

Energy Forward

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IMO 2020 & the Global Pandemic

What is IMO 2020?

The main type of "bunker" oil for ships is heavy fuel oil, derived as a residue from crude oil distillation. Crude oil contains sulphur which, following combustion in the engine, ends up in ship emissions. Sulphur oxides ("**SOx**") are known pollutants which can lead to acid rain and can cause harm to human health.

The International Maritime Organization ("**IMO**"), the United Nations agency tasked with setting global standards for safety, security and environmental performance in global shipping, under the International Convention for the Prevention of Pollution from Ships ("**MARPOL Convention**"), first adopted provisions to reduce SOx emissions from ships in 2005 under Annex VI of the MARPOL Convention ("**ANNEX VI**").

ANNEX VI imposes limits on the main air pollutants contained in ships exhaust gas, including SOx and nitrous oxides ("**NOx**"), and it prohibits deliberate emissions of ozone depleting substances. In 2008, the IMO's Marine Environment Protection Committee ("**MEPC**"), adopted amendments to revise ANNEX VI to lower the global limit on allowable sulphur content in fuel oil to 0.5 percent mass by mass (m/m) down from 3.5 percent m/m.

The revisions relating to SOx (hereafter referred to as "**IMO 2020**") came into force on 1 January 2020 and apply to all ships whether they are on international or domestic voyages within the waters of a party to ANNEX VI. For those areas designated as Emission Control Areas ("**ECAs**") under ANNEX IV (i.e. *the Baltic Sea area; the North Sea area; the North American area (covering designated coastal areas off the United States and Canada); and the United States Caribbean Sea area (around Puerto Rico and the United States Virgin Islands)*)¹ the SOx limits were reduced to 0.10 percent/m/m, from 1 January 2015 ("**ECA Regulations**").

An additional carriage ban which prohibits ships from carrying fuel that contains a SOx content greater than 0.5 percent for combustion purposes for propulsion or operation on board a ship unless the ship has an approved exhaust gas cleaning system ("**scrubber**") fitted, came into force on 1 March 2020. According to IMO, this ban was intended as an additional measure to support consistent implementation and compliance and provide a means for effective enforcement by port states.

Compliance with IMO 2020

IMO 2020 was expected to have wide reaching consequences on the shipping industry, impacting vessel operators, refineries, and even the global oil markets.

Compliance efforts across the shipping industry have been fragmented throughout the industry with key industry players favouring different solutions including the use of low sulphur fuel oil or LNG as bunkering fuel to installation of scrubbers. Each of these solutions come with their own set of issues as outlined below:

Proposed Solution	Description	Key Issues
<p>Using Compliant Low Sulphur Oil Fuels</p>	<p>The most straightforward option, and the one with the least capital investment required, is simply to switch from powering ships with high sulphur oil fuels to oil fuels that have low enough sulphur emissions to be deemed compliant by IMO 2020, such as gas oils and low, very-low or ultra-low sulphur fuel oils.</p>	<p>In the run up to 1 January 2020, the potential price differential between VLSFOs and high sulphur fuel oils ("HSFOs") was cited as a key issue impacting the availability of VLSFOs as a bunkering fuel option. A report by Tudor Pickering, Holt & Co. had even predicted that U.S. refiners operating complex plants with hydrocrackers and hydrotreaters that remove sulphur from distillates were positioned to profit from selling IMO 2020 fuels, noting that demand for low sulphur fuels could double earnings in 2020 from 2017 levels for complex refiners.²</p> <p>Accordingly, shortly before implementation of IMO 2020, there was a sharp rise in the price of VLSFOs and marine gas fuels (<i>Singapore VLSFO and MGO were trading at around \$700/metric ton in January 2020</i>).³ However, in the following months, the combination of (i) the oil price crash, precipitated by Russia and Saudi Arabia's contention over crude oil production cuts, and (ii) the slump in demand caused by the COVID-19 pandemic has led to a glut in availability of VLSFOs and has pushed down prices effectively erasing one of the biggest concerns that had been raised impacting the implementation of this option.</p> <p>There was also significant concern prior to 1 January 2020 about the availability of VLSFOs. One reason being that there is no universally accepted refining method for producing a 0.5 percent sulphur fuel⁴ or standardisation of fuel specifications.⁵ <i>By way of example, a container ship bunkering in Dubai and then topping up its tanks again in Singapore will need to have similar fuels available at both ports to avoid compatibility problems.</i> It was expected that larger bunkering hubs would have a wide range of VLSFOs immediately available at the start of 2020, but that at smaller ports the range of VLSFOs would be considerably limited.</p> <p>From a ship operation perspective, there are risks involved in using VLSFOs including increased wear and tear on engine components caused by the build-up of cat fines (introduced into VLSFOs during the refining process) inside a vessel's engines. In addition, the low viscosity of VLSFO can cause leakages which can result in engine fires. This leads to increased maintenance costs (resulting from additional checks for cat fine build-up by ship's engineering staff, and expensive cleaning of</p>

