

BUNKERSPOT

TAKING DECARBONISATION BY THE HORNS

SURVEYING BUNKERING OPTIONS
IN THE YEAR OF THE OX

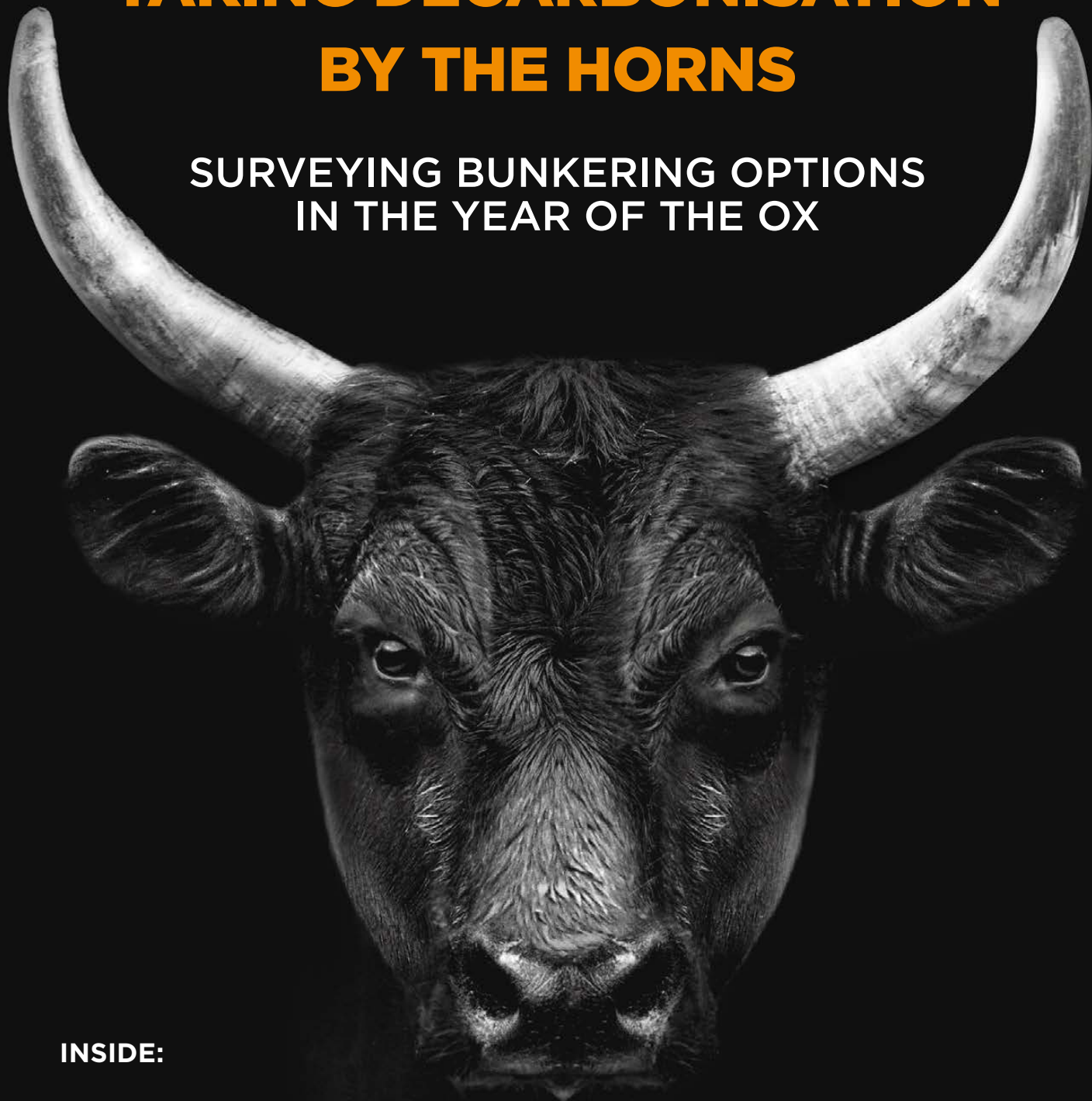
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Regulatory impact

Ioannis Generalis of Harris Kyriakides explores the interaction between marine fuel and international regulations on sulphur and greenhouse gas emissions

It is said shipping is the lifeblood of the world economy, transporting over 80% of world trade volumes. Following that logic, marine fuel is the lifeblood of shipping, and of pivotal importance to the world economy. This de facto prominent position has in recent times been raised to new heights, owing to the wider concept of green shipping, and regulation brought in to achieve it.

