlier this year, the shipping industry’s annual bunker costs could rise by up to \$60 billion in 2020 with full compliance with the IMO’s sulfur cap. They made the assumption that the majority of the world fleet would switch from high sulfur fuel oil to a gasoil-based fuel.

TIMELINE OF CHANGES IN SULFUR EMISSIONS REGULATION



Source: IMO

HOW DO YOU THINK VESSELS WILL COPE WITH THE EMISSION CONTROL AREAS SULFUR CAP IN 2020?



Source: FUJCON bunker conference survey, March 2017

In March, the International Bunker Industry Association provided another estimate of the potential cost, using a model provided by Marine and Energy Consulting. They estimated the rise in annual costs would be \$24 billion from 2020.

Shippers have a variety of options in how they choose to address this sharp rise in fuel costs in less than three years. Shifting to buying 0.5% sulfur bunker oil is likely to be the mainstream option, in particular when the shipping industry’s current inertia and financial problems are considered, but owners also have the option of investing in emissions-cleaning technology, shifting to cleaner alternative fuels or even ignoring the rules entirely and hoping they don’t get caught.

Let’s look here at the advantages and disadvantages of each of these options in turn.

0.5% SULFUR BUNKERS

On paper the simplest response to the IMO’s decision looks to be switching to a 0.5% sulfur fuel – and this is likely to be the option most shipowners fall into by default. The difficulty will lie in the price and availability of these fuels.

The first problem to examine is that there is no universally accepted refining method for producing a 0.5% sulfur fuel. The experience of northwest Europe in implementing its 0.1% sulfur emission control area at the start of 2015 suggests the market for these fuels will be fragmented, with several different specifications on offer.

There are some crude oils sweet enough to produce a residual fuel oil of around 0.5% sulfur directly from a refinery’s crude distillation unit. In some cases fuel oil may be desulfurized using hydrogen or other catalysts to produce the cleaner grade. And residue from a refinery’s hydrocracker or vacuum distillation unit may also be used, either on its own or blended with fuel oil and middle distillates.

Having this wide range of options is convenient for refiners, but will cause problems for the shipping industry. Blended products in particular may not be reliably stable, or may be incompatible with other fuels. This can lead to sludge forming at the bottom of a vessel's fuel tank, risking blocked filters or even engine failure.

These problems will make the 0.5% sulfur bunker market chaotic for the first few years after 2020, at least until a standardized set of specifications can be agreed upon. A container ship bunkering at Rotterdam and then topping up its tanks again in Singapore will need to have similar fuels available at both ports to avoid compatibility problems.

At the bunkering hubs a wide range of 0.5% sulfur fuels should be available immediately at the start of 2020, but at smaller ports the range can be expected to be more limited.

The other main problem with sourcing new 0.5% sulfur fuels is the price; the sharp rise in fuel costs likely to happen in 2020 has been shipowners' main objection to the IMO's decision.

By the end of April 0.1% sulfur marine gasoil was trading at a \$159.25/mt premium to 380 CST high sulfur fuel oil in Singapore, a \$151/mt premium in Rotterdam and a \$248.35/mt premium in Fujairah. A 0.5% sulfur bunker fuel could be expected to trade at a discount to 0.1% sulfur MGO, so these premiums should be at the higher end of what a 2020-compliant buyer would pay under current circumstances.

But current circumstances won't continue. In its base case the CE Delft fuel availability study forecast marine high sulfur fuel oil demand to drop from 228 million mt/year in 2012 to 36 million mt/year in 2020, while 233 million mt/year of new 0.5% sulfur bunker demand will emerge.

When the majority of marine fuel oil demand disappears in three years' time, the change will take away the main outlet for this refined product and the price can be expected to drop sharply. In theory the price would need to drop to the level at which it becomes competitive with coal as a power generation fuel before it could stabilize.

At the same time, the 233 million mt of new 0.5% sulfur demand may put some upward pressure on prices for those products as the marine market starts to compete with road diesel and heating oil consumers for limited middle distillate supplies.

This situation could leave the premium for 0.5% sulfur bunkers over conventional high sulfur fuel oil widening to as much as \$400/mt by 2022, according to some estimates. That would represent a \$40,000 rise in daily fuel bills for a container ship burning 100 mt/day.

NOT JUST A SHIPPING PROBLEM

There are quite a few options available to shipowners to reach compliance with the new sulfur cap. All of those have two things in common – high costs and uncertainty. Whichever way shipping companies decide to go, each one of them will have to make long-term expensive bets in an already troubled market. These decisions, like ripples in the water will affect their business strategies and investment decisions, like sale and purchase of tonnage for years to come.

In the meantime, what seems inevitable is the upcoming dramatic increase in freight rates across all the shipping sectors. Bunker costs may take up 70-80% of total voyage expenses. So, as their costs rise, shipowners will do the most natural thing – try to pass those on to their customers. Of course, in the currently weak freight market shipowners do not have enough clout to make clients take up the whole bill, but the lion's share will still have to be absorbed by those who pay for the transportation of goods. And numbers here can be quite substantial.

If we take an example from the dry bulk market, a delivery of 50,000 mt of sugar on a modern Supramax vessel from Brazil to North China, using MGO instead of the standard 380 CST fuel oil may cost around \$225,000 extra in bunker costs, considering the current bunker price spread in the port of Singapore. As this spread by some estimates could get two to four times wider in 2020, the added expenses may easily go over half a million dollars. This is just for one voyage.

If we assume that China imports 2.5 million mt of Sugar from Brazil and does it all on Supramax vessels, the total extra bunker costs on just this single arbitrage may easily reach \$25 million. A sum that would have to be absorbed by higher freight rates.