		<p>engine cylinders)⁶ as seen in vessels operating in ECAs.⁷ These risks were also expected to result in higher insurance premiums for vessels using VLSFOs.</p>
<p>Installing Scrubbers</p>	<p>The term 'scrubbers' refers to the installation of abatement technology that cleans high sulphur fuel oil (HSFO) to the required level. There are 3 types of scrubbers:</p> <ul style="list-style-type: none"> • open-loop seawater scrubbers – whereby sulphur-saturated wash water and waste is discharged back into the sea after cleaning; or • closed-loop scrubbers whereby the by-products are retained in tanks on-board and later disposed of; or • a hybrid design. <p>Scrubber technology was introduced at the 57th Session of the MEPC in 2008 as a SO_x abatement option. This was followed by the issue of the Exhaust Gas Cleaning System Guidelines in 2009.</p> <p>Scrubbers for SO_x removal are not new to the global maritime sector as they have been in use by vessels operating in the ECAs in compliance with the ECA Regulations, the EU Sulphur Directive, US EPA Vessel General Permit and US Coast Guard Directives.</p>	<p>Scrubbers require significant upfront capital investment (<i>depending on the size, type and age of the ship</i>) in material costs per ship, and additional crew training. In addition, as scrubbers are not suitable for all types of ships there may be an additional cost to retrofit the vessel. Wartsila Marine Solutions, one of the world's largest scrubber manufacturers, puts the cost of the equipment alone at between €1 million and €5 million euros (<i>approx. USD 1.1million – USD5.5 million</i>).⁸ Closed-loop scrubbers come with a much higher operating cost (<i>approximately USD800,000 more than an open-loop scrubber</i>), with the expense both of the caustic soda constantly being added and cost and risk of pollution relating to the safe disposal of discharge.⁹</p> <p>One rationale for fitting high cost scrubbers was the assumption that the price of HFOS would drop significantly due to a drop in demand. The cost of buying and installing the scrubbers is being weighed against fuel expenses that make up around half of a ship's operating costs, and with the expected rise in price of VLSFOs, Frontline Management A/S (<i>a Norwegian tanker operator, with 72 crude carriers in its fleet</i>) noted that although the scrubbers cost between USD2 million and USD4 million per ship, they expected a return on their investment within 9–18 months.¹⁰</p> <p>This theory held true in the first quarter of 2020 because VLSFO was much more expensive than HFOS,¹¹ however the spread between HFOS and VLSFOs has narrowed considerably in the last few months which means that such payback period will be lengthened.¹²</p> <p>Further, the environmental effects of scrubbers has been called into question:</p> <ul style="list-style-type: none"> • The wastewater effluent discharge of the open-loop system has led to some countries (including China, Singapore, Egypt, Russia, Malaysia, Belgium, Pakistan, Germany, Spain, Denmark, Lithuania, Ireland, Norway, Panama and UAE) banning the use of open-loop seawater scrubbers, and it is anticipated that more countries may follow suit.¹³ • Scrubbers also add to the weight of a vessel which means the vessel requires more HFOS to