Green shipping is all about reducing the impact of ships and their emissions to the environment. Some of these emissions are also hazardous to humans, such as sulphur oxides (SO_x), nitrogen oxides (NO_x) and particulate matter (PM). Others such as greenhouse gasses (GHG), most notably CO₂ emissions and methane, contribute to climate change.

The International Maritime Organization (IMO) is the UN branch bearing responsibility for the safety and security of shipping and the prevention of marine and atmospheric pollution by ships. It achieves the latter through the International Convention for the Prevention of Pollution from Ships (MARPOL). The IMO sets a global regulatory standard, which applies to all of its 174 Member States. However, these Member States may introduce tighter regulation, provided they comply with the IMO Protocols and Conventions they have ratified.

This article explores the interaction between marine fuel and two different sets of regulation. The first regulation, IMO 2020, sets a 0.5% m/m sulphur cap (mass by mass) on bunkers, and is already in force since 1/1/2020. The second regulation, which is in nascent form, aims to reduce GHG emission from ships by certain percentages and by certain future dates. It exists in the form of early measures on ship energy efficiency adopted by the IMO, of an initial strategy published by the IMO in 2018 (IMO Initial Strategy 2018), and of certain EU measures voted for under the EU Parliament, but yet to receive Council's approval. Let us examine these in turn.

IMO 2020

The IMO 2020 Regulations, and more spe-

cifically Regulation 14.1.3(1) of MARPOL Annex VI, imposed a 0.50% sulphur cap on all ships regardless of size, which fly the flag of a Member State which has ratified Annex VI and/or transit through the territorial waters of call at those Member States which have ratified Annex VI. In addition, Annex VI prohibits the carriage of high sulphur fuel oil (HSFO) exceeding 0.50% sulphur for use in fuel tanks (not as cargo) as of 1 March 2020, unless ships are fitted with scrubbers (exhaust gas cleaning systems) which are operational (Carriage Ban).

To abide by the 0.50% sulphur cap, shipowners/charterers broadly can resort to three different solutions: (i) use low or very low-sulphur compliant fuel oil (VLSFO), (ii) use alternative fuel such as liquefied natural gas (LNG), methanol, liquefied petroleum gas (LPG), hydrogen fuel cells, or biofuels which emit reduced or negligible SO_x, and (iii) use equivalent methods, the most common of which includes fitting (or retrofitting) their ships with scrubbers.

LIABILITY

Liability for compliance with MARPOL Annex VI principally rests with shipowners. It is common to find charterparty provisions to the effect that shipowners warrant that a vessel shall comply with international and national rules and regulations. This is the case in voyage charters, where shipowners supply fuel and factor this into the freight rate (for example through a bunker adjustment factor), but for exceptional circumstances.

In time charters, by contrast, allocation of risk between the parties is feasible. As it is charterers who are commonly obliged to purchase and provide fuel whilst the ship is on hire, clearly drafted contractual clauses, such as BIMCO's Marine Fuel Sulphur Content Clause for Time Charter Parties, or INTERTANKO's Bunker Compliance Clause, may shift liability onto charterers, failing which shipowners may need to rely on implied terms. Liability however will remain with shipowners where the ship is not fit or capable of consuming compliant fuel oil.

COMPLIANCE

Compliance with the IMO 2020 regulations was adequate throughout 2020. The Maritime and Port Authority of Singapore (MPA) reported that 96% of all ships calling at Singapore in the first quarter of 2020 used compliant fuel, with just 12 ships exceeding the sulphur cap, likely due to HSFO residue in the tanks and piping. Singapore derived figures further reveal 70% of bunker fuel sold over the first six months of 2020 was VLSFO, 11% was marine gasoil (MGO), and 18% was HSFO. Meanwhile, Bureau Veritas VeriFuel and VPS, companies which provide bunker testing, reported similar figures at the ARACON conference, with two-thirds of bunker fuel throughout 2020 consisting of VLSFO, with HSFO at 20%, and MGO (which consists of a lighter distillate with low sulphur) accounting for 12%.

