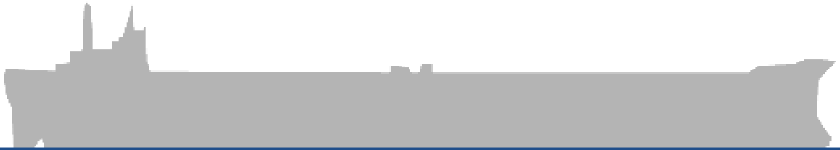
Galbraiths

3RD LOW SULPHUR SURVEY RESULTS

FEBRUARY 2019



Introduction

- Following on from the successes of our first Low Sulphur Questionnaire in December 2017 and the second edition in July 2018, Galbraiths Research has commissioned another survey of market participants, to once again try to gain an insight into how the market and its key players view the legislation and how they feel it will impact the market.

- Galbraiths Research created two separate anonymous surveys, one for owners and one for charterer / refiners, with 15 and 13 questions respectively, covering a range of topics relating to the sulphur cap. During December 2018 and January 2019 these surveys were released to participants. We are pleased to announce that we received more responses to this 3rd edition of the survey than in either of our previous editions, with an **80% increase in the number of participants** in total compared with our 2nd edition, therefore **giving an excellent snapshot of current opinions relate to the regulation**. We would like to take this opportunity to thank everybody who took the time to complete our survey.

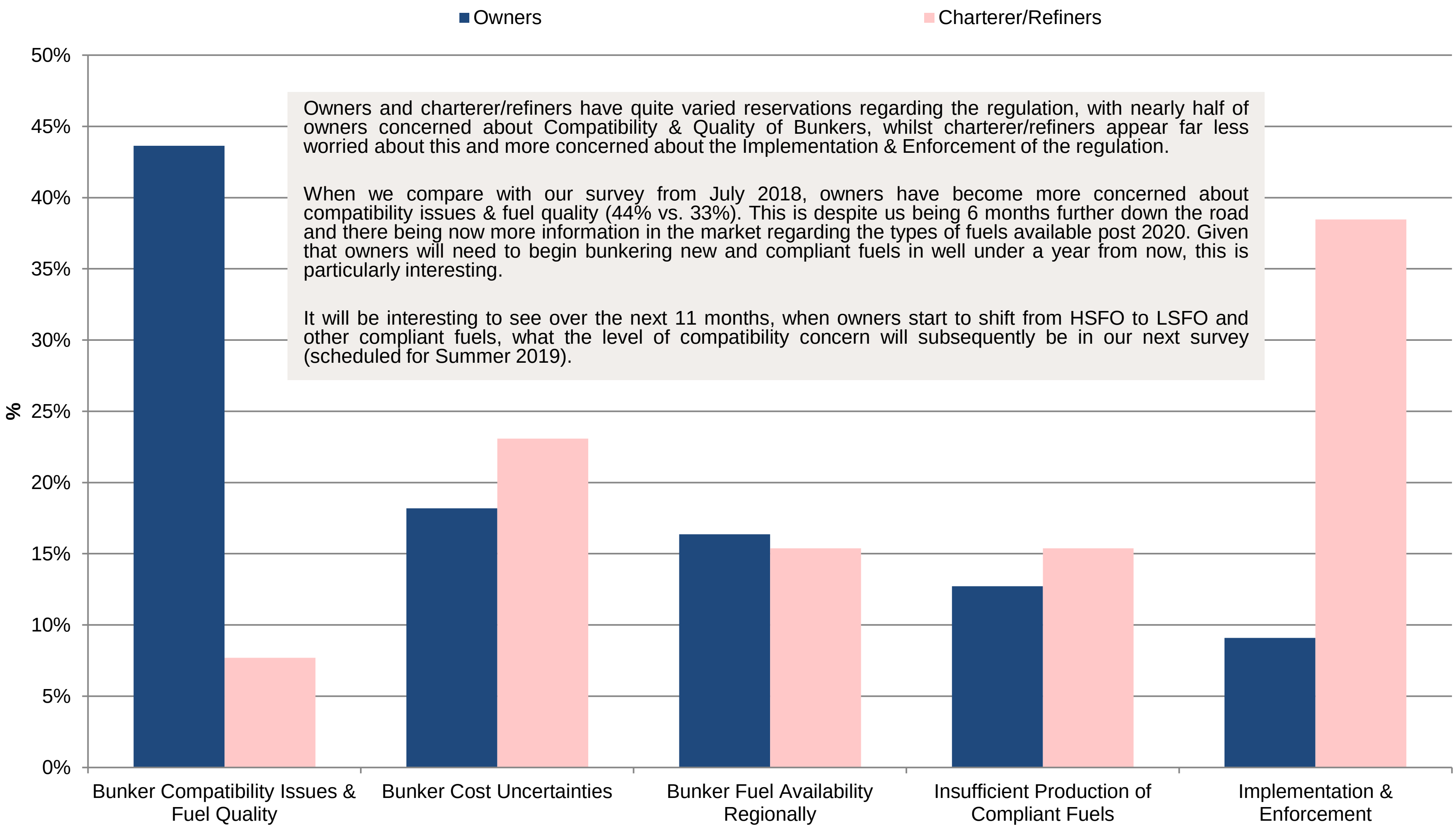
- This new survey not only allowed us to ask new questions, but also to follow up on the suggestions previously received and the most welcome feedback following the previous surveys.

- The results to these answers have now been collated and analysed and over the next few slides we have collated the findings of each of the surveys, highlighting the key points of interest and, where possible, comparing the differences in opinion between owners and charterer / refiners and the differences in responses since our previous surveys.

- A full list of the questions that were included in our 3rd LS Survey can be found in the attached Appendix on Page 21.

- Should you wish **to review the previous LS Surveys** to compare the results and changing opinions for yourself, then please do send us an **email at 'research@galbraiths.co.uk'** and we will gladly send you the previous versions. Equally, should you have **any comments or suggestions, we would be more than pleased to hear from you**.

What will be the biggest challenge of the regulation?



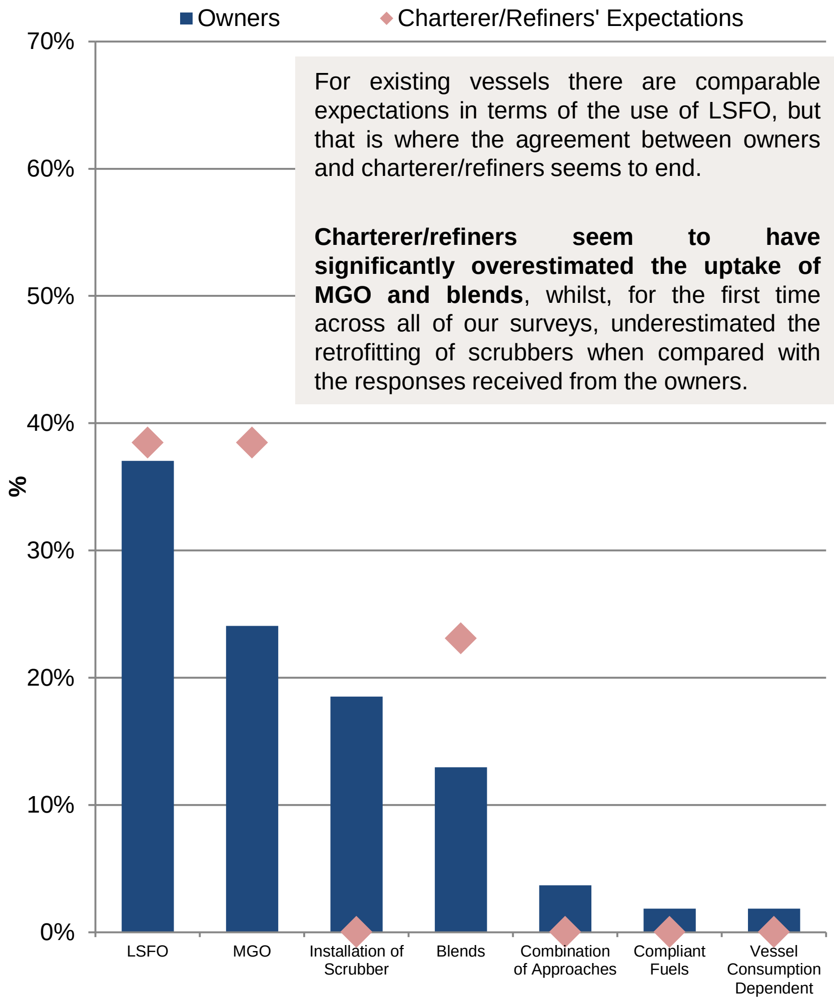
Owners and charterer/refiners have quite varied reservations regarding the regulation, with nearly half of owners concerned about Compatibility & Quality of Bunkers, whilst charterer/refiners appear far less worried about this and more concerned about the Implementation & Enforcement of the regulation.