While this is an extra pain for shipowners, considering the weakness in the freight market, it can be both a problem and a blessing for traders. Depending on which side of the fence they are sitting on. High freight is an issue for long-haul suppliers as it makes their CIF price less competitive. For example, it can make Brazilian sugar less attractive for Chinese buyers. China might instead pay more attention to closer suppliers like Australia or Guatemala and those countries might find higher bunker prices to be a blessing.

Such examples are easily found in pretty much every commodity market across every shipping sector. So at the end of the day, one thing is for certain: as shipping tries to adjust to the new sulfur cap, it will not be an isolated battle. Anyone with the skin in the game of seaborne trade will feel this one way or another.

— [Alex Younevtch, managing editor, freight markets, S&P Global Platts](#)

Moving into the middle distillate market will also mean shipowners' fuel costs will fluctuate in unexpected ways over which they have little influence. While fuel

oil crack spreads tend to move largely in response to demand from shipowners in various key locations worldwide, in the middle distillate market marine demand will only take up a small segment and will be less influential.

Shipowners will have to get used to a situation in which a spike in heating oil demand after a cold snap in the US could lead to a sharp rise in their fuel bills overnight.

Lastly, regional imbalances of middle distillate supply and demand mean the location of the cheapest bunkers is likely to change.

Rotterdam currently relies on cheap Russian fuel oil cargoes to supply bunkers at a lower price than most competing ports worldwide. But Europe is a net importer of middle distillates, unlike the Middle East and Asia-Pacific regions where more advanced refineries are delivering a higher distillate yield.

Once 0.5% sulfur bunkers become the default marine fuel, it seems likely that shipowners looking for the lowest prices will need to shift their bunker purchases to Suez or Singapore.

SCRUBBERS

Equipping vessels with exhaust gas cleaning systems, or scrubbers, is a solution that many in the shipping and bunkering industries are keen to promote.

By installing a system that sprays alkaline water into a vessel's exhaust, the shipowner can remove sulfur dioxide and other unwanted chemicals from its emissions. The technology has long been used in land-based power plants, though it remains less well-tested at sea.

The principal advantage of scrubbers is that they allow shipowners to continue burning fuel oil while remaining compliant with the new global sulfur cap. But this comes at a cost: the shipowner needs to find up to \$6 million in advance to install the equipment on each vessel.

Over time, that capital will be saved in lower fuel bills – and the speed of return on investment will be determined by the price differential between high sulfur fuel oil and 0.5% sulfur bunkers.

Finnish technology company Wartsila, one of the world's largest scrubber manufacturers, gives a case study of a typical tanker with an 8 MW engine for which a payback time of around 4.8 years could be expected for a scrubber installation costing €3.8 million (about \$4.2 million).

For a container ship with a 20 MW engine the payback time for a larger scrubber costing €5.275 million would be around five years, according to the company's estimates.

On top of the capital expense is the cost of taking the vessel to dry dock for about a month to install the equipment, if the shipowner is retrofitting an existing vessel with the system.

A lack of shipyard space worldwide may limit the uptake of scrubbers before 2020, as the global fleet is currently also gradually being retrofitted with ballast water management systems to comply with new regulations.

The length of payback time, along with the time needed in dry dock, means that scrubber retrofits would not be cost-effective for any vessel likely to be scrapped within a few years.

Some are hoping scrubber installation prices will drop in the coming years before 2020 as more manufacturers enter the market, while others are waiting to check how effective the systems are before committing to the investment.

Shipowners looking at scrubbers will also need to consider which type is most suitable for their needs.

Open-loop scrubbers take in naturally alkaline seawater and then flush the discharge out to sea, while closed-loop systems add caustic soda to raise the alkalinity of the water being used, and have the option of the discharge being retained to dispose of at port. Hybrid systems with the option to work in either open- or closed-loop modes are also available.

Closed-loop scrubbers come with a much higher operating cost, with the expense both of the caustic soda constantly being added and of the discharge disposal. Open-loop scrubbers also tend to be considerably cheaper to install, with a price tag as much as \$800,000 lower than closed-loop versions in some cases.

But open-loop systems come with a regulatory risk: lawmakers concerned about ocean acidification may seek to prevent shipowners from simply removing the sulfur from their emissions and then dumping it in the sea.

There's also a wider regulatory risk with all types of scrubbers, in that they are not designed to cope with all of the environmental regulations likely to be imposed on shipping over the next decade.

The current technology is suitable for removing sulfur and nitrogen from emissions and with some modifications may be able to remove most particulate matter. But if restrictions on carbon emissions come into

force, the current scrubber technology would not be a cost-effective means of complying.

The main stumbling block preventing shipowners from taking on scrubbers in higher numbers is the up-front capital investment required. Shipping companies in many cases are struggling to access credit for their day-to-day costs, and most are unlikely to find banks willing to loan them several million dollars for a retrofit.

But credit may be available from other sources. With a relatively short time over which the savings a scrubber enables overtake the initial cost, most shipowners could be expected to repay their loans promptly.

A large container line is reported to have signed a deal with a bunker supplier for the supplier to provide credit to fit scrubbers on board the shipping company's vessels in return for the shipper guaranteeing future fuel purchases.

Major oil refiners will be keen to secure some guaranteed demand for their remaining fuel oil output after 2020, and they have large enough balance sheets to cope with the risk they would take on by lending to the shipping industry.

Market sources say more suppliers may be willing to sign similar deals as part of term contracts lasting at least five years.

The availability of fuel oil after 2020 may prove to be a problem for some shipowners using scrubbers. The shift to 0.5% sulfur fuels in 2020 will make conventional fuel oil bunkers much more of a niche product, and at smaller ports many suppliers may give up on keeping fuel oil in storage.

If a situation emerges where a single supplier has a monopoly on fuel oil bunkering for vessels with scrubbers at some ports, that supplier is likely to charge much more for the product – paring back the shipowner's potential savings.

There is also a risk of scrubbers becoming a victim of their own success. CE Delft forecasts at most 38 million mt/year of fuel oil demand from vessels with scrubbers in 2020.