While 2020 figures reveal VLSFO is the bunker of choice when compared to HSFO and MGO, its wide use also indirectly suggests it is winning the overall battle when compared to scrubbers. Clarksons reported 700 retrofits of scrubbers that could now be delayed or cancelled altogether. It is suggested this has resulted from the narrow VLSFO/HSFO price spread which at the time of writing in January, stood at \$50 per metric tonne (p/mt), half of the \$100 p/mt figure employed by scrubber manufacturers to argue for economic viability, with the payback period now pushed from 1-2 years to 4-6 years. The HSFO price has held up owing to increased demand by US refiners as a feedstock, while the VLSFO price has come under attack owing to increased supply, firstly due to an abundance of vacuum gas oil (VGO) diverted away from a COVID-19 stricken motor industry under frequent lockdowns and used in blending, and secondly due to a VAT rebate and consumption tax waiver by the Chinese government. Moreover, there are concerns over a delay in scrubber installations brought about by COVID-19, and over increasing bans by several ports and countries on the washwater from open-loop scrubbers.

'Mandatory regulation constitutes the single biggest incentive causing owners and operators to begin, accelerate, and intensify decarbonisation activities'

Ioannis Generalis



Image © Harris Kyriakides

DECARBONISATION

In 2011, the IMO adopted measures under MARPOL Annex VI to reduce GHG emissions through the Energy Efficiency Design Index (EEDI) made mandatory for new ships, and the Ship Energy Efficiency Management Plan (SEEMP), which applies to all ships, both over 400 Gross Tonnage (GT).

The *EEDI* is an *index* which sets a minimum energy efficiency level (measured in grams of CO₂ emissions) per capacity distance (measured in tonne-mile), and depends on the type and size of the ship. It is a par for ship energy efficiency applied worldwide, irrespective of where the ship is built or operated, and its flag State. As it is a performance-based mechanism, how this level is attained is left open to the industry.

The way EEDI is calculated introduces a phased reduction approach using a reduction factor **X** per phase (Regulation 21 MARPOL Annex VI), whereby:

$$\text{Attained EEDI} \leq \text{Required EEDI} = (1-X/100) \times \text{Reference line value}$$

The SEEMP on the other hand is a *plan* and does not set a par, but rather aims at energy-related operational efficiency. It incorporates best practice for fuel-efficient ship operation, such as improved voyage planning, frequent propeller cleaning, and waste heat recovery systems.

In 2018 the IMO further introduced its Initial Strategy, which (a) sets goals, and (b) identifies candidate measures. Unlike the EEDI and SEEMP requirements under MARPOL Annex VI however, the Initial Strategy is not legally binding. In fact, Paragraph 1.4 of the Initial Strategy introduces a revision due in 2023, which is widely seen as the earliest any form of mandatory IMO regulation may emerge.

The *goals* of the Initial Strategy appear in Paragraph 3 under '*levels of ambition*', and are summarised below:

1. To review and aim to strengthen the EEDI requirements for ships;
2. To reduce CO₂ emissions on average

across international shipping, by at least **40% by 2030**, pursuing efforts towards 70% by 2050, compared to 2008; and

3. To peak GHG emissions from international shipping as soon as possible and to reduce the total annual GHG emissions by at least **50% by 2050** compared to 2008.

The *candidate measures* are divided in short, medium, and long-term measures. Short term translates to between 2018 and 2023, medium term translates to between 2023 and 2030, and long term translates to beyond 2030.

Short-term *candidate measures* offer a mix of technical, operational, and policy-oriented solutions. Some of these include:

- Further improvement of EEDI and SEEMP
- Speed optimisation and speed reduction analysis
- Port development including power supply from renewable sources and alternative fuel supply
- Research into alternative fuels and marine propulsion
- Incentives to develop and use new technologies

Mid to long-term candidate measures are predictably less detailed, and include further enhancement of operational / technical measures, further policy adjustments, introduction of new/innovative emission reduction mechanisms, development and provision of zero-carbon or fossil-free fuels, and development of a feedback mechanism.

Meanwhile, both the EU Commission and the EU Parliament are individually pursuing the inclusion of shipping in the EU Emissions Trading System (ETS). The EU ETS is the world's first and largest carbon market, and functions on a 'cap and trade' basis. Simply put, a cap is set on the total amount of GHG emissions, and reduced over time so that total emissions fall. Within the cap companies receive or buy emission allowances, which they can trade.

The EU Parliament recently voted for a draft amendment of The EU 'Monitoring Reporting and Verification of Carbon Dioxide Emissions from Maritime Transport' (MRV) Regulation (EU) 2015/757. In addition to extending the EU ETS to the maritime transport sector,

new article 12(a) obliges companies to a 40% CO₂ reduction by 2030, and introduces financial penalties for failing to do so. The EU Commission on the other hand would rather not combine the EU ETS and the EU MRV, and is set to roll out its own proposal for shipping's inclusion in the EU ETS during 2021, building on the European Green Deal. Either approach will be subject to approval by the EU Council, which represents EU Governments, and the ensuing negotiations are not expected to conclude until 2022. Moreover, the Commission considers reviewing legislation that could increase shore-side electricity (SSE) supply to ships in ports (Alternative Fuels Infrastructure Directive, Energy Taxation Directive), by mandating SSE infrastructure in cruise and cargo terminals, and exempting SSE from local taxes for a transitional period.