When we compare with our survey from July 2018, owners have become more concerned about compatibility issues & fuel quality (44% vs. 33%). This is despite us being 6 months further down the road and there being now more information in the market regarding the types of fuels available post 2020. Given that owners will need to begin bunkering new and compliant fuels in well under a year from now, this is particularly interesting.

It will be interesting to see over the next 11 months, when owners start to shift from HSFO to LSFO and other compliant fuels, what the level of compatibility concern will subsequently be in our next survey (scheduled for Summer 2019).

Which option in terms of compliance is your company/are owners most likely to implement in 2020?

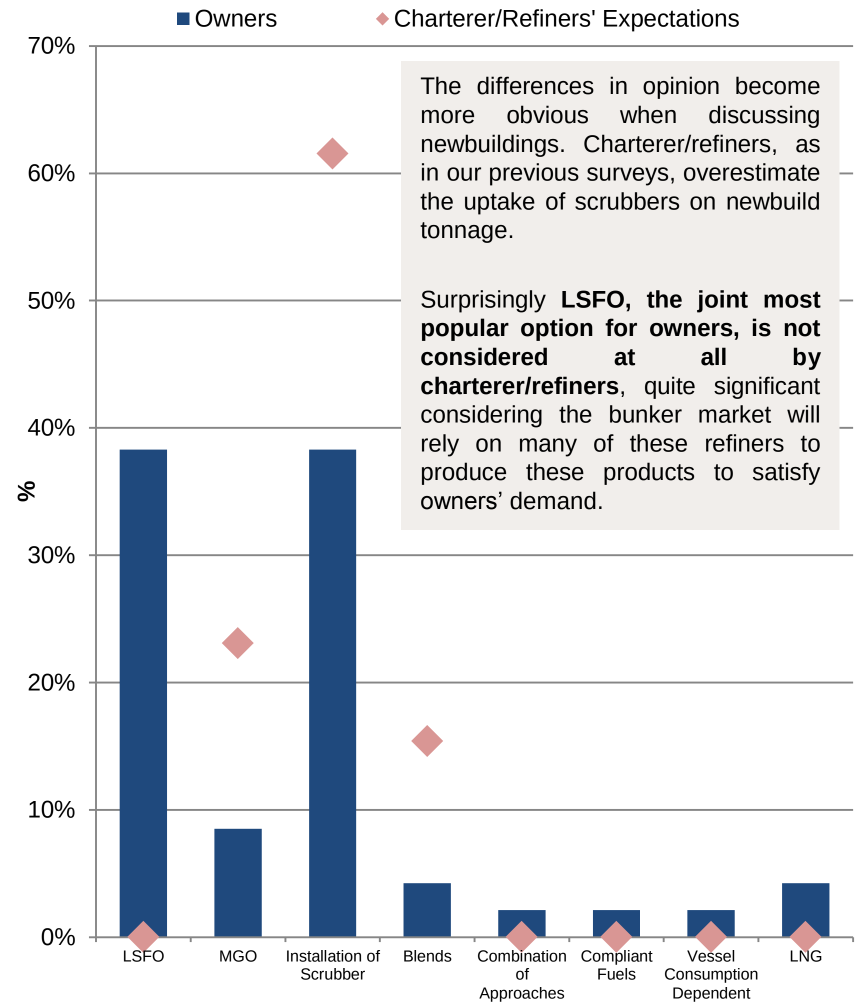
Compliance on Existing Vessels



For existing vessels there are comparable expectations in terms of the use of LSFO, but that is where the agreement between owners and charterer/refiners seems to end.

Charterer/refiners seem to have significantly overestimated the uptake of MGO and blends, whilst, for the first time across all of our surveys, underestimated the retrofitting of scrubbers when compared with the responses received from the owners.

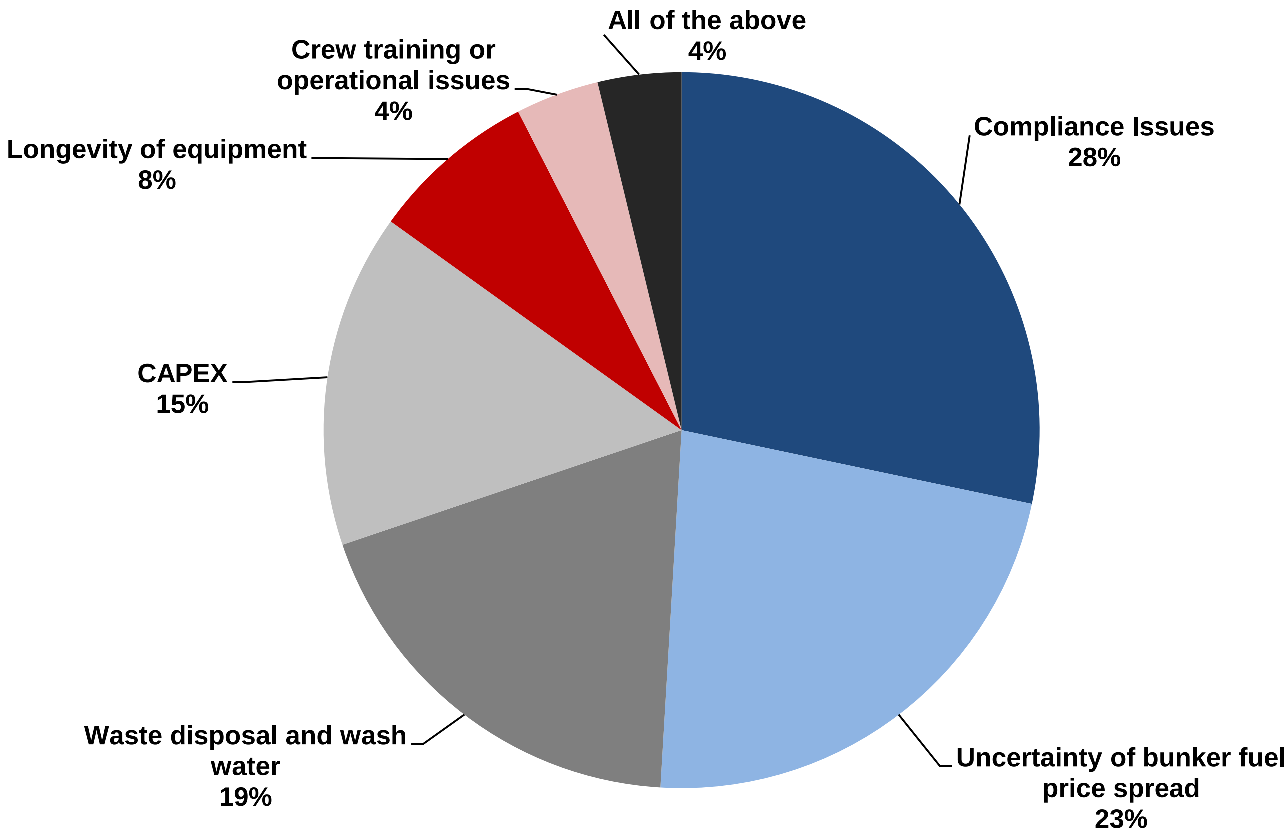
Compliance on Newbuildings



The differences in opinion become more obvious when discussing newbuildings. Charterer/refiners, as in our previous surveys, overestimate the uptake of scrubbers on newbuild tonnage.

