EEXI Compliance and Carbon Intensity Reduction.

Webinar Questions and Answers.

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Q&A Contents.

1. CII MEASURES. ................................................................................................................................................................ 3
2. ANNUAL EFFICIENCY RATIO (AER). ................................................................................................................................. 5
3. PASSENGER SHIPS. ........................................................................................................................................................ 6
4. TANKERS & BULKERS. .................................................................................................................................................... 7
5. SHIP OWNERS. ................................................................................................................................................................ 9
6. EEDI.............................................................................................................................................................................. 10
7. APPLICABLE VESSELS.................................................................................................................................................. 11
8. FUELS........................................................................................................................................................................... 13
9. 2030 STRATEGY GOAL.................................................................................................................................................. 14
10. MISCELLANEOUS...................................................................................................................................................... 15

All questions in this document were asked in the Question & Answer section of the webinar and please note it may not all be in perfect English due to the global audience.
If you have any questions about this webinar please contact M&O.comms@lr.org.
1. CII Measures.

1.1. One of the (easiest) measures for EEXI compliance is a reduced ship speed - if this is the case, the 'capacity' of the world fleet reduces. With globalisation and demand set to increase, the number of new builds will likely increase. How do these EEXI and CII measures account for the carbon intensity associated with increased new build demand?

Neither measure takes the carbon intensity of new construction into account. EEXI (new regulations 20A and 21A of MARPOL Annex VI) is unlikely to stimulate significant new construction activity. Carbon intensity reduction (new regulation 22B of MARPOL Annex VI) might, depending on the consistency and strength of enforcement of the requirement over the period 2023 – 2030. The targets for carbon intensity reduction are based on the decarbonisation goals set by the IMO and forecast growth of the global shipping fleet.

1.2. What kind of measures is IMO targeting for ships to achieve compliance with CII, which expects year on year reduction of CO2 emissions?

The IMO is not targeting measures; it is taking a goal-based approach. The use of the AER as the mandatory carbon intensity indicator also means that the IMO is not guiding the industry in terms of its expectations of employing energy-efficient technologies or alternative fuels. The message is: reduce carbon emissions.

1.3. EEXI implementation would likely reduce the CII of vessels ideally. Is there any study done on how much EEXI will have an impact on CII reductions?

There is an appreciable correlation between technical efficiency and operational carbon intensity. However, CII performance, as measured by AER, is determined by the way in which a ship is operated more than its technical efficiency. Moreover, for ships where EEXI (new regulations 20A and 21A) does not result in material changes in average main engine loads (speed), then it will have no material impact on the carbon intensity performance of a ship. Compliance with the Carbon Intensity Reduction requirement (new regulation 22B of MARPOL Annex VI) will have to be delivered by other means.

1.4. Is CII applicable for the same ship types as EEXI (new regulations 20A and 21A)/EEDI?

New regulation 22B applies to the same ship types as EEDI and EEXI. These ship types are defined in regulation 2 of MARPOL Annex VI. The difference is that CII will apply to ships 5,000 GT and above, whereas EEXI is 400 GT and above. The lower threshold may be reduced in the future, but this is not expected in the first iteration of the carbon intensity reduction requirement (new regulation 22B).
1.5. Is the selection of high quality (expensive) paint which will be applied to the underwater hull area effective in improving EEXI and Carbon intensity index? Applying good paint at underwater hull area will be more effective than using additive in fuel? Which factor contributes the most critical to improving EEXI and CII. Is it to maintain a clean hull (sea creature attaching) or surface damage (physical damage) that will also cause ship drag or something else?
Under EEXI (new regulation 20A and 21A), a sea trial following procedures approved by the Administration can be undertaken to establish the reference speed of the vessel with a more efficient hull coating system applied than that applied at new build. Reduced fouling on hulls which reduces drag, would also be reflected in reduced fuel consumption and contribute to an improved AER under the carbon intensity reduction requirement (new regulation 22B).

1.6. For CII, how would consumption during, for example, anchoring be considered?
The use of AER as the CII means that there is no attribution of fuel consumption to specific stages of a voyage or operations, including anchoring. Consumption during anchoring would simply be considered as consumption without distance travelled. Notwithstanding, proposals have been made for fuel consumed at anchor to be excluded when it is related to port congestion and waiting for a berth.

1.7. With CII based on AER, CII improvement can be achieved by trading as much in ballast as possible! Any comments?
AER encourages optimisation for ballast legs and is a sub-optimal metric, but it is the only metric for the majority of ships that is supported by the IMO DCS.
2. Annual Efficiency Ratio (AER).