		<p>burn, thereby increasing the vessel's carbon footprint.</p> <p>According to a McKinsey report¹⁴ installation gained strong momentum between 2H 2018 – 1H 2019, as the order book increased from approximately 1,600 scrubbers in September 2018 to about 3,700 scrubbers in September 2019. However, the global pandemic has led to serious delays to existing orders for the retrofitting of scrubbers, or to cancellations as owners and operators seek to slash costs.</p>
<p>Using LNG as an alternate marine fuel</p>	<p>LNG remains a small part of the marine fuels market in the medium term, DNV GL forecasts that LNG will make up to 41 percent of marine fuel in 2050.¹⁵</p> <p>As future proofing strategy in terms of corporate sustainability and environmental goals, LNG is better positioned than other bunker fuels in case of potential changes on other pollutants.¹⁶ LNG as a marine fuel is considered the cleanest option as it cuts SOx and particulate emissions to negligible amounts, reduces NOx by around 85 percent, and reduces CO₂ emissions by up to 21 percent on a well-to-wake basis.¹⁷</p> <p>However, there is a risk of 'methane slip' - 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. It is thought that 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 favourably..</p>	<p>During the last 4 years, LNG pricing has been generally more stable, and cheaper than traditional bunker fuels and offers significantly lower sulphur emissions. However, the LNG bunkering market is still in its infancy:</p> <ul style="list-style-type: none"> • According to DNV GL, LNG-fuelled new build orders surged in 2019 to 100 vessels which is three times the annual average ordered between 2016 and 2018. • There has been progress in LNG bunkering infrastructure in a global scale. In early 2019, there were only 6 bunkering vessels operational around the world and as of February 2020, there are 12 in operation with a further 27 on order or under construction.¹⁸ However, a more global network of bunkers is still required to make LNG a viable solution to IMO 2020. <p>As with scrubbers, the costs involved in retrofitting an existing ship with an LNG engine can be prohibitively expensive, so any ship-owner looking into this option will likely also need to be in a position to buy a new vessel.</p> <p>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. <i>However, CMA CGM (third largest container line) has stated that just 1 percent of cargo capacity will be lost in these ships to accommodate the storage tanks.</i>¹⁹</p> <p>More complex crew training particularly to address safety concerns associated with using LNG will be needed.</p>

Methanol bunkering

Interest in methanol bunkering is also starting to rise thanks in part to a sharp rise in methanol production in the US. According to the Methanol Institute's chief operating officer, as at July 2020, there were 11 ships trading with methanol as fuel and another 9 ships being built at shipyards.²⁰ On 24 August 2020, German shipyard Fassmer GmbH Co announced that it received an order from the Alfred Wegener Institute (AWI) to build a new methanol-powered research vessel which will operate mainly in the North Sea with a regional focus in the vicinity of the island station on Heligoland operated by the AWI.²¹

In addition, there have been regulatory developments that will make methanol a viable alternative bunkering fuel:

In September 2018, IMO's sub-Committee on Carriage of Cargoes and Containers prepared draft guidelines for the safety of ships using methanol as fuel, setting them on course for formal approval of methanol as a bunkering fuel by the IMO's Maritime Safety Committee ("**MSC**") in 2020.²² The MSC approval has been delayed by the impact of COVID-19 and the new timeline for approval is anticipated to be in Q1 2021.

In August 2020, Lloyd's Register and Methanol Institute drew up a technical reference for methanol bunkering ahead of the IMO's next meeting.