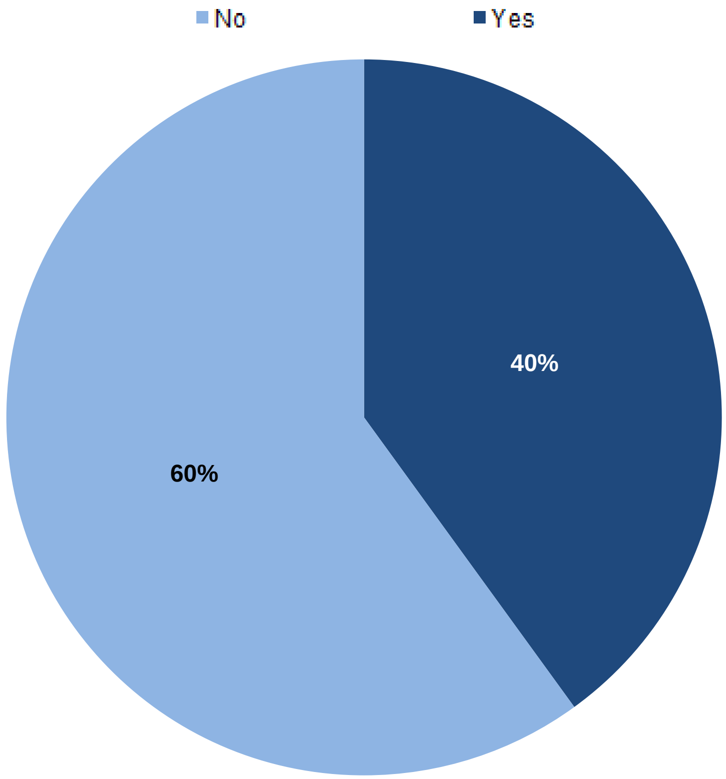
Surprisingly **LSFO, the joint most popular option for owners, is not considered at all by charterer/refiners**, quite significant considering the bunker market will rely on many of these refiners to produce these products to satisfy owners' demand.

Owners: What are you most concerned about in terms of scrubbers as an option of compliance?



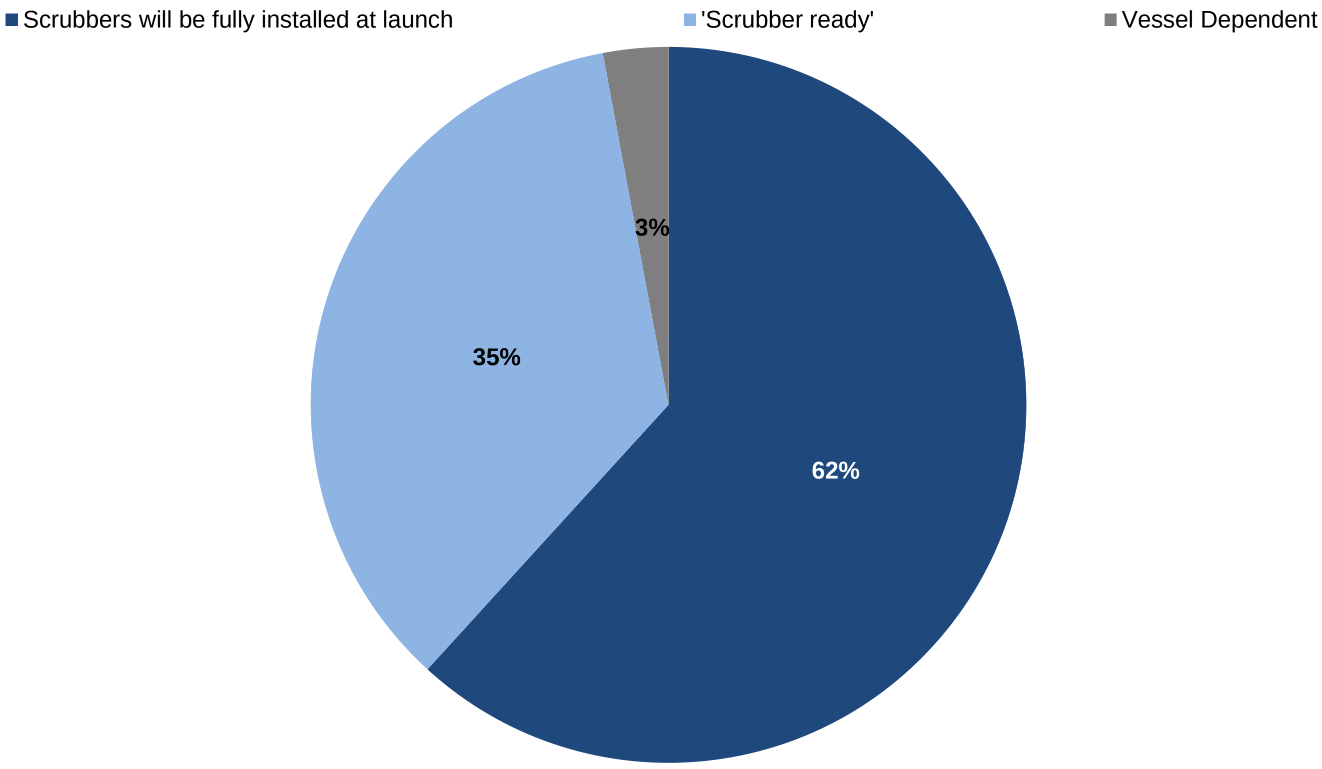
The concerns about scrubbers have largely remained unmoved since July 2018, reflecting perhaps the already entrenched views about the technology from across the owning community. A few notable adjustments have been the **disappearance of 'Availability of HSFO' as a concern**, perhaps given the increased availability of information from refiners as we approach the deadline date. **'Compliance Issues', as a result of future regulation has moved slightly ahead of other concerns**, almost certainly as a result of the strong stances already taken by a number of ports in banning the use of Open Loop scrubbers and reinforcing the worry for some that scrubbers may be regulated out of the market in the future.

Owners: If opting for scrubbers, will the majority of the vessels to be fitted / retrofit with scrubbers be finished by 1st January 2020?



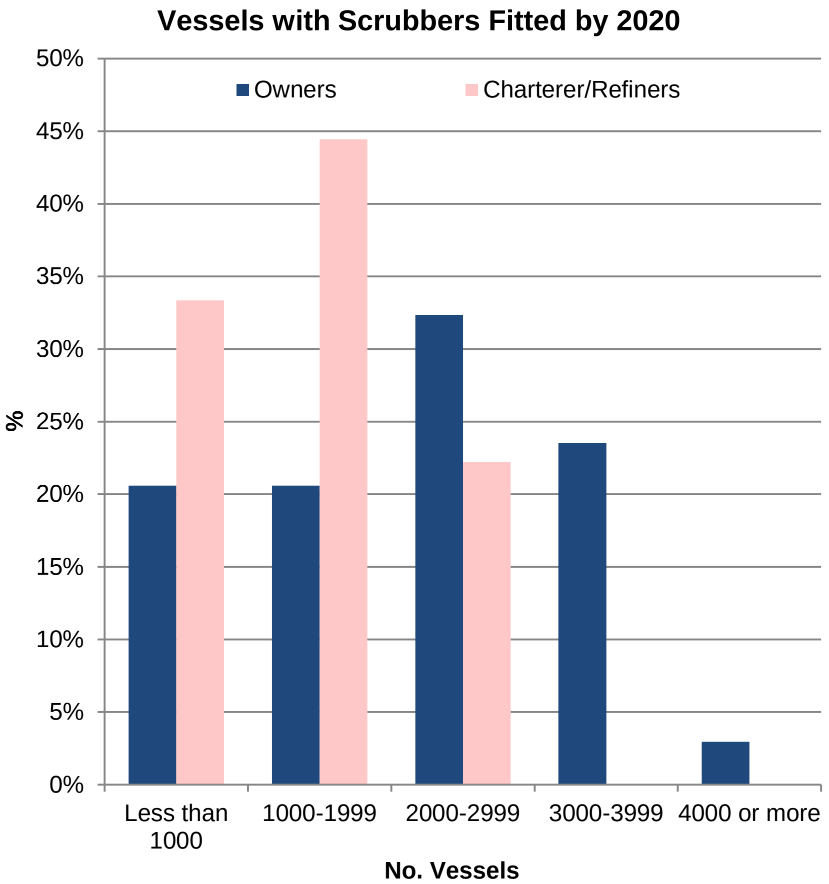
The results from this question helps to draw attention to something that is often overlooked when discussing IMO 2020, that the regulation, and the resulting methods of compliance will continue to develop and change post 1st January 2020. **The majority of owners fitting scrubbers onto their vessels, will not have those scrubbers fitted at the deadline**, as such the bunker demand landscape in particular will continue to develop beyond that date. This is also, perhaps, indicative of the limited yard space, scrubber fitting expertise and scrubber manufacturer capacity that has been bottlenecking the fitting of scrubbers in the run up to the deadline date.

Owners: If opting for scrubbers, will your newbuildings be 'scrubber ready' or will scrubbers be fully installed at launch?