But if a larger portion of the global fleet is retrofitted, more fuel oil demand will be preserved and the price difference between high sulfur fuel oil and 0.5% sulfur bunkers will narrow over time.

In this scenario the shipowners that were earliest to fit scrubbers will see the greatest advantage – particularly those that installed the technology to use in the European or North American 0.1% sulfur emission control areas in 2015.

LNG AND OTHER ALTERNATIVES

The next option to consider is finding a less conventional bunker fuel to switch to that still complies with the IMO's standards. Several industry players, as well as many politicians in Europe and North America, have long been advocates of LNG bunkering as a solution to the shipping industry's environmental problems.

LNG should be cheaper than 0.5% sulfur bunkers under normal circumstances, while offering significantly lower emissions. The main advantage of switching to this fuel is in how it protects against future likely environmental restrictions for shipping – on nitrogen, particulate matter and carbon emissions.

Another advantage is the lack of potential compatibility issues, as a fairly consistent specification of the fuel should be available at all ports with LNG bunkering facilities. And dual-fuel engines capable of burning MGO as well as LNG are widely available, meaning the shipowner can switch fuels if LNG becomes more expensive.

As with scrubbers, the main objection to LNG bunkering is the costs involved. Retrofitting an existing ship with an LNG engine would be prohibitively expensive, so any shipowner looking into this option will need to be in a position to buy a new vessel.

Another significant cost is that LNG engines and fuel tanks typically take up much more space on board than their conventional equivalents, cutting down on the amount of cargo a vessel can carry.

The need for more complex crew training, as well as concerns over its safety, have also been cited as barriers to the widespread adoption of LNG bunkering.

The other problem with LNG bunkering is that it remains a relatively new phenomenon, except for LNG tankers that can burn their own cargo, and the infrastructure for it to become a mainstream option has not yet been built.

At present LNG bunkering is mostly being done by passenger vessels steaming short distances around Scandinavia. The fuel is delivered either by truck or by ship to ship transfer from small barges.

While these delivery methods are suitable for smaller vessels, they would be far too slow for the larger container ships and oil tankers. These ships would either need delivery to be ex-wharf or from large bunker barges.

Some of these barges have been designed and ordered already, and northwest Europe's first ones

are due to become operational later this year. But until the infrastructure is consistently available at most major ports worldwide, shipowners with unfixed schedules will not be in a position to order LNG-fueled vessels.

One other disadvantage of LNG is the “methane slip” issue. While burning LNG will produce much less carbon dioxide than a gasoil-based bunker fuel, if you include the natural gas that can escape while bunkering, the greenhouse gas emissions can be higher.

If lawmakers decide to factor methane slip into their calculations of the environmental impact of LNG bunkering, they may start to look on it less favorably.

LNG isn't the only alternative fuel being pitched to shipowners as a means of adjusting to the new sulfur cap. Thanks to a sharp rise in production in the US, interest in methanol bunkering is also starting to rise.

Methanol has similar environmental advantages to LNG, with lower sulfur, nitrogen, particulate matter and carbon emissions than gasoil-based fuels.

It should also be cheaper than 0.5% sulfur bunkers under most circumstances, and its properties as a liquid fuel are easier for shipping crews to work with than those of LNG.

Installation costs of a small methanol bunkering station have been estimated at around €400,000, according to a report by FC Business Intelligence and the Methanol Institute published in 2015, while a bunker barge could be converted to carry methanol for around €1.5 million.

That compares with a bill of about €50 million to build an LNG terminal, and €30 million to build a new LNG bunker barge, according to the reports.

But methanol also has the same problem of requiring huge capital expenditure up front. While it can be cost-effective to retrofit a vessel to use methanol, the cost of doing so and of taking a vessel to dry dock is still high. Methanol bunkers also have the disadvantage of not being reliably available at all major ports.

A GAME-CHANGER FOR THE REFINING INDUSTRY

2020 is a game-changer. When the global specification for bunker fuel cuts its sulfur content on January 1 that year, we're going to see a surge of middle distillate demand and a sharp drop in high sulfur fuel oil.

So how does the refining industry meet this? It looks like we have to change 3 million b/d of high sulfur fuel oil into a comparable volume of compliant 0.5% sulfur bunkers.

There just isn't the capacity to do that by desulfurizing. And you're not going to do it by changing crudes either – you're not going to leave high sulfur crude in the ground and somehow magically find a lot more heavy low sulfur crude that we can use to produce the new bunker fuels.

So we're going to have to figure out a way to destroy some of this high sulfur material, segregate some low sulfur material and get some more middle distillates to blend into the 0.5% sulfur product.

The bottom line in PIRA's forecasts for refining capacity additions is that the net supply of high sulfur products could decline by 1.4 million b/d by 2020 and the low sulfur supply grow by 900,000 b/d. But the net demand requirements are much higher.

We need to destroy close to 3 million b/d of high sulfur product, create more than a million b/d of low sulfur and also create more middle distillates – for other demand growth purposes as well as the bunker market.

Looking at the net balance, we're about 1.5 million b/d out – long on the high sulfur, and short on the middle distillates and low sulfur.

But that's with natural yields from capacity that we know is coming on by 2020. This capacity isn't enough, which means that prices will have to move for more expensive steps to be taken. That could include running cokers at maximum utilization, switching the feedstocks going into residual catalytic crackers or other measures.

And in the end you may encourage some additional burning of fuel oil to get rid of it. The Saudis burn crude and fuel oil to make electricity for desalination, and this could spill into other areas like Russia if the product gets cheap enough.

2020 is less than three years away now, and that's too tight a timeline for any more major capital investment. If they had implemented the change in 2025 instead it would have been easier, but changing the date no longer appears to be an option.