Methanol has been presented as an option for bunkering fuel because:

- it remains in a liquid state at room temperature and atmospheric pressure, allowing its storage in existing fuel storage tanks or, due to its miscibility in water, even in ballast water tanks, the infrastructure costs are thought to be relatively less than using LNG.
- the installation costs of a small methanol bunkering station have been estimated at around €400,000, and (*according to a report by FC Business Intelligence and the Methanol Institute published in 2015*) a bunker barge could be converted to carry methanol for around €1.5 million. This compares with a bill of about €50 million to build an LNG terminal, and €30 million to build a new LNG bunker barge.
- it has similar environmental advantages to LNG, with lower SO_x, NO_x, and carbon emissions than gasoil-based fuels.
- its properties as a liquid fuel at room temperature are easier for shipping crews to work with than those of regasified LNG which requires specialized equipment.

However, presently the regulations and technical specifications are yet to be agreed by the IMO. Moreover, at present methanol bunkers are not reliably available at all major ports, so investment in infrastructure will be needed before this becomes a feasible alternative for bunkering fuel.

WHO BEARS THE COST OF COMPLIANCE?

Compliance with IMO 2020 requires expenditure of considerable costs, which raises the question of who will be responsible for the cost (both CAPEX and OPEX), time and risk of installing scrubbers, or retrofitting vessels to allow them to use VLSFO or LNG. The vessel owners' and time charterers' interests in this regard will clearly be divergent.

Prior to 1 January 2020, shippers expected the following cost implications of IMO 2020:

- The cost of switching to the use of VLSFO, was expected to be passed by owners to shippers who anticipated higher costs associated with their marine freight due to the increased cost of VLSFO. In the run up to 1 January 2020, some long-term agreements included a price adjustment method also known as Bunker Adjustment Factor ("BAF") to offset price risks associated with the foreseeable increase of volatility in freight costs. For those vessels where scrubbers were installed, the cost of scrubber installation was to be accounted for within carriers' surcharges as a means of recovering their capital expenditures, even though the cost of HSFO was anticipated to be considerably lower than low-sulphur means of compliance.
- If carriers opt to use LNG as an alternative fuel, shippers expected increased costs associated with a less accessible and more expensive fuel. In the long run, however, costs would remain more insulated as regulations continue to change.

In the run up to 2020, carriers had revised their BAFs upwards to mitigate the cost impact of the IMO sulphur cap, with a number of them introducing surcharges over and above their BAFs. According to Gibson Research in March 2020, shippers were facing premiums of between US\$14,000 and US\$20,000 per day, depending on the ship's characteristics and price of fuel on board.²³ However, in the wake of the VLSFO price slump, some carriers (such as CMA CGM)²⁴ have cancelled their low sulphur surcharges, however this may not be the case for carriers that incurred the costs of installing scrubbers.

NEGOTIATING THE CHARTERPARTY: IMO 2020

'When negotiating new charterparties or discussing the resolution of issues under existing charterparties after 1 January 2020, parties must evaluate potential impact of IMO 2020; in particular they should consider the following: (*this list is not exhaustive*);

- Does the charterer have a right to require an owner to fit a scrubber or provide any other means to allow it to comply with IMO 2020?
 - i. Does a charterer have any rights when exposed to additional fuel costs resulting from an owners' decision not to fit a scrubber?
 - ii. What about in circumstances where forecasts indicate that compliant fuel will not be available in the trading area where the ship is employed?
 - iii. Where a scrubber is installed, which party will be responsible for the costs of treatment of wastewater effluent from open loop scrubbers and waste from closed loop scrubbers?
- Can the owner unilaterally take a vessel out of service to fit a scrubber? If so, which party will bear the cost of the price differential for the balance period of the charter?
- Which party will be responsible for the costs of removing non-compliant fuel (including cleaning noncompliant residues from tanks and systems) and replacing it with compliant fuel?
- Performance warranties may be affected by the additional demands placed on machinery to power scrubbers. Similarly, blended fuels are likely to have different calorific values to standard fuels, which may also affect performance warranties.