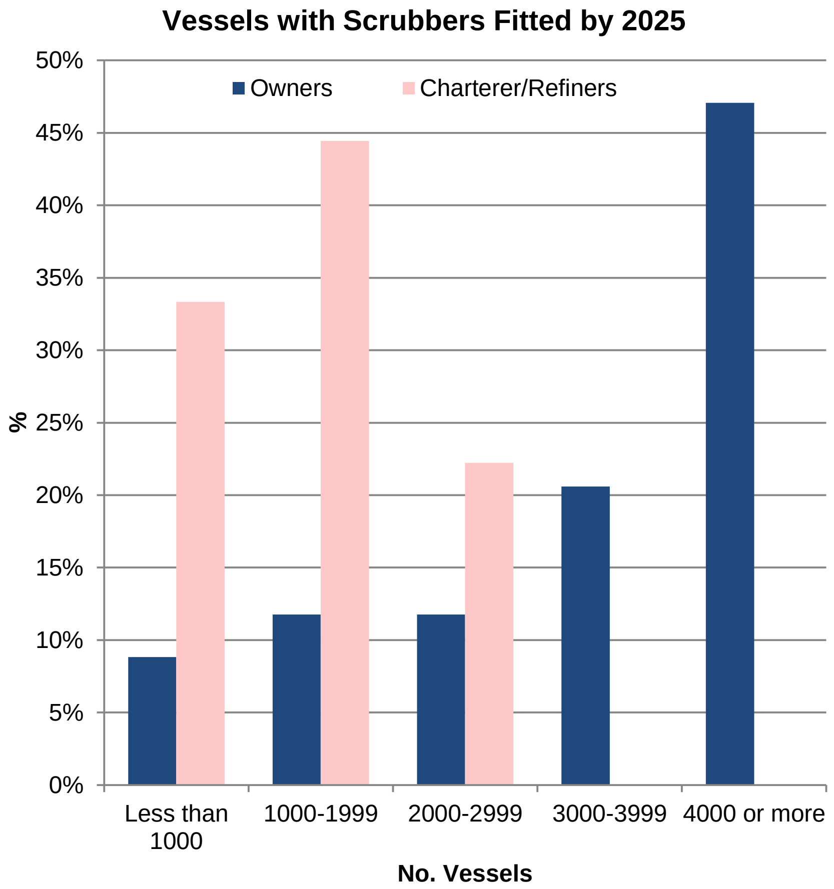


The responses received to this question has shifted in the 6 months since our last survey. Of the owners who have indicated they will be installing scrubbers, the **clear majority (62%) intends to have scrubbers fully installed at launch**, rather than build a scrubber ready vessel. This represents a reversal in just 6 months, where the majority (58%) were only building their vessels to be scrubber ready.

How many vessels do you think will have scrubbers on board by 1st January 2020 vs. 1st January 2025?

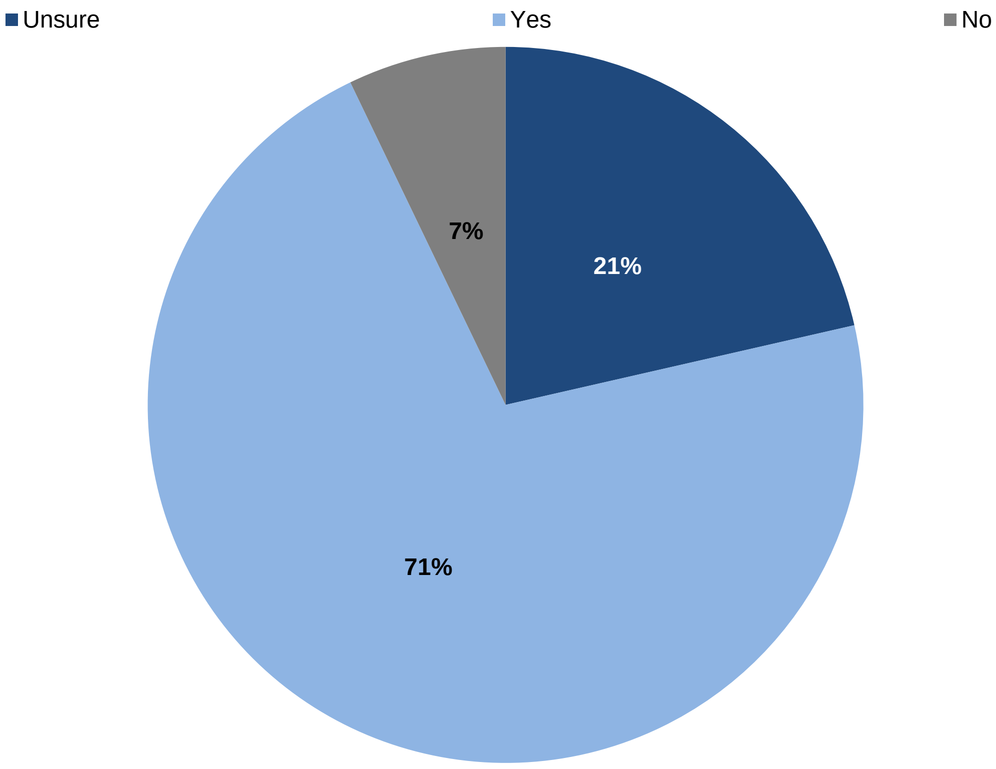


Both owners and charterer/refiners are quite split in terms of the expected number of vessels with scrubbers fitted by 2020, with no majority really agreeing on a particular range. However, reading the highest, **44% of charterer/refiners see 1,000-1,999 vessels installing scrubbers by 2020.**



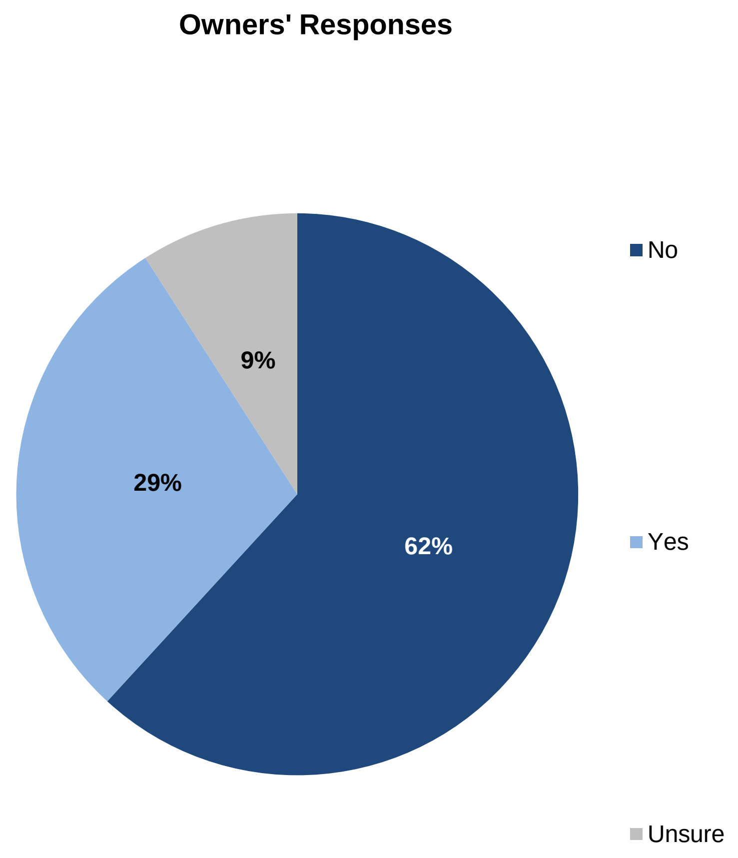
Charterer/refiners are expecting little or no uptake in scrubbers from 2020 onwards, with the profile of answers remaining the same from 2020 into 2025. Contrast this with the **owners' responses, who expect a quite dramatic increase of double the capacity by 2025**, with over 4,000 scrubbers expected to be installed.

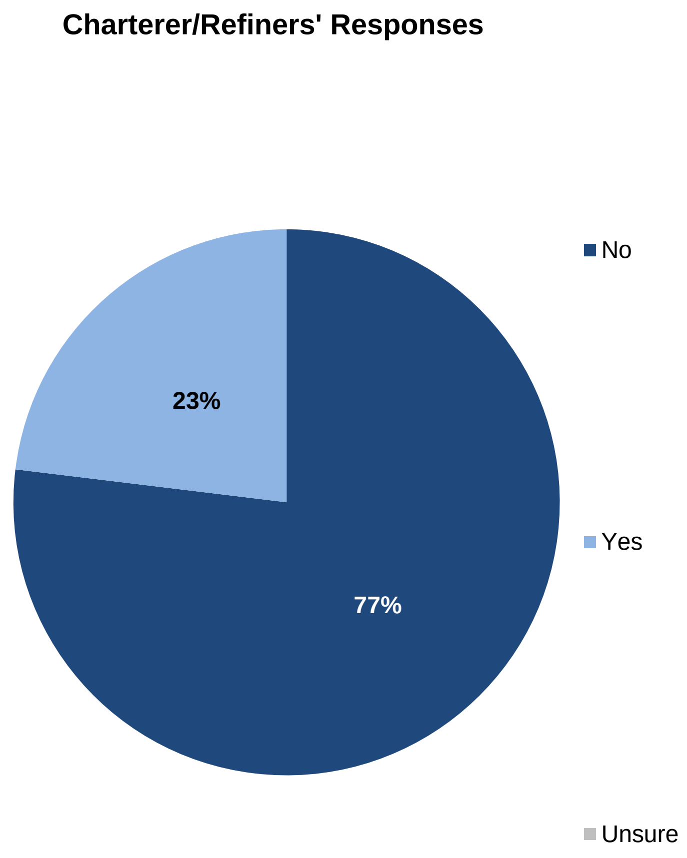
Charterer/Refiners: Do you foresee any compatibility issues between compliant (max 0.5%) bunker fuels from 2020 onwards?