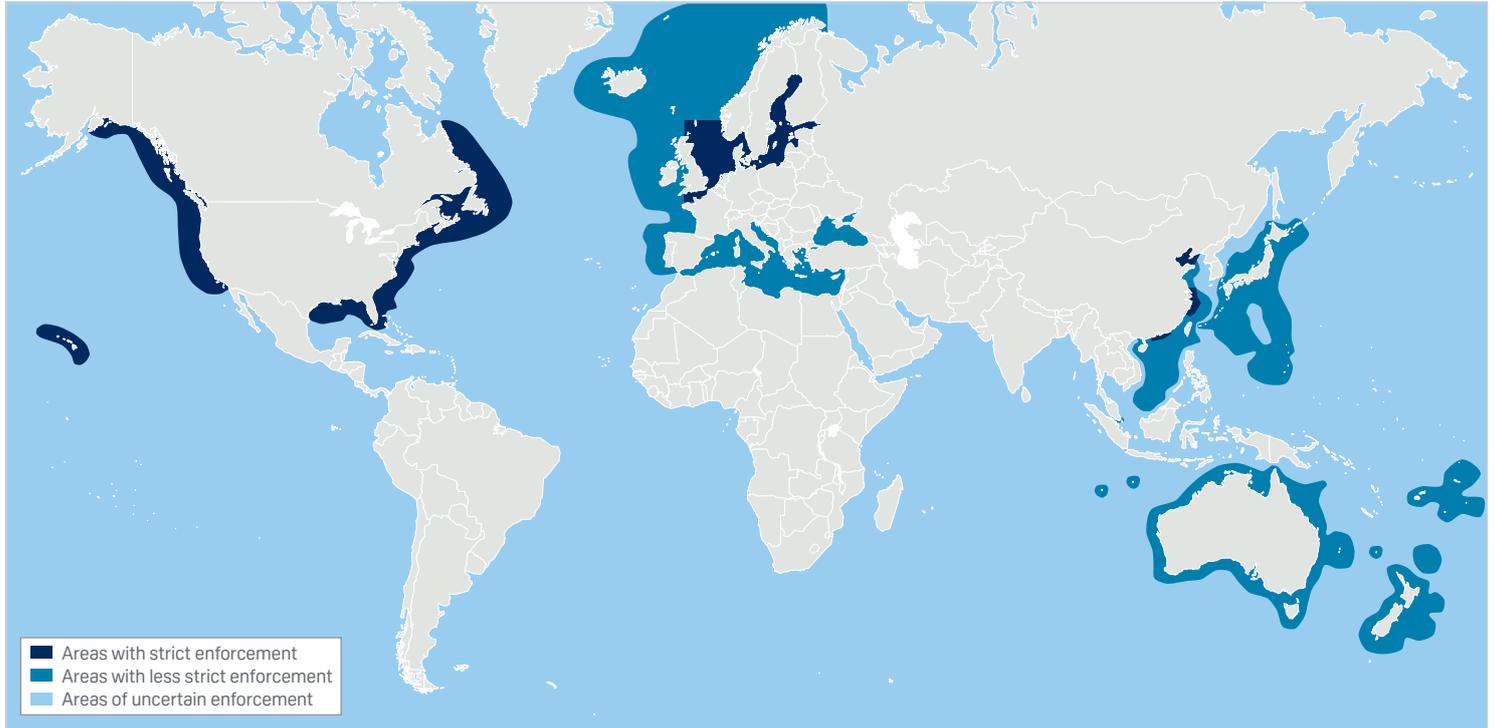
— [Rick Joswick, managing director of global oil, PIRA](#)

REFINING CAPACITY: CUMULATIVE CHANGES BY 2020 (vs 2016)

million b/d	Increased crude/ cond runs	New facilities added						Net supply	Demand	Long/ (short)
		FCC	H/C	Coking	Dist. flux saved	VGO HDS	Resid HDS			
Runs/Capacity	3600	400	1100	900			300			
Mogas/Naphtha	1000	200	200	100				1400	1200	200
Middle Distillate	1200	100	600	400	100			2300	3700	-1400
HS VGO	500	-400	-1000	300			-50	-150	-800	
HS VR	400	0		-800	-100			-100	-600	
HS Resid/HFO	900	-300	-1000	-500	-100		-50	-250	-1400	1500
LS Resid/HFO	400		200				50	250	900	1200
Total	3400	-70	-100	-100	0	0	0	3200	3200	0

Source: PIRA

LIKELY AREAS OF SULFUR EMISSIONS ENFORCEMENT AFTER 2020



Source: Platts

NON-COMPLIANCE

Finally, the possibility of non-compliance has to be addressed. While no-one wants to encourage law-breaking, in some cases the option of ignoring the IMO and continuing to burn fuel oil without a scrubber may look advantageous.

CE Delft's report shied away from dealing with non-compliance as a factor in bunker demand after 2020, but Marine & Energy Consulting estimates as much as 50 million mt/year of non-compliant fuel oil demand may persist in 2020.

The issue here is the lack of clarity on inspection and enforcement regimes for the sulfur cap after 2020. At this year's FUJCON bunker industry event in Fujairah in March more than 30% of respondents to a poll said there would be some degree of non-compliance in emission control areas in 2020.

The US has traditionally been a strict enforcer of environmental regulations in its territorial waters. The European Union has sought to toughen its regime since the cut in sulfur emission limits in the north of the continent in 2015, and Australia and New Zealand are likely to follow Europe's example before 2020.

But outside of these areas, few expect other countries to develop a robust enforcement system before 2020. And if the price differential between high sulfur fuel oil and 0.5%

sulfur bunkers widens to as much as \$400/mt, there will be a strong financial incentive to burn non-compliant fuel wherever you can reliably get away with it. Even in areas of limited enforcement, some shipowners may be willing to risk getting caught if the likely fine is significantly less than their potential saving in fuel costs.