- Indemnification provisions should be considered where there is risk of blended fuels separating leading to different fuels with different sulphur levels and consequently burning fuel having a sulphur content above 0.5 percent m/m.
- Bunker price adjustment clauses are likely to be the subject of negotiation particularly as forecasts suggest considerable price volatility of the new blended fuels especially in the period immediately following the implementation of the IMO 2020 sulphur cap.

In October 2018, BIMCO introduced a series of standard clauses to attempt to address some of the above issues:

- BIMCO 2020 Marine Sulphur Content Clause for Time Charter Parties
- BIMCO 2020 Fuel Transition Clause for Time Charter Parties.

Further information on these clauses is available on BIMCO's website.²⁵

ADOPTION & ENFORCEMENT OF IMO 2020

The IMO does not have the legal authority to levy any fines or take any actions for non-compliance, and it is up to individual flag and port states to enforce the regulation and impose penalties. The three month grace period permitted for the transition to low sulphur fuel ended in March 2020, upon which port states were expected to begin rigorously enforcing the IMO requirements making it an offense for ships to carry fuel that contains a sulphur content higher than 0.5 percent unless the ship has a scrubber. State port authorities are expected to take actions ranging from fines to the detainment of ships found to be non-compliant.

Article 4(4) MARPOL Convention requires that these should be "*adequate in severity to discourage violations ... irrespective of where the violations occur.*" The table below taken from a KPMG Report²⁶ sets out the maximum enforcement penalties in select countries, shows the disparity in available penalties:

Country	Maximum Penalty
Belgium	EUR 6 Million
Denmark	No Maximum
Finland	EUR 800,000
France	EUR 200,000
Germany	EUR 22,000
Latvia	EUR 2,900
Lithuania	Eur 14,481
Netherlands	EUR 81,000 + gains
Norway	No Maximum
Sweden	SEK 10 Million
UK	GBP 3 Million
Canada	CAD 25,000
USA	USD 25,000/ Seizure of Vessel
Singapore	Jail time for owners and captain of Vessel

- The Maritime and Port Authority of Singapore ("**MPA**") published two technical guides on the IMO 2020 rule. Under these regulations, ships that call Singapore are subject to verification on compliance with the sulphur limit, including the carriage ban of non-compliant fuel, during port state and flag state inspections. Ships are selected for the inspections based on a risk matrix, which takes into account whether a FONAR (defined below) has been submitted. The regulations also introduce custodial sentences for captains and owners of vessels that use non-compliant fuel in its territorial waters.²⁷
- Under China's Atmospheric Pollution Prevention and Control Law, the Chinese Maritime Safety Administration can impose of minimum fine of RMB 10,000 up to a maximum of RMB 100,000 but no more than RMB100,000 (approximately US \$14,610).

- In the US, MARPOL implementation and enforcement is addressed through the combined efforts of the Coast Guard and the Environmental Protection Association (EPA). The Coast Guard may refer serious violations to the EPA which can impose civil on non-compliant vessels of USD25,000 per violation, per day..²⁸
- On the other side of the scale, in 2019 Indonesia decided to defer enforcement of the IMO 2020 cap for Indonesia-flagged vessels operating in its territorial waters cap citing national interests and a large volume of domestic HSFO.²⁹

IMPACT OF COVID-19

Global enforcement of IMO 2020 began with the Chinese Maritime Safety Administration reporting that it had caught two vessels for violating the low sulphur fuel requirements only 12 days after IMO 2020 came into effect. However, the COVID-19 lock-down measures have resulted in fewer vessel inspections in some countries and in some cases such as the UK, the suspension of routine port state control inspections which include IMO 2020 compliance inspections.