The great majority of refiners foresee compatibility issues between compliant fuels from 2020 onwards, suggesting that owners are correct to have this issue at the top of their main concerns surrounding the regulation. Also significant, is that this **percentage of refiners expecting issues (71%), is well up on the percentage expecting the same issues back in July 2018 (50%)**. Given that refiners should be in possession of more information regarding the compliant fuel offerings than 6 months ago, this perhaps, should encourage owners to be especially careful with their bunkering operations.

Have you been actively testing compliant fuels and/or blends on your seagoing vessels?

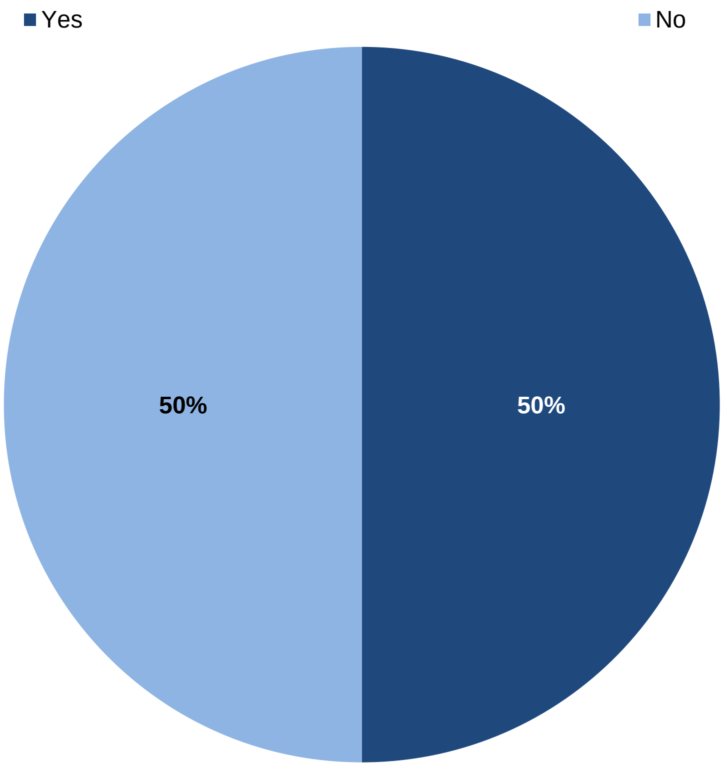




When compared with the results from our survey in July 2018, there has been a slight increase in **the proportion of owners undertaking tests on the compliant fuels/blends, up to 29%** compared with 24% from 6 months ago.

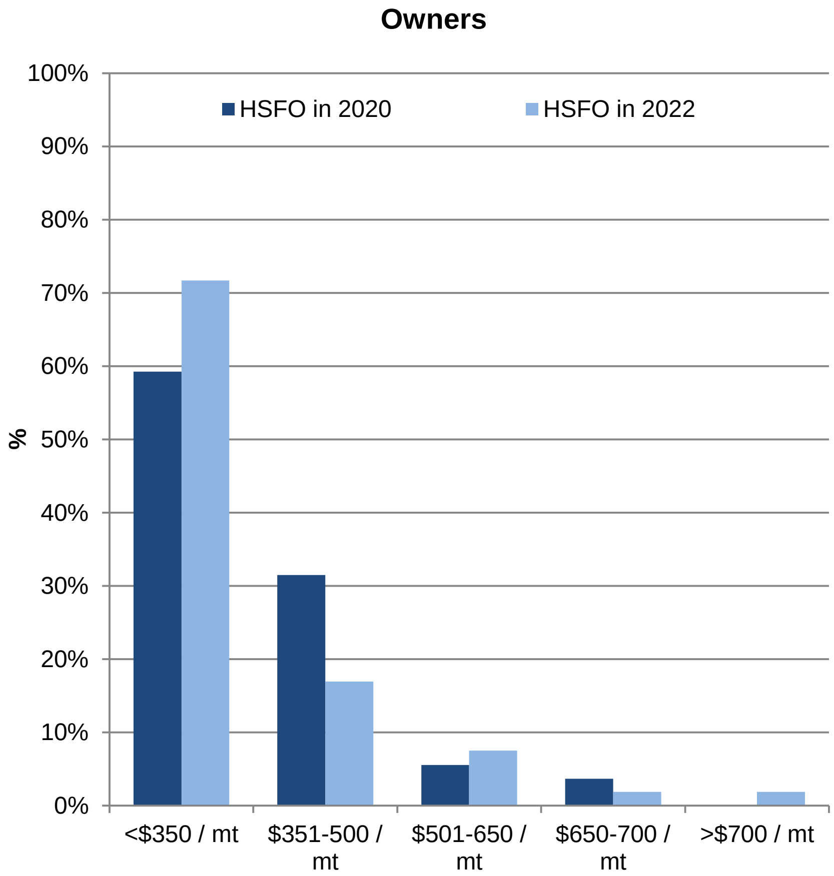
Given, however, that the significant majority, of both respondents have not undertaken tests and, with the previous slide showing that charterer/refiners expect compatibility issues, it should not be a great surprise that many unknowns remain regarding compliant fuels and that 'Bunker Compatibility & Fuel Quality remain the owners' main concern.

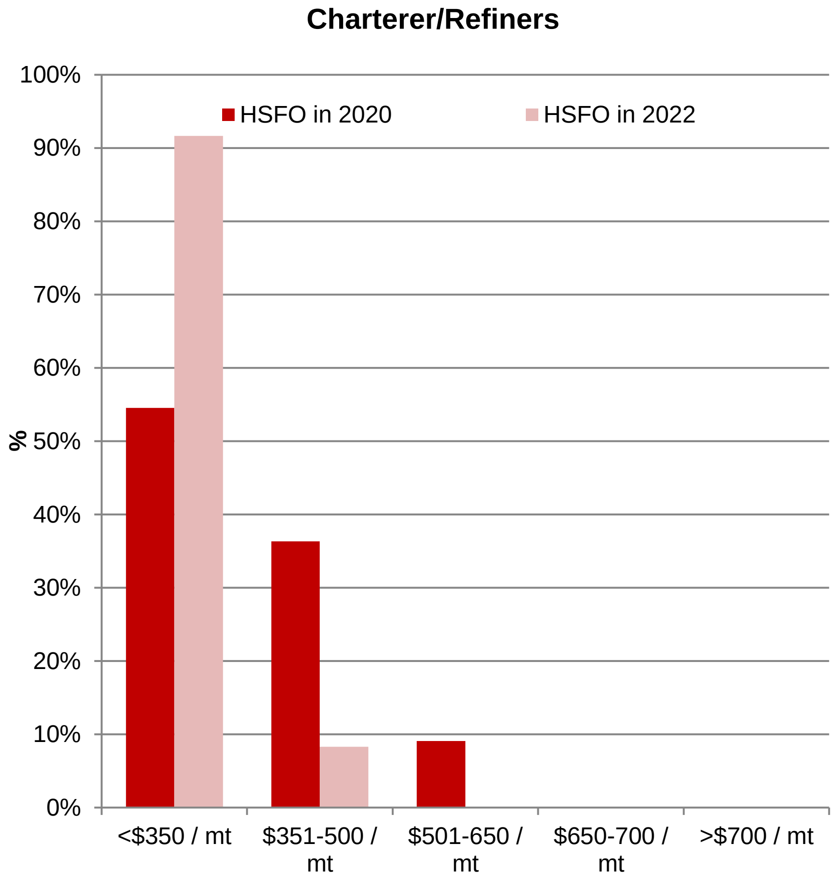
Charterer/Refiners: With regards to your time chartered tonnage, if any, are you currently in discussions to secure bunkers required from 2020 onwards?