2.1. Why is AER being used and EEOI when we know that EEOI is a better measure?

AER is supported by the IMO DCS. EEOI is not. IMO, DCS data will be used to verify the carbon intensity reduction achieved by a ship on an annual basis. If the IMO DCS collected the data required to verify EEOI, then EEOI would be an option.

2.2. We can clearly control EEXI / EEDI, but surely there will be a charterer driven AER for a given EEDI/EEXI?

AER will be determined by how a ship is operated. Charterers will have a significant influence over the AER of the ships they charter.

2.3. AER/cgDIST is fine but does not take account of works such as shore power. We need better, don't we?

All stages of a voyage or operations, including port operations when a vessel may use shore power, are included in the calculation of AER/cgDIST. Therefore, the use of shore power to reduce total fuel consumption will improve the attained annual carbon intensity reduction as measured by AER/cgDIST.

2.4. Why do both the Poseidon Principles and the Sea Cargo Charter focus on AER?

Poseidon Principles uses AER because that is the only metric the IMO collects verified data for. If the IMO uses other metrics based on verified data, our understanding is that the scheme would adapt. The Sea Cargo Charter uses EEOI.
3. **Passenger Ships.**

3.1. **Will there be an EEXI for passenger (cruise) ships (non-ro-ro and non-ro-ro cargo) with Conventional Propulsion? Also will, in this case, the CII also apply for them?**

EEXI (new regulations 20A and 21A of MARPOL Annex VI) does not apply to these ship types, but it is possible that the scope of ship types covered by EEDI and EEXI could increase in the future. Passenger ships as defined in regulation 2.32 of MARPOL Annex VI would not be required to comply with carbon intensity reduction (new regulation 22B of MARPOL Annex VI), but if they were, cgDIST would be the expected metric.

3.2. **For our existing passenger vessels, we have limited crossing trips - how can we reduce carbon emissions?**

EEXI (new regulation 20A and 21A) and carbon intensity reduction (new regulation 22B of MARPOL Annex VI) are not applicable to passenger ships that are not ROPAX or cruise ships having non-conventional propulsion.

3.3. **Is / will be there EEXI for passenger/cruise ships with Conventional Propulsion?**

It is possible that the scope of ship types covered by EEDI and EEXI could increase in the future. There is no EEXI for passenger ships using conventional propulsion at this stage.
4. Tankers & Bulkers.

4.1. We have limited trips for existing vessels. How can we reduce carbon emissions?

Overridable Power Limitation (OPL) is expected to be the primary means of compliance in bulker and tanker trades. OPL does not result in de-rating of the engine, so the minimum power requirements for EEDI-certified ships would not be affected. An overridable arrangement provides immediate access to the reserve of power above the MCR limit.

4.2. How many tankers participated in this study? Was it all the tankers or less?

The data provided is based on publicly available information in the EU MRV database and provides a reasonable proxy of the impact on the global fleet. However, it is representative of the fleet that is reporting an EEDI, and many of them will be contracted after 1/1/2013.

4.3. 24% of tankers were above the EEXI limit, and only these will need engine power limits (as shown in slide 12 in the webinar materials)?

As an indication of the impact on the tanker fleet, yes.

4.4. A recent Clarksons report comments that 70% of bulk carriers do not comply currently with EEXI. Does your own data confirm this assessment? What about the tanker and container sector?

We have no reason to disagree with the Clarksons assessment and expect similar impacts in the tanker and container sectors. It should be recalled that EEXI is designed to require existing ships to "catch-up" with new ships of the same size and deadweight. As the majority of ships are constructed to the standards applicable at the time of build, it is unsurprising that a high proportion of the global fleet will need to take steps to comply with EEXI.

4.5. How do you deal with shuttle tankers installed with advanced manoeuvering capability? During such operation, engine power output is high. Not able to comply with EEXI. Can correction be used?

Proposals have been made to provide for exclusions for STS operations. However, exclusions are unattractive to many because they are difficult to verify.
4.6. For bulkers and other types of ships, the sea trials are normally done at draughts, not corresponding to dwt/full load. How is the "Vref at "full" capacity" to be determined in these cases?

The reference speed can be obtained from sea trials carried out at any load condition and model tests that correspond to the same load condition and the EEXI load condition (i.e. summer load-line draught).

4.7. What accommodations will be made for ships outside the standard types? heavy lift vessels, special case ferries, parcel tankers, etc

EEXI (new regulation 20A and 21A) and carbon intensity reduction (new regulation 22B of MARPOL Annex VI) only apply to the ship types to which EEDI is applicable and which are defined in regulation 2 of MARPOL Annex VI. Neither requirement would be applicable to heavy-lift ships or passenger ship. Parcel tankers would be considered tankers, and the requirement would apply, subject to the deadweight tonnage (EEXI) and gross tonnage (carbon intensity reduction) thresholds being met.