MITIGATING ENFORCEMENT RISK

Where ship owners face an enforcement risk, they can mitigate the enforcement risk by using one of the following instruments:

Fuel Oil Non-Availability Reports ("FONARs"): The 2019 Guidelines for Consistent Implementation of the 0.50% Sulphur Limit under MARPOL Annex VI (the "**IMO 2020 Guidelines**") state that FONARs are not waivers or exemptions to the obligations stemming from IMO 2020. The IMO 2020 Guidelines highlight that the information provided in a FONAR should be taken into consideration for purposes of minimizing or declining to impose penalties or other enforcement actions related to IMO 2020 compliance by the competent authority of the corresponding member state when performing port state control. A vessel that submits a FONAR will therefore be in *de facto* breach of IMO 2020, which may lead to claims under charterparties where for example, there is a deviation from the original course to a different port to take on compliant fuel.

Another concern with the use of FONARs is the uncertainty of what is meant by '*non-available*' – whether this means that the available VLSFO is unsuited to a particular vessel's engines; or that there is no VLSFO available at a particular port at all. As at March 2020, 41 FONARs were reported to IMO, of which 34 related to a lack of VLSFO at a port and 9 referenced bunkered fuels that did not meet the 0.5 percent sulphur threshold. BIMCO reported that these low numbers did not take into account instances where vessels waited for fuel to become available in a port or where vessels travelled to different ports to source compliant fuel.

Ship Implementation Plans ("SIPs") address issues related to preparing the vessel for use of IMO 2020 compliant fuel oil. Items covered by the SIP include;³⁰

- i. risk assessment and mitigation plan (impact of new fuels);
- ii. fuel oil system modifications and tank cleaning (if needed);
- iii. fuel oil capacity and segregation capability;
- iv. procurement of compliant fuel;
- v. fuel oil changeover plan ; and
- vi. documentation and reporting.
- vii. IMO has indicated that a SIP can be taken into consideration by flag state and port control agencies when verifying compliance with IMO 2020.

THE ROLE OF CLASSIFICATION SOCIETIES AND INSURERS

Non-compliance with the IMO 2020 requirements could potentially cause a vessel to lose its classification status on the grounds that it is unseaworthy. This may lead to claims against the ship owner under the

charterparty for the cost of taking replacement fuel (including the cost of removing the non-compliant fuel and cleaning tanks and lines required to take on compliant fuel) as well as claims for the associated delays and payment of any financial penalties.³¹

In theory, flag states that have ratified ANNEX VI should revoke or, at least, suspend vessels' MARPOL certificates, if they do not comply with IMO 2020. If this occurs, or if a vessel is otherwise deemed to be unseaworthy, or no longer in class, as a result of non-compliance, owners may be considered to have breached seaworthiness, class and/or other warranties under their Hull and Machinery and Protection and Indemnity policies. In a report issued by insurance broker Marsh, it is noted that: "*if a vessel fails to comply with the requirements of the MARPOL Convention, then it would effectively be in breach of the flag state national law, and the vessel's MARPOL certificate may be withdrawn, or at least suspended, by the flag state,*" All of the top 10 flag states (i.e. Panama, Liberia, the Marshall Islands, Hong Kong, Singapore, Malta, the Bahamas, Greece, China and Cyprus) have ratified ANNEX VI.³²

So while the low penalties, lax enforcement and the potential use of FONARs and SIPs to mitigate penalties may not be sufficient to discourage the use of non-compliant fuel as bunker fuel, the consequences of a potential loss of classification or loss of insurance should be sufficient cause for ship owners to ensure their compliance with IMO 2020.

The global pandemic has resulted in delays in the conduct of physical surveys by classification societies. However a number have adapted quickly by providing online services and conducting remote surveys whereas others have granted temporary force majeure extensions for vessels scheduled to dry-dock for repairs or renewal surveys. The Korean Register, for example, has reportedly granted one-month extensions for physical surveys or the period of a voyage to the next port, whichever is longer where needed it has granted extensions for vessels scheduled to dry-dock for repairs or renewal surveys.³³

SUCCESSFUL IMPLEMENTATION OF IMO 2020?