Only half of the charterer/refiners have responded with the affirmative that they are actively **discussing the securing of bunkers on their time chartered tonnage**. Given that the deadline is now under a year away and that compliant bunkering operations will need to begin well before that deadline, this is something of a surprising response.

HSFO Price Expectations

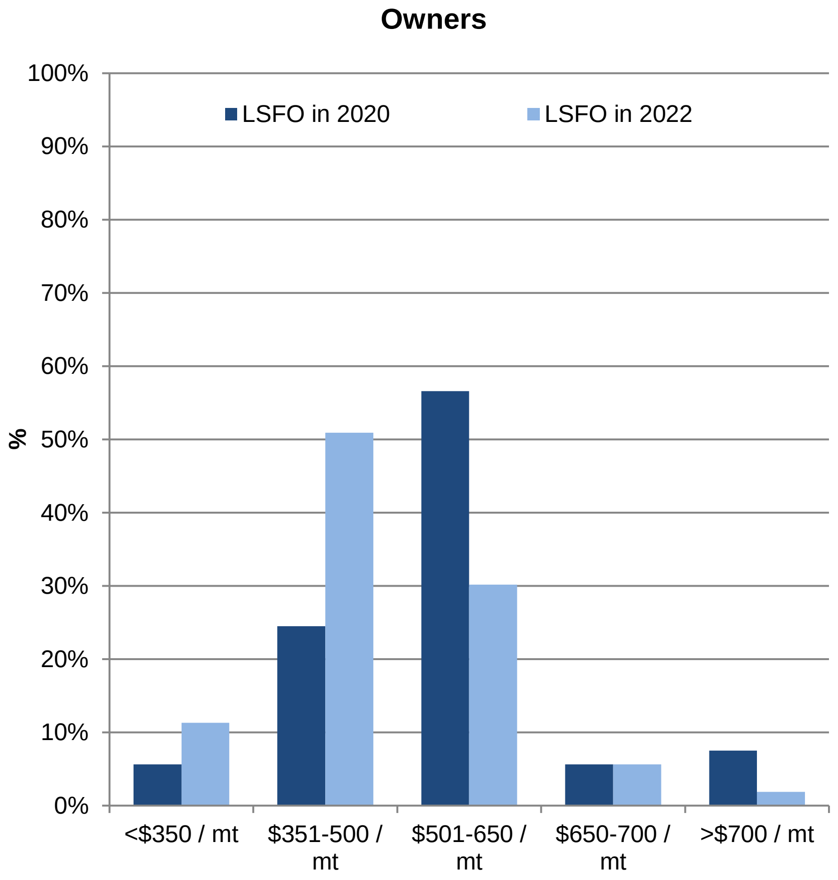


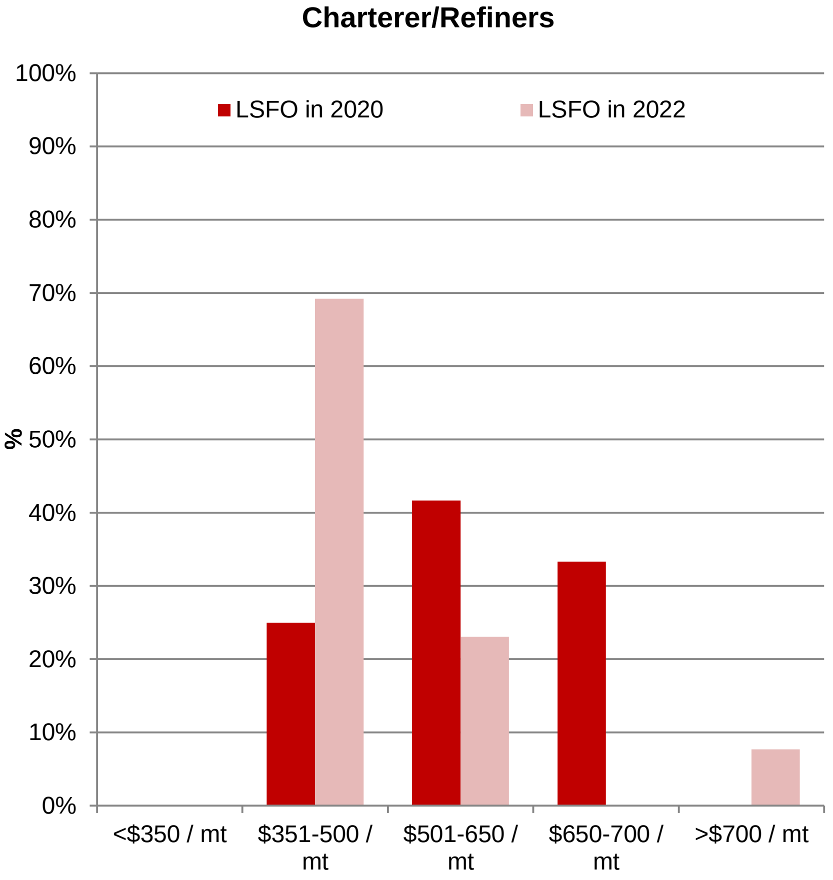


Owners' expectations of HSFO prices remain largely unchanged between 2020 and 2022 of less than US$ 350 / mt, suggesting that they expect prices to remain stable. At the time of writing, the bunker price for HSFO fits the profile of the majority of the responses above, so owners are expecting little movement from now.

The profile of answers from charterer/refiners are very similar to that of the owners. **Respondents are almost unanimous in their expectation for HSFO prices to remain below US$ 350 / mt in 2022**.