4.8. Will it be allowed to remove some of the consumption from AE's used for cargo cooling?

A proposal has been made to include correction factors for cargo heating, cooling and tank washing. Exemptions for these have also been proposed. Exemptions are unlikely, and correction factors would tighten over time to encourage more efficient use of energy in cargo operations.
5. Ship Owners.

5.1. How much control do shipowners have over AER? It seems charterer driven, and if so, how can shipowners be punished for operational considerations driven by charterers. Few will likely agree to charter party restrictions.

AER is a sub-optimal metric, and until the IMO has collected data on other metrics, its use will remain, regardless of consequences. We would encourage the industry to make sure it collects and reports carbon intensity as measured by other metrics throughout the period 2023 – 2026 so that it can be taken into account when the carbon intensity reduction requirement is reviewed in 2026. The IMO is going to encourage such voluntary reporting.

5.2. What is the best technology to meet the EEXI requirements for shipowners?

There is no "best technology"; there is a cost-effective technology that suits the type and trade of the ship. Overridable power limitation is expected to be the lowest capital cost, the least invasive means of compliance for most ships. Where it is not an option, then energy saving devices like wind assist technologies and air lubrication systems are options, as are lower-carbon fuels. However, owners should not consider EEXI (new regulation 20A and 21A) and carbon intensity reduction (new regulation 22B of MARPOL Annex VI) separately; OPL may get ships into the game, but ships that need to adapt to comply with carbon intensity reduction by 2030 should plan to do so early. Lloyd's Register (LR) Advisory Services can be engaged to help with this challenge.
6. **EEDI.**

6.1. **Will it be allowed to remove some of the consumption from AE's used for cargo cooling?**

Not at present. It is being considered. LR Advisory Services can be engaged to help with this challenge.

6.2. **How is it possible that ships which are delivered with an attained EEDI which is lower compared to the required EEDI, still can have an EEXI which is too high? This seems not logical. I.e. at delivery, the ships are compliant, but a couple of years later, they are not anymore.**

This is the effect of using EEXI as a means of requiring ships to catch-up with new ships of the same type and deadweight.

6.3. **Is the EEXI applicable to vessels without EEDI?**

Yes, of those vessels are of a type and deadweight to which EEDI applies. EEXI applies to existing ships, both pre-EEDI and EEDI certified.

6.4. **If we have an EEDI technical file including a certificate with the attained EEDI below the required EEDI (vessels are less than 5 years). Do we need to worry about EEXI? or is the attained EEXI same as attained EEDI and also the required EEXI same as the required EEDI?**

For most ship types and deadweight tonnage categories, there is alignment between the EEDI and EEXI reduction rates. For example, EEXI for an existing 20,000 dwt tanker is EEDI Phase 2 for 20,000 dwt tanker (20% reduction relative to the EEDI reference line for tankers). The critical issue is whether the attained EEDI is less than the required EEXI. If it is, then a new IEEC can be issued as a matter of process based on the EEDI Technical File. If it is not, then the steps outlined in the presentation will need to be completed by the first annual, intermediate or renewal survey for the issue of endorsement of an IAPP after entry into force of the requirement. The exact date of entry into force will be confirmed in June 2021.
7. Applicable Vessels.

7.1. How will EEXI apply to OSV's and tugs?

Neither EEXI (new regulations 20A and 21A of MARPOL Annex VI) nor carbon intensity reduction (new regulation 22B of MARPOL Annex VI) should apply at this stage. Flag States of ships operating solely in their waters may impose equivalent national requirements, though.

7.2. Do the EEXI requirements apply to Yachts and SuperYachts - if so, what are the determining characteristics (e.g. >3,000GT, Commercially Registered or Private Pleasure)

Neither EEXI (new regulations 20A and 21A of MARPOL Annex VI) nor carbon intensity reduction (new regulation 22B of MARPOL Annex VI) should apply at this stage.

7.3. Is EEXI applicable to Military shipping?

In general, no. However, application to military shipping will depend on the policy of the respective government and navy.

7.4. As tugboats are usually <500 gt and not deployed on longer voyages but typically for harbour duties, I assume they might be exempted or get a separate set of rules?

Neither EEXI (new regulations 20A and 21A of MARPOL Annex VI) nor carbon intensity reduction (new regulation 22B of MARPOL Annex VI) should apply at this stage. Flag States of ships operating solely in their waters may impose an equivalent national requirement, though.