In January 2020, the IMO secretary-general announced the successful implementation of IMO 2020, citing only 10 cases of compliant fuel unavailability in the first 20 days.³⁴ In hindsight, this may have been an overly optimistic view given that the three-month grace period which ended in March 2020 had not yet lapsed.

The months that followed saw an unprecedented fall in shipping demand brought on by the lock-down measures taken by various governments to limit the spread of COVID-19, and the significant narrowing in the VLSFO/HSFO spread. The impact of these events has reverberated throughout the shipping industry:

- i. From a charterer's perspective, the lower bunker prices offers some hope for the future given the poor demand, although for those who had purchased bulk fuel at peak prices this offers little salvation;
- ii. Ship owners who installed or planned to install scrubbers face a longer wait for a return on their investment, as the projected savings from the anticipated drop in HSFO prices did not materialise, and the demand for their vessels dropped; and
- iii. Bunker suppliers, must now supply bunker fuels at a fraction of the price seen only 6 months ago shattering projected earnings. For example, Bunker Holding Group which enjoyed "amazing" results in the financial year 2019/2020 has indicated that it does not expect a repeat of the good results for financial year 2020/21, due to the decline in world trade and markets that are still heavily affected by the COVID-19 pandemic³⁵.

In addition, delays in inspections and enforcement activities by state port operators and classification societies mean that at this time it is difficult to draw any conclusive analysis on the success of the implementation of IMO 2020.