LSFO Price Expectations

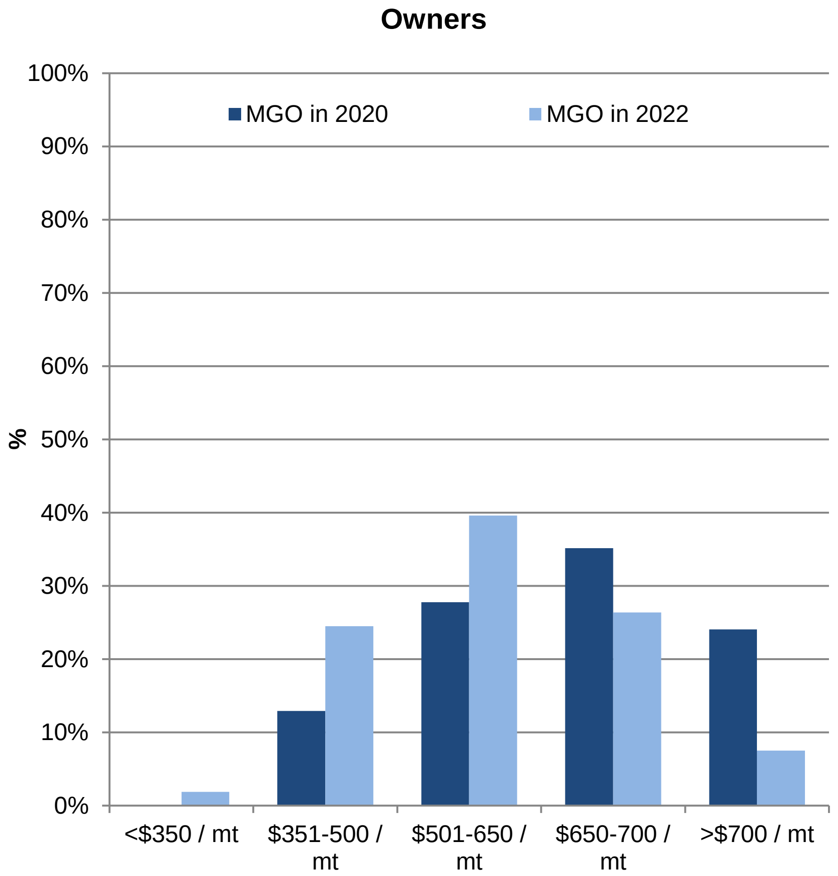


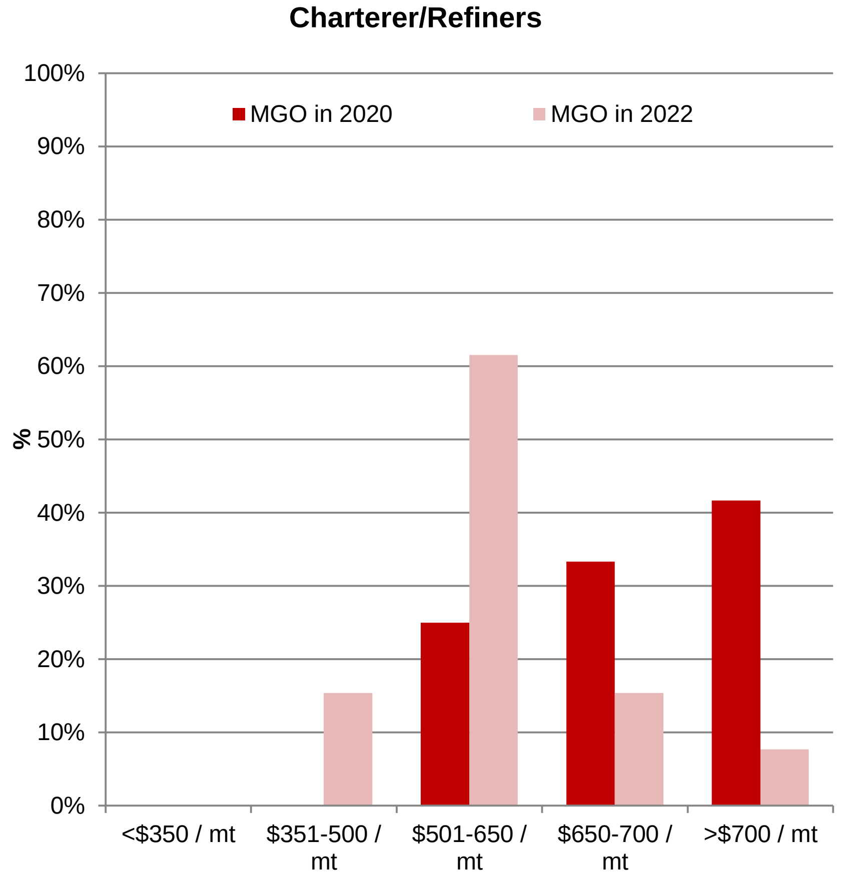


A majority of owners anticipate the price of LSFO to remain in the US$ 351-650 / mt range in 2020. In 2022, the prices are expected to have shifted from the price range of US$ 501-650 / mt, to US$ 351-500 / mt, suggesting **a majority of owners expect the prices to fall in the two years after the implementation of the regulation**.

For 2020, charterer/refiners are split in their pricing ideas for LSFO, highlighting the uncertainty present in the market, even with the deadline fast approaching. For 2022, it seems that respondents are more in agreement regarding pricing, **expecting LSFO to fall into the US$ 351-500 / mt bracket**, in line also with owners' expectations.

MGO Price Expectations

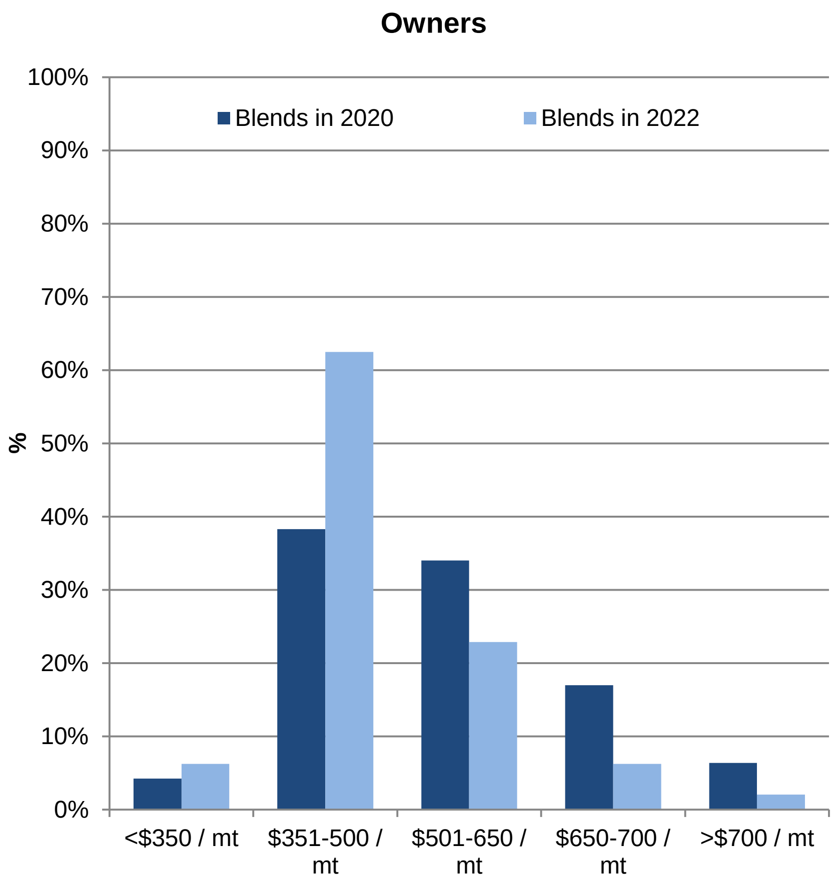


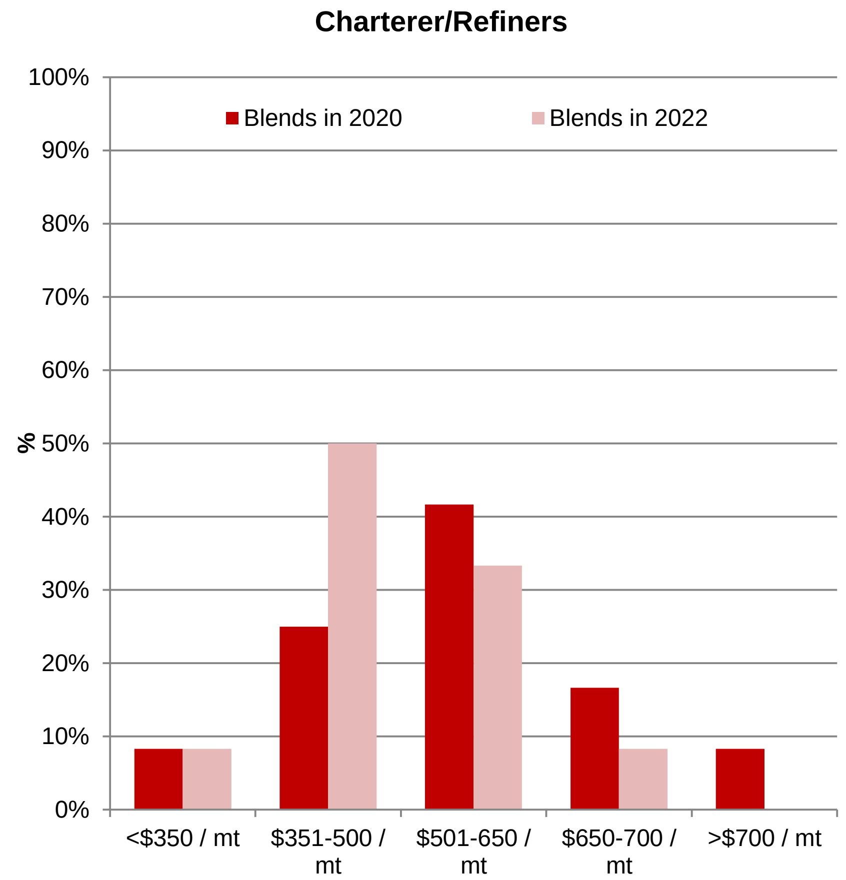


Of all the bunker fuels that we asked for price expectations, MGO perhaps presents the **most varied spread of answers**, with no clear majority of owners able to agree on a 'most likely' price bracket for the fuel in either 2020, or 2022.

When compared with the owners, we see a slightly more focussed majority, at least in terms of pricing in 2022. Given the profile of responses above, the **majority of charterer/refiners expect the price of MGO to fall back from the upper ranges of over US$ 700 / mt, towards the US$ 501-650 / mt range by 2022**.