7.5. Is MEPC 75(76) going to affect non-international ships, i.e. those only operating in cat d water?

Neither EEXI (new regulations 20A and 21A of MARPOL Annex VI) nor carbon intensity reduction (new regulation 22B of MARPOL Annex VI) should apply at this stage. Flag States of ships operating solely in their waters may impose an equivalent national requirement, though.

7.6. Why is it that only cruise ships having non-conventional propulsion included in the regulations? What about conventional cruise vessels and very large yachts over 5000GT?
These are the only forms of cruise ships for which reference lines exist; without reference lines, it is not possible to include a ship type in the requirements. This may change in the future.

7.7. **What happens to vessels which are trading as floating storage units, temporarily or permanently? They have almost none or few nm, high cargo traded.**

Exclusions from the carbon intensity reduction requirement for floating storage are being considered and would address this if agreed.

7.8. **What will be the impact of this regulation on Aux engines, Boiler operation etc**

Both requirements encourage the efficient use of fuel, whether for propulsion or for auxiliary and cargo related purposes. Fuel consumption used for the operation of a boiler when a ship is sailing at the EEXI condition is not included in the calculation as it is not expected that the boiler would normally be used when at sea (there are exceptions for steamships that use a boiler for propulsion power).
8. Fuels.

8.1. Instead of considering LNG as an alternative fuel, would it be possible to use onboard only HFO instead of Diesel oil (being the CF_HFO < CF_Diesel)? Especially in cases where the difference between the attained EEXI and the required one is small.

Using alternative fuels covered by the EEDI/EEXI framework is possible, provided that the ship can use those fuels. The use of HFO would also require an approved exhaust gas cleaning system (EGCS).

8.2. The total carbon footprint of low sulphur fuels is much higher than high sulphur fuels. Are there any intentions to penalise the vessels using VLSF compared to vessels using HFO and Scrubber?

Neither EEXI (new regulations 20A and 21A of MARPOL Annex VI) nor carbon intensity reduction (new regulation 22B of MARPOL Annex VI) considers lifecycle emissions of marine fuels. Lifecycle emissions associated with fuel will be addressed by separate IMO requirements in due course as part of the work to drive an energy transition in shipping ahead of IMO 2050. Fuel lifecycle labelling is the way in which this may be operationalised.

8.3. With the rate at which carbon-neutral fuels seem to be becoming a viable alternative, isn’t IMO behind the curve with its requirements, especially to 2050?

IMO will need to address the treatment of net-zero fuels in its work on lifecycle analysis of marine fuels. This work is essential and has started but needs to be accelerated this year. Note that whether net-zero fuels should be considered in technical efficiency requirements is a contentious issue (all fuels should be used efficiently), but accommodation of net-zero fuels in operational requirements (like carbon intensity reduction (new regulation 22B of MARPOL Annex VI) should be more straightforward.

8.4. How will the use of biofuels affect this?

Biofuels will gain no credit under EEXI because they are a drop in fuel, and there is no mechanism in place to ensure that a ship uses the fuel that its IEEC certification is based on. Under carbon intensity reduction (new regulation 22B of MARPOL Annex VI), biofuel blends will gain credit to the extent that the carbon content from sampling and laboratory analysis allows. This is frequently only a marginal improvement. Biofuels with net-zero credentials are currently not accommodated in the IMO DCS and do not gain equivalent credit in the form of a substantially reduced AER. IMO will need to address the treatment of net-zero fuels in its work on lifecycle analysis of marine fuels. This work is essential and has started but needs to be accelerated this year.

9.1. Do you believe the EEXI will have any real impact on the 2030 goals, given the predominant adoption of the EPL as a means for compliance?

The contribution of EEXI (new regulation 20A and 21A of MARPOL Annex VI) is expected to be limited – it is not designed to significantly reduce carbon intensity - and as a result, it is packaged with a requirement to reduce operational carbon intensity (new regulation 22B of MARPOL Annex VI).

9.2. How much can EEXI contribute to meet the IMO's Initial strategy goal by 2030?

The contribution of EEXI (new regulation 20A and 21A of MARPOL Annex VI) is expected to be limited – it is not designed to significantly reduce carbon intensity - and as a result, it is packaged with a requirement to reduce operational carbon intensity (new regulation 22B of MARPOL Annex VI).
10. **Miscellaneous.**

10.1. **The conservatism in the methodology adopted for assessing the actual performance of ESD's will likely have a significant impact on the demand for such systems. Are there any plans in place to ensure avoidance of bias, so one type of ESD is not unfairly advantaged/disadvantaged? E.g. Air lubrication vs flow modifiers**

No. This level of detail on the potential impacts of the EEXI and its methodologies have not been considered, and market-related consequences would not be considered by the IMO.