Endnotes

- ¹ Details of the ECAs are available here: [https://www.imo.org/en/OurWork/Environment/Pages/Emission-Control-Areas-\(ECAs\)-designated-under-regulation-13-of-MARPOL-Annex-VI-\(NOx-emission-control\).aspx](https://www.imo.org/en/OurWork/Environment/Pages/Emission-Control-Areas-(ECAs)-designated-under-regulation-13-of-MARPOL-Annex-VI-(NOx-emission-control).aspx)
- ² "New marine fuel rules to boost diesel prices for at least a year: analysts" Reuters (11 June 2019) available at <https://www.reuters.com/article/us-imo-shipping-usa-refiners/new-marine-fuel-rules-to-boost-diesel-prices-for-at-least-a-year-analysts-idUSKCN1TB2CJ>
- ³ "IMO 2020: Low sulphur fuel prices surge, discount to MGO vanishes", Seatrade Maritime News (7 January 2020) available at <https://www.seatrade-maritime.com/bunkering/imo-2020-low-sulphur-fuel-prices-surge-discount-mgo-vanishes>
- ⁴ **NOTE:** There are some crude oils sweet enough to produce a residual fuel oil of around 0.5% sulphur directly from a refinery's crude distillation unit; whereas in some cases fuel oil may be de-sulphurized using hydrogen or other catalysts to produce the cleaner grade.
- ⁵ **NOTE:** On 23 August 2019, the Secretariat of IMO issued the [Joint Industry Guidance on the Supply and Use of 0.50% Sulphur Marine Fuel](#) which provides a primer on key fuel properties for VLSFOs which includes information on cold flow properties, stability, viscosity, acid number, flashpoint, ignition quality etc., as well as an analysis of fuel compatibility issues the test methods currently available for evaluating fuel quality. This is the first step in standardizing the specifications for VLSFOs.
- ⁶ "Emissions Regulations: Concerns for the Marine Industry, Marsh Report Q1 2018" available at https://safety4sea.com/wp-content/uploads/2018/01/Marsh-Emissions-Regulations-Concerns-for-the-Marine-Industry-2018_01.pdf
- ⁷ "Low sulphur fuel operational issues in 2020 set to increase losses: QBE" by Marcus Hand (31 July 2018) available at <https://www.seatrade-maritime.com/news/americas/low-sulphur-fuel-operational-issues-in-2020-set-to-increase-losses-qbe/>
- ⁸ "Sulphur scrubbers 'no silver bullet' for shipping industry – Wartsila", Reuters Business News dated 20 April 2018 available at <https://www.reuters.com/article/uk-shipping-fuels-scrubbers/sulphur-scrubbers-no-silver-bullet-for-shipping-industry-wartsila-idUKKBN1HR1V6>
- ⁹ "Tackling 2020: The Impact of the IMO and how Shipowners Can Deal With Tighter Sulfur Limits" 2017 S&P Global Platts (at page 5) available at <https://www.spglobal.com/platts/en/market-insights/special-reports/shipping/tackling-2020-sulfur-limits>
- ¹⁰ "Maritime Emissions Rule Triggers Split in Shipping Costs", Wall Street Journal (20 December 2019) available at <https://www.wsj.com/articles/maritime-emissions-rule-triggers-split-in-shipping-costs-11576839601>
- ¹¹ "Scrubbers bet pays off for shipowners as marine fuels spread remains wide", S&P Global Platts (3 March 2020) <https://blogs.platts.com/2020/03/03/scrubbers-bet-pays-off-for-shipowners-as-marine-fuels-spread-remains-wide/>
- ¹² **NOTE:** The spread between HSFOs and VLSFOs dropped dramatically from USD 298mt at the start of 2020 to [USD49.50 \(on 29 June 2020\) at Rotterdam](#) according to Ship & Bunker. This has been precipitated by the drop in demand of bunker fuel globally occasioned by the oil price crash and economic slow-down caused by the effects of COVID-19. In addition, the anticipated fall in HSFO prices did not materialize sophisticated, complex refiners (particularly in the US) which have the capability to 'pre-scrub' HSFO into low sulphur bunker fuel have reportedly been buying up large quantities of HSFO.
- ¹³ "Scrubber discharges bans in ports: What you should know", Safety4Sea (22 November 2019) available at <https://safety4sea.com/cm-scrubber-discharges-bans-in-ports-what-you-should-know/>
- ¹⁴ "What shipowners, refiners, and traders should know about IMO 2020", McKinsey & Company, Oil & Gas Insights (13 November 2019) available at <https://www.mckinsey.com/industries/oil-and-gas/our-insights/what-shipowners-refiners-and-traders-should-know-about-imo-2020#:~:text=IMO%202020's%20changes%20to%20the,global%20residual%20fuel%20oil%20demand.&text=In%20turn%2C%20increased%20MGO%20or,by%2025%2C000%20barrels%20per%20day>
- ¹⁵ "IMO 2020: Ready or not?" (6 April 2019) https://sea-lng.org/wp-content/uploads/2020/02/200214_SEALNG2019reviewDIGITAL_compressed.pdf
- ¹⁶ **NOTE:** The [Marine Environment Protection Committee meeting](#) in 2016 noted that the IMO would begin discussions on the regulation on CO₂ emissions in 2023, and declared that from 2021, the North and Baltic Seas will be designated Nitrogen Emission Control Areas where stricter emissions limits for nitrogen oxides (NOx) will be enforced.
- ¹⁷ "LNG as a Marine Fuel – Our Zero Emissions Future Starts Now", SEA_LNG Report (February 2020) available at https://sea-lng.org/wp-content/uploads/2020/02/200214_SEALNG2019reviewDIGITAL_compressed.pdf
- ¹⁸ Ibid. See Note 17 (at page 14).
- ¹⁹ "Why CMA CGM ordered 'game changing' 22,000 teu LNG-powered containerhips" Seatrade Maritime News (30 April 2018). Cached copy available at <https://webcache.googleusercontent.com/search?q=cache:pA05iq-mnXkJ:https://www.seatrade-maritime.com/asia/why-cma-cgm-ordered-game-changing-22000-teu-lng-powered-containerhips+&cd=1&hl=en&ct=clnk&gl=hk>
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