Blends Price Expectations

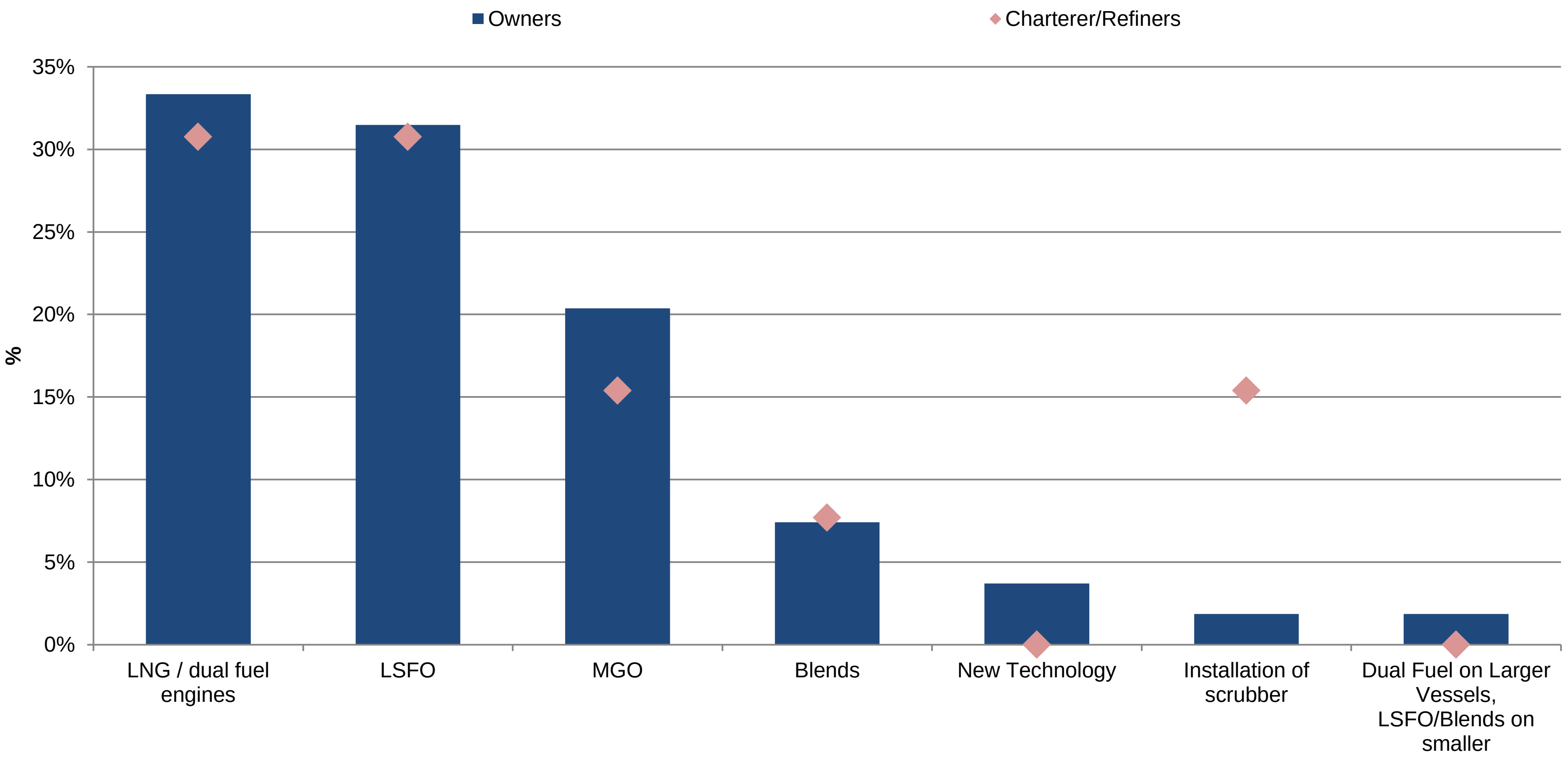




Price expectations from owners with regard to blends are focussed on the US$ 351-500 / mt range, with the majority of respondents expecting these fuels to fall into that price range during both 2020 and 2022.

Charterer/refiners have provided their most varied expectations on pricing for blended compliant fuels, perhaps indicative of the overall uncertainty surrounding, particularly, this form of compliant fuels. Still, **the majority does just move from the US$ 501-650 / mt in 2020, down to US$ 351-500 / mt in 2022**.

Which compliance option do you believe will be most prevalent in 10 years time, i.e. 2029?



Expectations are perhaps most in line when looking further into the future, with the exception of slightly different expectations regarding the proliferation of scrubbers in 2029. However, when compared with our survey from July 2018, the viewpoints of both parties have quite dramatically converged. **The expectation of scrubbers as the primary form of compliance in 10 years time, has fallen from 50% of charterers to the 15% we now see. LNG / Dual Fuel closely followed by LSFO seem to be viewed as the most viable options in 2029.**

BULLET POINTED ANSWER

Owners: What are you concerns, if any, about potential future regulation that restricts the use of scrubbers; either open-loop, hybrid or closed-loop?

This was an open ended question were we asked owners to offer their own ideas and suggestions. The following represent some pertinent points raised by owners:

- **Environmental concerns leading to regulation:**
  - In particular with respect to open-loop scrubbers and the discharge of wash water
  - The uncertainty surrounding the environmental impact of ‘transferring contents from air to the sea’
  - Political pressure surrounding scrubbers and environmental impact to lead to regulation
  - National regulations and Port Rules will lead to the effective banning of open-loop scrubbers

- **‘IMO should impose usage of cleaner fuel and push refiners to produce the required grade’**

APPENDIX

The Regulation of Open-Loop Scrubbers

Country	Port/Sea Area
Belgium	Antwerp
China	All ports and rivers
	Bohai Rim DECA
Denmark	Aalborg
	Frederecia
	Kalundborg
Finland	Porvoo
France	Port Jerome
	Seine River
	Le Havre
	Ambes
Germany	Weser ports
	Elbe ports
	Kiel canal ports
	Rostock
Gibraltar	Gibraltar
Italy	Ravenna
Latvia	Ventspills

Country	Port/Sea Area
Lithuania	Klaipeda
Norway	Glomfjord
Portugal	Lisbon
Russia	Primorsk
	St. Petersburg
Singapore	Singapore
Spain	Algeciras
	Cartagena
	Huelva
Sweden	Brofjorden
	Gavle
	Norrkoping
	Umea
	Sundsvall
	Skelleftehamn
UAE	Fujairah
United Kingdom	Finnart
	Hull

On our questionnaire we also queried both sets of respondents whether, as a result of Singapore announcing a ban on the discharge of washwater from open-loop scrubbers, they would expect to see any further countries or ports following suit. Obviously, since the surveys were released to participants, a number of further announcements have come to light, with a range of authorities banning the use of open-loop scrubbers.

Rather than present the results of our now somewhat outdated question, we present the above table which is based on a circular by the International Chamber of Shipping (15.01.2019) plus some additional information. It **highlights the authorities that, at the time of writing (31.01.2019), have banned washwater discharge and use of open-loop scrubbers in their waters**. Obviously this remains fluid and we would expect further announcements over the course of the coming year.

Low Sulphur Limit 2020 – Survey Questions

Owners' Survey

1. What kind of vessels do you own / manage?
2. What will be the biggest challenge of the regulation?
3. Which of the following options is your company most likely to implement on your currently trading fleet to meet compliance on the implementation date in 2020?
4. Which of the following options is your company most likely to implement on your newbuildings to meet compliance on the implementation date in 2020?
5. If opting for scrubbers, will your newbuildings be 'scrubber ready' or will scrubbers be fully installed at launch?
6. If opting for scrubbers, will the majority of the vessels to be fitted / retrofit with scrubbers be finished b 1st January 2020?
7. What are you most concerned about in terms of scrubbers as an option of compliance?
8. What are your concerns, if any, about potential future regulation that restricts the use of scrubbers; either open-loop, hybrid or closed-loop?
9. How much do you believe bunker fuels will cost in 2020?
10. How much do you believe bunker fuels will cost in 2022?
11. Have you been actively testing compliant fuels and/or blends on your seagoing vessels?
12. Which compliance option do you believe will be most prevalent in 10 years time, i.e.. 2029?
13. How many vessels do you think will have scrubbers on board by 1st January 2020?
14. How many vessels do you think will have scrubbers on board by 1st January 2025?
15. After Singapore recently announced the ban on using open-loop scrubbers in their national waters, do you think other countries or ports will follow suit? If yes, which ones?

Charterers' Survey

1. What kind of vessels do you own / manage?
2. What will be the biggest challenge of the regulation?
3. Which of the following options are the majority of owners most likely to choose for their currently trading fleet to meet compliance on the implementation date in 2020?
4. Which of the following options are the majority of owners most likely to choose for their newbuildings to meet compliance from the implementation date in 2020?
5. How much do you believe bunker fuels will cost in 2020?
6. How much do you believe bunker fuels will cost in 2022?
7. Do you foresee any compatibility issues between compliant (max 0.5%) bunker fuels from 2020 onwards?
8. Have you been actively testing compliant fuels and/or blends on seagoing vessels?
9. With regards to your time chartered tonnage, if any, are you currently in discussions to secure bunkers required from 2020 onwards?
10. Which compliance option do you believe will be most prevalent in 10 years time, i.e.. 2029?
11. How many vessels do you think will have scrubbers on board by 1st January 2020?
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