FUTURE COMPLIANCE

How shipowners/charterers comply with the emerging GHG reduction regulation, and which marine fuels prevail, will depend on (a) the regulation we end up with, (b) where it becomes applicable, and (c) by when.

A recent *Lloyd's List* survey on decarbonisation published in January considered the expectations of owners and various other stakeholders on which marine fuels will be used in 2030 and in 2050. These expectations were similar for owners/non-owners, but varied dramatically between the two dates. In 2030, 20% of owners and 22% of non-owners went for liquefied natural gas (LNG), while 20% of owners and 17% of non-owners favoured current marine fuels with carbon offsetting. By 2050, these figures dropped drastically to 7% and 8% (LNG) and 5% (current fuel and carbon offsetting), with ammonia favoured by 20% of both groups, hydrogen by 19% of owners and 16% of non-owners, and batteries by 15% and 19% respectively. Another important outcome of the survey was that mandatory regulation constitutes the single biggest incentive causing owners and operators to begin, accelerate, and intensify decarbonisation activities.

Research supports that the IMO 40% reduction target by 2030 can be met under mandatory speed reduction and operational efficiency standards. This finding suggests current fuel meeting IMO 2020 standards (such as VLSFO) may predominate until 2030. More research however suggests the 50% target by 2050 will not be met under operational and efficiency measures alone, bringing into play alternative fuel. Alternative fuel is broadly categorised as carbon fuels (LNG, LPG, methanol/ethanol), carbon neutral fuels (biofuels/biomethane, synthetic methane), and zero carbon fuels (hydrogen, ammonia). LNG is widely seen as a short-term stepping-stone to long term solutions involving hydrogen and ammonia. No suitable alternative fuel candidate however has so far emerged for deep-sea shipping, and all of them bear drawbacks (for example methane slip for LNG and toxic fumes for ammonia). Hybrid powering solutions involving batteries are also seen as a viable option.

In the short (2030) term, much will depend on whether the EU ETS push materialises. To date various groups such as the European Community Shipowners' Association (ECSA), the International Chamber of Shipping (ICS) and BIMCO, as well as countries such as Greece, South Korea and Japan, have opposed the push. The principal arguments

against the EU ETS are that it creates an uneven playing field, and supports the principle that 'whoever pays can continue to pollute'. China's stance is eagerly anticipated – the country having previously blocked a similar push in aviation by threatening to hold back \$60 billion of orders from Airbus.


If the EU ETS inclusion goes through, shipping companies may need to revise their strategies. Much will depend on cost/benefit analysis, tailored to specific ship types/sizes, of buying emission allowances and investing in longer-term solutions/research, or investing in available shorter-term solutions such as LNG. Moreover, a successful EU ETS push may influence other countries to adopt their own market-based measures, and may even urge the IMO to promote a global carbon shipping market. This combined uncertainty partly explains the current decrease in newbuilding activity, in expectation of incoming regulation.

CONCLUSION

Green shipping has firmly put the spotlight on marine fuels. IMO 2020 regulation imposing a 0.50% sulphur cap on bunkers has so far been complied with, VLSFO emerging as a clear winner, ahead of HSFO combined with scrubbers, and alternative fuel. However, one would

be wise to monitor the HSFO/VLSFO price spread, which has so far been narrower than expected, owing to the COVID-19 pandemic, a Chinese rebate on tax, and increasing bans on washwater from open-loop scrubbers.

Which marine fuel ultimately prevails is far less certain when viewed under incoming regulation on decarbonisation. While the industry is focusing on hydrogen/ammonia long-term, research suggests the 40% CO₂ reduction by 2030 envisaged under the IMO Initial Strategy 2018 can be achieved by speed reduction and operational efficiency standards, in which case current IMO 2020 fuel such as VLSFO should predominate short-term. If, however, the EU push to include shipping in the ETS materialises, careful cost/benefit analysis tailored to specific ship types and sizes will be required to determine whether to continue using current fuel along with carbon offsetting and/or hybrid battery solutions, or to adopt mid-term options such as LNG.

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