At distances of more than 200 nautical miles away from land, it will be the responsibility of the country under whose flag each vessel is registered to enforce the sulfur cap. And as several key flag states are not signatories to MARPOL Annex VI – the section of the international environmental convention governing air pollution from ships – universal compliance seems highly unlikely.

Most countries are still working on inspection and enforcement techniques for ships in or near their territorial waters, and no concrete plan has yet emerged on how to enforce the sulfur cap in the high seas. Long-distance drones capable of testing emissions and stationed on islands in the middle of the ocean may become the preferred solution to this problem, but there are no signs of this system being implemented in time for 2020.

Some have also suggested the idea of banning keeping high sulfur fuel oil in fuel tanks for vessels without a certified scrubber, or continuously monitoring emissions on board vessels burning high sulfur fuel oil. But these proposals have yet to gain much traction among regulators.

HOW THE FORWARD CURVE IS REACTING TO THE SULFUR CAP

At S&P Global Platts we publish forward curves for various refined product markets up to three years out from the present. That's already giving us a picture of how the market is pricing in differentials between products for 2020, based on current understandings of fundamentals – i.e. reduced HSFO demand, and increased demand for low sulfur residual fuels and gasoil.

Recently we've been watching the Hi-lo closely – that's the price difference between high and low sulfur fuel oil, with the low sulfur product usually the more expensive of the two. We've seen a trade for calendar 2020 with a \$60/mt spread, \$10/mt wider than we previously had it pegged.

We've also seen similar moves in trades for calendar 2018 and calendar 2019.

While the 1% low sulfur fuel oil won't itself be compliant with the IMO's new sulfur cap, it will be a useful blending component for suppliers producing a 0.5% sulfur bunker fuel. With the widening hi-lo in 2020, we're starting to see the market pricing in increased demand for the new low sulfur residual fuel oil-based products.

You can also see a similar trend in the forward curve for gasoil's premium over high sulfur fuel oil. Whereas the current market is showing a premium of about \$200/mt for gasoil, for 2020 the futures market is implying a differential of \$250-300/mt.

All of this is demonstrating how the market is starting to show interest in the new 0.5% sulfur fuels, both distillate- and residual-based. And we can expect to see these differentials widening even further if the shipping industry continues with its current reluctance to pursue alternative methods of complying with the sulfur cap.

— [Ned Molloy, managing editor for fuel oil and Eleni Pittalis, commodity associate, S&P Global Platts](#)

ROTTERDAM'S MGO AND HIGH SULFUR FUEL OIL PRICES



Source: Platts

One problem to note in passing is that not all non-compliance in 2020 will be by ship operators deliberately ignoring the IMO rules. Currently in the US a ship operator can submit a fuel oil non-availability report (FONAR) to the Environmental Protection Agency if it was unable to purchase compliant fuel before entering the US emission control area, and this report will be taken as a mitigating factor in deciding whether or not to prosecute the operator.

If the FONAR system is applied more widely after 2020, and 0.5% sulfur bunkers are not universally available, non-compliance could become widespread. And under a scenario where the FONAR system is used more liberally, you could see situations where an operator is allowed to burn non-compliant fuel because the 0.5% sulfur product available at the last port of call was not compatible with the fuel in its tanks at the time.

But the main disadvantage of non-compliance is that it will not be a long-term solution to the problems posed by the IMO's decision. Politicians, campaigners and wider society are not likely to tolerate a scenario of effectively optional compliance for long, and the length of time before a more robust global enforcement regime emerges will be unpredictable.

Failing to comply with the sulfur cap in some areas may be possible in the first few years after 2020, particularly if the supply of 0.5% sulfur bunkers is unreliable at first, but it will become increasingly risky over time.

S&P GLOBAL RATINGS: OUTLOOK FOR SHIPPING INDUSTRY REMAINS CHALLENGING

The shipping industry is the anchor of global world trade, carrying about 90% of goods. As the world's energy system shifts to cleaner fuels, the IMO expects its cut in marine fuel sulfur limits to have a significant beneficial impact on the environment and on human health. However, the additional cost of compliance is not welcome for the shipping industry, at a time when it is facing weak – albeit recovering to some extent in certain sectors – charter rate conditions and struggling to generate profits.

S&P Global Ratings' outlook for the shipping industry as a whole remains challenging because fragile demand and structural oversupply continue to weigh on charter rates in many of the sub-sectors. We believe that these factors will continue to constrain cash flow generation for most ship operators in 2017.

We rate 18 shipping companies globally in sectors ranging from liquefied natural gas shipping and passenger ferry, which we assess as the least risky, to container liner and dry bulk shipping, which we assess as the most risky.

After taking many negative rating actions in recent years, mostly driven by the persistent low freight rate environment, further downgrades could follow if charter rates underperform our base-case in the short term. This is reflected by the current negative outlooks on one-third of our rated global shipping portfolio. Of the global portfolio,

we rate two-thirds in the B category. Given more immediate challenges, the implications of the IMO regulations are not currently materially weighing on our ratings. Rather, we see other near-term risks as more influential.

If the slowdown in consumption in China – the engine of growth in global trade – is sharper than our economists currently forecast, it would be challenging for the sector. In particular, a decline or a shifting pattern of commodity imports from Asia, a region which imports by far the largest share of iron ore and coal globally, would create difficulties for dry bulk ship operators.

The banking sector's appetite for shipping loans has diminished meaningfully over the past few years of the industry's downturn, and funding has consequently become more selective. Any further tightening in credit conditions could intensify troubles for smaller players in particular.

Scrapping of vessels has been persistently high in recent times—with a record number of vessels scrapped in 2016 – and there has been limited new ordering activity since 2015. However, material new vessel orders would not be welcome in the chronically oversupplied industry.

Considerable political risks and uncertainties exist, such as potential shifts in US trade policy under the Trump administration and the UK's withdrawal from the EU. Any related decline in global trade volumes would be detrimental to the industry.