10.2. **Wouldn't there be a case of 'managing' performance of a vessel by making sure you move out of 'D' every other year (by perhaps slow steaming) without any other technical measures?**

The details of what corrective actions may actually require are limited at this stage. There will certainly be the option to take immediate operational steps (trade and contractual obligations allowing), trade and contractual obligations allowing, but equally investment in technical efficiency may be necessary.

10.3. **In the case of power, limitation to reduce the attained EEXI, which SFOC should be considered? Still the one at 75% of original MCR?**

If power limitation is employed, the SFC used in the EEXI calculation should be the SFC at 75% of the limited MCR (it is 83% for LNG diesel-electric and steam turbine).

10.4. **How is the calculated EEXI determined? Can companies do it themselves?**

The final calculation guidelines will be published in June 2021. Companies with the necessary technical expertise would be able to do the calculations themselves. Verification of the EEXI Technical File would need to be done by an organisation recognised by the flag State, for example, Lloyd's Register. LR Advisory Services can also calculate the EEXI, recommend methods for compliance and prepare the EEXI technical file as well.

10.5. **For shaft power, limitation derating is the only option?**

Overridable power limitation is not de-rating of the engine. Overridable power limitation is one potential means of compliance with EEXI (new regulations 20A and 21A of MARPOL Annex VI).
10.6. **Is power reserve/ unlimited mode mandatory in case of shaft/engine power limitation application?**

Yes, otherwise, the engine is considered to have been de-rated.

10.7. **How do you see power limitations in relation to class rules with regards to manoeuvrability?**

Overridable power limitation (OPL) allows for reserve power to be used up to the total installed power in the case of an emergency and when evasive manoeuvres need to be taken to maintain the safety of the vessel, the crew, and the environment.

10.8. **For energy efficiency devices with power effects that cannot be measured through model tests, will CFD estimations suffice?**

As drafted, the guidance allows numerical or CFD calculations, although there is concern about the lack of quality and technical standards for CFD.

10.9. **Which is the most appropriate document defining the vessel type for the EEXI?**

Regulation 2 of MARPOL Annex VI provides the definitions of ship categories to which EEXI (new regulations 20A and 21A of MARPOL Annex VI) applies.

10.10. **Who and when will it be decided that the reference lines will be adapted around GT or Deadweight...or has one method already been discarded?**

It is expected to be decided by IMO in June 2021. The current state of play indicates that deadweight will be used for the majority of ship types, with only cruise ships having non-conventional propulsion ROPAX ships using GT. Using GT for ro-ro cargo ships remains under consideration.

10.11. **Is there any restriction towards increasing the DWT to reduce the EEXI?**

No, but it may have other structural and classification related implications that would need to be taken into account.

10.12. **In what way does EEXI defer from the GHG rating given by RightShip?**

The calculation of indicators EEXI and the RightShip EVDI are similar; however, the application of these indicators is very different. EEXI is an IMO statutory requirement (new regulations 20A and 21A of MARPOL Annex VI) that requires the value to be equal to or less than a fixed value (the Required EEXI). The RightShip EVDI is a voluntary industry metric used to rank vessels against their peers and is continuously changing.
10.13. Is EEXI basically improving SEEMP?

No. EEXI (new regulation 20A and 21A of MARPOL Annex VI) is a technical efficiency requirement, like EEDI (regulation 20 and 21 of MARPOL Annex VI) but applied to new ships. SEEMP is a management plan which should be used to help ensure that Company ships comply with the carbon intensity reduction requirement (new regulation 22B of MARPOL Annex VI) when in operation.

10.14. What could be the universities role? Should we do more research and/or train our students to learn more about EEXI?

As GHG emissions reduction is a high priority issue for shipping, universities have a significant role to play in helping the industry understand the ways and means of achieving the Initial IMO Strategy. This includes (amongst other things) evaluating policy options, assessing technologies and technology readiness and research into new and innovative fuel, power and efficiency solutions.

10.15. In the case of an already installed Energy saving device (e.g. propeller Duct), what would be the procedure for validating its performance and incorporating the same in the EEXI calculation?

Sea trials can be performed that follow the requirements of the guidelines to establish the reference speed of the vessel with the ESD in place. Model test data will also be required if the sea trials are not performed at the EEXI load condition to sale the results. In the absence of sea trial data, then tank testing and/or numerical calculations would be required. As drafted, the guidance allows numerical or CFD calculations, although there is concern about the lack of quality and technical standards for CFD.