S&P Global Ratings' price assumptions currently include average crude oil prices of \$50/b for 2017 and 2018, which represent only a moderate increase on last year. However, an unexpected large increase in bunker fuel prices (which strongly track crude oil prices) could weigh heavily on shippers' cash flows and liquidity profiles in certain sectors. Those operating vessels under bareboat- or time-charter contracts would be protected from rising fuel prices, as the charterer normally pays the bunker fuel

bill. Nevertheless, spot operators entering into short-term charters, often for a single voyage at market rates, and container liners bear fuel risk.

Shippers will need to choose how to tackle the stricter IMO requirements over the next three years. Currently weak industry conditions, as well as the 2020 timeframe, have meant that many shipowners may only make final decisions next year.

As our base-case forecasts for the cyclical shipping industry typically apply weightings to financial ratios of 50% for the current year and 50% for the first subsequent forecast year, we expect shipowners' credit metrics to be affected from 2019 (or earlier if shipowners choose to make investments or comply with regulations before then).

Many shippers might choose to meet the stricter IMO requirements by using low-sulfur compliant bunker oil or cleaner alternative fuels from 2020. LNG could be tempting over the longer-term if gas becomes cheaper than oil. Therefore, the key impact on our rated issuers will be the higher cost of the compliant fuel at this time, the extent of which will depend on negotiations with refineries – which will in turn need to ensure sufficient quantities of compliant fuel are available.

Lloyd's List estimates shipping costs could rise between 20% and 85% as a result of the new IMO cap, depending on vessel speed and size, which is clearly very material.

Dry bulk, tanker, and gas carrier operators could be sheltered from rising fuel costs if they operate vessels under bareboat- or time-charter contracts, whereby the charterer normally pays the bunker fuel bill. Nonetheless, spot operators and container liners typically bear fuel risk, although the latter may be able to pass costs through via bunker surcharges (also known as bunker adjustment factor), albeit with some time lag.

GLOBAL SHIPPING COMPANIES RATINGS

Shipping Company	Segment	Rating	Business Risk Profile	Financial Risk Profile
Nakilat Inc.	Gas carriers	AA-/Negative/-- (SACP 'bbb-')	Strong	Aggressive
MISC Bhd.	Oil tankers/gas carriers	BBB+/Stable/-- (SACP 'bb+')	Fair	Intermediate
PAO Sovcomflot	Oil tankers/gas carriers	BB+/Stable/-- (SACP 'bb-')	Fair	Aggressive
Wan Hai Lines Ltd.	Container liner	BB+/Negative/--	Weak	Intermediate
BW Group Ltd.	Oil tankers/gas carriers	BB/Stable/--	Fair	Significant
Capital Product Partners L.P.	Oil tankers/containerships	BB-/Stable/--	Fair	Significant
Navios Maritime Midstream Partners L.P.	Oil tankers	B+/Stable/--	Weak	Significant
Bahia de las Isletas, S.L.	Ferry operator	B+/Stable/--	Weak	Aggressive
Scandferries Aps	Ferry operator	B+/Stable/--	Fair	Highly leveraged
Moby Spa	Ferry operator	B+/Negative/--	Weak	Aggressive
Hapag-Lloyd AG	Container liner	B+/Watch Negative/--	Weak	Aggressive
Navios Maritime Partners L.P.	Drybulk/containerships	B/Stable/--	Weak	Aggressive
Overseas Shipholding Group Inc.	Oil tankers	B/Stable/--	Weak	Highly leveraged
Global Ship Lease, Inc.	Containerships	B/Stable/--	Weak	Highly leveraged
Navios Maritime Acquisition Corp.	Oil tankers	B/Negative/--	Fair	Aggressive
CMA CGM S.A.	Container liner	B/Negative/--	Weak	Highly leveraged
Navios Maritime Holdings Inc.	Drybulk/barges	B-/Negative/-- (SACP CCC+)	Weak	Highly leveraged
Eletson Holdings Inc.	Oil tankers/gas carriers	CCC+/Watch Dev/--	CCC Criteria	CCC Criteria

Source: S&P Global Ratings

Costs may be passed on in some other particular cases, for example, passenger ferry vessels operating near coastlines may be able to raise ticket prices by advertising themselves as more environmentally friendly operators. However, conversely ferry operators may be disadvantaged if they compete with bridges/tunnels, which will not be affected by the higher cost base.

Shipowners could also meet the IMO requirement by investing in approved equivalent methods (which must receive Flag State approval), such as the Exhaust Gas Cleaning System, commonly known as “scrubbers,” for up to \$6 million per vessel (although prices could fall as technology advances).

Some report that scrubbers need at least two to three years to break even, but this could be shorter if residual oil prices drop. However, shippers will need to arrange financing for this option, and we understand that vessels will be out of use (for a month or so) while the equipment is installed. A survey by global financial services company UBS showed that just 19% of owners wanted to install scrubbers due to concerns over the initial cost. However, some argue that a lot of high-sulfur oil will still be produced after 2020, and therefore such fuels will be sold

at a heavy discount (these fuels are residual, naturally derived from the refining process).

Where vessels are leased – for example, by container liners – this will lead to negotiations on whether the lessor or lessee will bear the cost of compliance. Should shipowners bear the entire cost of scrubbers and should lessees pay for more expensive fuel?

Apart from environmental and health benefits, there are some other potential benefits of the IMO regulations to bear in mind. The tanker segment could actually gain from increased demand if fuel prices become more volatile because of arbitrage opportunities. Furthermore, low-sulfur compliant fuel oil will need to be transported to various locations and demand for floating storage may also increase. As a result, the segment would be unlikely to support investment in scrubbers. The new regulation could also add to vessel scrapping, as it's cheaper to incorporate scrubbers into a new-build vessel. This could help to curb chronic supply pressure in the industry.

— [Rachel J. Gerrish and Izabela Listowska, directors, S&P Global Ratings](#)

IMO'S EDMUND HUGHES TALKS TO PLATTS ABOUT DEADLINES, COMPLIANCE AND ALTERNATIVE SOLUTIONS AND APPROACHES AHEAD OF 2020

Edmund Hughes is head of air pollution and energy efficiency in the marine environment division of the IMO.

S&P Global Platts: We sometimes hear speculation in the shipping and bunker industry – especially in Singapore – about whether there will be any delay, or phased implementation, to the IMO's 0.5% global sulfur limit on bunker fuels from the start of 2020.

Edmund Hughes: It's highly unlikely – I'd say there's a negligible chance of January 1, 2020 being postponed. The only way the date could be changed is by an amendment to MARPOL Annex VI – and it takes a minimum of 22 months for an amendment to be proposed, approved, adopted and then enter into force. So a proposal would have to be submitted to MEPC 71 in July in order for a postponement to be considered, and none has been received. Alternatively a Party to MARPOL Annex VI could request the Secretary-General to circulate an amendment, but this would need to happen by September this year, but that's also highly unlikely, after agreement on a timeline only last October at the seventieth session of the Marine Environment Protection Committee (MEPC 70). We have worked hard to get this decision.



It's interesting when people ask whether a phased approach could be adopted, because in fact there has been a phased approach, from 4.50% (adopted in 1997 through the Protocol to MARPOL introducing the new Annex VI), to 3.50% (adopted in 2008), and then to a 0.50% sulfur limit (also adopted in 2008). So the 2020 deadline has been on the table since 2008, and MEPC's decision in October 2016 (to confirm the 2020 implementation date), following a review of that date, should allow sufficient time to prepare. The conclusions of the fuel oil availability study clearly indicate that there should be a sufficient supply of compliant fuel from the refining industry.

Platts: The second topic on everyone's minds is what compliance rate we'll get in 2020. There was at least a perception with the implementation of the 0.10% sulfur ECA zones, that some shipowners used non-availability waivers even when compliant fuel was actually available. What work is being done on the waivers regime?

EH: Ships have to demonstrate the actions taken to comply, that best efforts have been made, in order to seek a waiver – as specified in MARPOL Annex VI, paragraph 18.2.1. The Party can require the ship to “present a record of the actions taken to attempt to achieve compliance.” However, a ship should not be required to deviate from its voyage, nor should they be delayed unduly, in order to achieve compliance (paragraph 18.2.2). The US

has introduced an electronic system for submission of a Fuel Oil Non-Availability Report (FONAR). There's potentially room to learn from such an approach.

But on the broader point, if large sections of the shipping industry decide it's not in their interest to comply with international regulations, we are heading into dangerous territory. Port states, and governments generally, have significant powers under the United Nations Convention on the Law of the Sea (UNCLOS) part XII, to clamp down further to protect the marine environment, if they feel international regulations are not being followed. So if some unscrupulous shipowners are planning on not complying with the 0.50% limit, then the whole industry could face consequences down the road as there is likely to be a significant loss in confidence by policy makers in the regulatory regime for international shipping. The easier route is to buy into the idea that it works because everyone buys into it, as with all other international requirements.

Platts: Is toughening up compliance and verification going to be discussed at the MEPC 71 meeting at the IMO in July?

EH: MEPC will consider a new output on consistent implementation of the 0.50% sulfur limit and the draft scope includes verification and compliance issues, to implement globally, as well as the potential of a "FONAR" type process for waivers. MEPC has already approved a circular providing guidance on sampling from the piping in the engine room, for consistency across port state control authorities. The sampling location is important, for example, to prevent cross-contamination and provide a true representative sample.

The actual size of fines for non-compliance is up to each country – that's something IMO does not have a remit to consider. But I would say that flag states are increasingly conscious of their own reputation. They would not lose their right to be a flag state if they failed to enforce the sulfur limit sufficiently. But they could go onto a black list for port state control, or a gray list, and then ships avoid those flags or reflag. If the ship (or flag) is on a black list under one of the port State control agreements, the ship is likely to be targeted for more frequent inspections. And for shipowners, this goes beyond just fiscal penalties – if your vessel is detained, you can lose your charter.

Another thing to bear in mind is that responsible shipping companies, which are committed to compliance, will have a strong desire to see their governments make sure there is a level playing field. So we could well see individual governments proposing a ban on the carriage of non-compliant fuel for ships that do not have a flag State approved scrubber fitted.

I think generally more people will be aware of the 2020 limit than the ECAs, because it's global – so you don't have the excuse of sailing into a part of the world where you weren't as familiar with the rules.

Platts: There is a lot of thinking going on in the bunker industry about what share of 0.50% demand will be met by clean marine gasoil products, and what share will be a residual blend. On both areas, will the IMO be officially asking the ISO to look into whether the standard ISO:8217 marine fuel specifications might need altering because of this big reduction in sulfur?

EH: Indeed, one part of the new output expected to be approved by MEPC in July, will be to request the ISO to consider the possible new blended fuel types. MEPC has recognized that there are various technical issues to be resolved, and discussions with a broad range of stakeholders to be had on the practicalities of supplying compliant 0.50% fuel oil.

Platts: Beyond sulfur, let's talk about carbon. What stage are we at with the IMO's regulation of carbon emissions from the shipping industry, and how does this fit in with the Paris Agreement, and the EU's approach?

EH: The IMO supports the broader UN efforts to limit global warming to 2 or even 1.5 degrees Celsius, and shipping will play a part in that. The work of IMO to address CO2 emissions can be traced back to 1997 when the Conference adopting the new MARPOL Annex VI adopted a resolution inviting the MEPC to consider CO2 reduction strategies. In December 2003, the IMO Assembly adopted resolution A.963(23) on IMO Policies and practices related to the reduction of greenhouse gas emissions from ships, which urged MEPC to identify and develop the mechanism(s) needed to achieve the limitation or reduction of GHG emissions from international shipping. In the ensuing years, MEPC has since been energetically pursuing measures to limit and reduce GHG emissions from international shipping.

In 2011, IMO adopted the energy-efficiency requirements in MARPOL Annex VI which became mandatory in 2013, bringing in the Energy-Efficiency Design Index (EEDI) for new ships and the Ship Energy Efficiency Management Plan (SEEMP), mandatory for all ships. To date there are nearly 2,500 new ships which are EEDI compliant.

Alongside the technical and operational measures, the MEPC had held discussions on market-based measures and those put forward included an Emissions Trading System, and a Port State levy. It was agreed at the time to suspend discussion on market-based measures in 2013 and the MEPC considered the use of a phased approach to implementation, with the focus of its initial work being on data collection, as a basis for future technical work.

CO2 emissions from ships should be internationally regulated, not regionally, given the nature of the shipping business. Last October, the MEPC agreed a road-map for addressing GHG emissions from ships, which includes consideration of further measures. A data collection system for fuel oil consumption was also adopted at the last MEPC,

and data collection will begin from calendar year 2019. We are working now to build the database and systems for that.

In the medium to long term, by 2050, NGOs tell us, carbon emissions from the shipping sector need to have halved in order to contribute to the well below 2 degrees or hopefully 1.5 degrees C maximum scenario envisioned under the Paris agreement. The issue is that, like other transport, shipping is still largely powered by fossil fuel powered engines, but unlike other transport modes, I'm not aware of a technology that at this time can directly replace the marine diesel engine on the high seas, in terms of cost, efficiency and reliability. Hydrocarbons propel ships and allow shipping to operate to support world trade.

Now, maybe a 50% reduction in carbon emissions per ship is possible, with energy efficiency measures including if you slow ships right down. But what if the global fleet expands from now until 2050, as seems likely, due to growth in demand for trade by ship? Also, slow steaming is fine when

there's overcapacity of ships, like currently, but should we ever see \$100,000 per day charter rates again, the market is likely to respond and ships speed up.

One possible future consideration that has been highlighted is that if a third of all shipping is carrying hydrocarbons from one place to another, and if that trade in hydrocarbons slows down as a consequence of action taken under the Paris Agreement, then possibly the overall growth of emissions from shipping maybe limited. But then you have the whole question of the impact on developing countries. Around 60% of shipping trade serves developing countries, and often forms a core part of their development strategy. Many small island states are at risk of being submerged, due to climate change, yet are also entirely dependent on ships to transport goods in and out, so if the cost of shipping goes up it impacts them hugely. So there are many difficult questions to be resolved.

— [Ned Molloy, managing editor for fuel oil and Eleni Pittalis, commodity associate, S&P Global Platts](#)

Contributors: Paul Hickin, Jack Jordan, Surabhi Sahu, Alex Younevitich, Ned Molloy, Eleni Pittalis, Rachel J, Gerrish, Izabela Listowska, Rick Joswick

Edited by: Maurice Geller

Layout and Design: Martina Klančičar

S&P Global Platts

© 2017 S&P Global Platts, a division of S&P Global Inc. All rights reserved.

The names "S&P Global Platts" and "Platts" and the S&P Global Platts logo are trademarks of S&P Global Inc. Permission for any commercial use of the S&P Global Platts logo must be granted in writing by S&P Global Inc.

You may view or otherwise use the information, prices, indices, assessments and other related information, graphs, tables and images ("Data") in this publication only for your personal use or, if you or your company has a license for the Data from S&P Global Platts and you are an authorized user, for your company's internal business use only. You may not publish, reproduce, extract, distribute, retransmit, resell, create any derivative work from and/or otherwise provide access to the Data or any portion thereof to any person (either within or outside your company, including as part of or via any internal electronic system or intranet), firm or entity, including any subsidiary, parent, or other entity that is affiliated with your company, without S&P Global Platts' prior written consent or as otherwise authorized under license from S&P Global Platts. Any use or distribution of the Data beyond the express uses authorized in this paragraph above is subject to the payment of additional fees to S&P Global Platts.

S&P Global Platts, its affiliates and all of their third-party licensors disclaim any and all warranties, express or implied, including, but not

limited to, any warranties of merchantability or fitness for a particular purpose or use as to the Data, or the results obtained by its use or as to the performance thereof. Data in this publication includes independent and verifiable data collected from actual market participants. Any user of the Data should not rely on any information and/or assessment contained therein in making any investment, trading, risk management or other decision. S&P Global Platts, its affiliates and their third-party licensors do not guarantee the adequacy, accuracy, timeliness and/or completeness of the Data or any component thereof or any communications (whether written, oral, electronic or in other format), and shall not be subject to any damages or liability, including but not limited to any indirect, special, incidental, punitive or consequential damages (including but not limited to, loss of profits, trading losses and loss of goodwill).

Permission is granted for those registered with the Copyright Clearance Center (CCC) to copy material herein for internal reference or personal use only, provided that appropriate payment is made to the CCC, 222 Rosewood Drive, Danvers, MA 01923, phone +1-978-750-8400. Reproduction in any other form, or for any other purpose, is forbidden without the express prior permission of S&P Global Inc. For article reprints contact: The YGS Group, phone +1-717-505-9701 x105 (800-501-9571 from the U.S.).

For all other queries or requests pursuant to this notice, please contact S&P Global Inc. via email at support@platts.com.

For more information, please visit us online or speak to one of our sales specialists:

NORTH AMERICA	EMEA	LATIN AMERICA	ASIA-PACIFIC	RUSSIA
+1-800-PLATTS8 (toll-free)	+44-(0)20-7176-6111	+55-11-3371-5755	+65-6530-6430	+7-495-783-4141
+1-212-904-3070 (direct)				