Richardson Lawrie Associates Ltd

a Wade Maritime Group Company

The New Age of Shipping Regulations

Special Topic

September 2022

WADE MARITIME GROUP

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Introduction

Decarbonisation refers to the process of reducing 'carbon intensity' or limiting CO2 emissions resulting from the burning of fossil fuels. The 2015 Paris Agreement has set a goal to curb global warming to below 2 degrees Celsius above pre-industrial levels and has planned to cap it to 1.5 degree Celsius. Like many other industries across the globe, the maritime industry is changing and transitioning in an attempt to meet the above targets.

The International Maritime Organisation (IMO), to date, has adopted a series of measures to lead the industry towards its goal of reducing greenhouse gas emissions, starting with the Energy Efficient Design Index (EEDI) for newbuildings, and regulations for nitrogen oxides (NOx) and sulphur oxides (SOx). Measures are also being taken to reduce the emissions of volatile organic compounds (VOCs) and particulates.

In 2021, the International Maritime Organization (IMO), set into motion two other key regulations: the EEXI (Energy Efficiency Existing Ship Index) and the CII (Carbon Intensity Indicator), to achieve its ambitious goal of reducing vessels' carbon emissions per transport work by at least 40% by 2030 and 75% by 2050, off the 2008 baseline. The above-mentioned regulations are due to come into effect on 1 January 2023, and preparations to meet their requirements are being made across the globe. These regulations were adopted with an aim of improving the efficiency of vessels and specifically older tonnage in case of the EEXI.

As an extension, the SEEMP (Ship Energy Efficiency Management Plan or Ship Operational Carbon Intensity Plan) Part III provides a roadmap to achieve the required CII ratings. It is a mandatory document to have on board that lays out the plan to improve the CII for the next three years.

COMING SOON!

SHORT TERM OUTLOOK
OIL TANKER MARKET
October 2022

- Economic Developments
- Oil Prices, Demand and Supply
- Tanker Demand Supply and Rates

CII (Carbon Intensity Indicator): A measure of vessel's operational efficiency

CII is a measure of the vessel's operational efficiency and will be calculated based on the amount of CO2 emitted per cargo carrying capacity and nautical mile. As of January 1, 2023, the Carbon Intensity Indicator (CII) applies to all ships above 5,000 Gross Tonnage (GT). The rating of the CII is calculated on the basis of the IMO Data Collection System (DCS) data and will include a rating from A to E, with its stringency increasing every year. Ships with a "D" rating for three consecutive years and an "E" rating in one year will be forced to submit an action plan to improve its' rating and this is a part of the SEEMP.

Methodology used for calculating the CII:

- The Carbon Intensity Indicator (CII) is calculated as follows:

$$CII = \frac{\text{Annual fuel Consumption} * \text{CO2 factor}}{\text{Annual distance travelled} * \text{DWT or GT}} * \text{Conversion Factor}$$

- The derived CII is the CO_2 (in grams) emitted per cargo-carrying capacity and nautical mile. For some special ship types and operations, the obtained CII will be adjusted using conversion factors, which MEPC 78, held in June this year, has approved; but some other correction factors will be discussed in MEPC 79. Every year the vessel will be rated from A to E, with "A" being the maximum and "C" being considered an acceptable rating.
- Where the mid-point of "C" is the required rating and "E" defines the 2019 reference level. (Figure1)
- The required CII rating will be subject to yearly reductions. (Table 1)

Figure 1: Methodology used for calculating the CII:

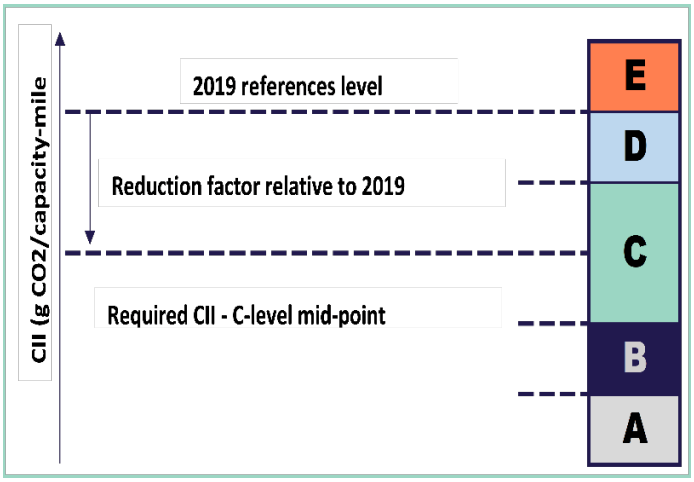


Table 1: The Required CII Ratings

Year	Reduction from 2019 ref. (mid-point of C-rating band)
2023	5%
2024	7%
2025	9%
2026	11%
2027-2030	to be decided

The SEEMP Part III

The SEEMP Part III, serves as a roadmap in order to achieve the required CII. The SEEMP III will be subject to company audits and verification. It is applicable on vessels of 5,000 GT and above and it will be compulsory to be retained on board. Most importantly, a ship's SEEMP Part III needs to be approved and on board by 1 January 2023. The first reporting of the CII is due no later than 31 March 2024. The SEEMP III must include the following:

- Methodology used for calculating the CII.
- This will establish the required CII for the next three years.
- It will include an implementation plan elaborating on how the targeted CII will be achieved over the next three years.
- Improvement and self-evaluation procedures will be established together with an action plan to correct a bad rating.
- The SEEMP Part III will be subject to regular updates, and one should note that this comes in addition to the SEEMP Part I and the SEEMP Part II.

Impact of the CII on the industry:

- The impact of the regulation and consequent high exposure to carbon risk, cannot be understated since many cargo owners, charterers, banks and insurance companies have all committed to reducing the emissions from their shipping supply chains and portfolios. In the future, vessels with poor CII ratings could have their commercial attractiveness severely hampered. Charterers will not want to fix them, insurance premiums for these ships will increase, they will likely not get preferred slots in ports around the world and port fees will increase for these ships.
- According to some experts, almost one third of the world's fleet would not meet the proper criteria for a good CII rating. If ship owners do not proactively manage the CII rating of their ships, they run a risk of having dead assets in their fleet. Shipping routes and trade patterns may also be affected as routes with harsher weather would become even less attractive, considering the effect on fuel consumptions, emissions and subsequently the CII ratings.
- Since CII ratings are based on emissions per transport work, shipping companies will need to optimise the time vessels stay at anchorage or in ports, as when a ship is not moving, transport work is also zero. However, their emissions remain as boilers and auxiliary engines may still be operating – at anchorage or at berth the vessel is not engaged in actively transporting cargo, yet it still produces emissions. Since these emissions are not associated with any actual "work" done, they have a negative effect on the overall efficiency of the vessel. The longer a ship exists in such a state, in which it does not contribute "work", yet still exudes emissions, it has negative ramifications on the CII. Thus, it is expected to incentivise "Just-In-Time" arrivals.
- The net result is likely to mean a slowdown in vessel speeds even allowing for the fact that most ships are already slow steaming.
- Consideration will also need to be given, for example, to the wording of time charter parties. Delivery and re-delivery terms will need to take into account emissions already recorded in the year to date. Records of emissions will also likely impact secondhand prices.

EEXI (Energy Efficiency Existing Ship Index): A measure of vessel's design efficiency

The EEXI is an extension of the EEDI, aiming to increase the design efficiency of existing tonnage on a par with new builds. The EEXI requires ship owners to track the emissions and energy consumption of in-service vessels over 400 GT. It is to be calculated with respect to MARPOL Annex VI, using standard values for fuel consumption. Simply put, the EEXI attempts to determine the efficiency of design of existing tonnage and helps ship owners to implement techniques and technologies to make their existing fleet more carbon efficient. Vessels have to attain EEXI approval once in a lifetime, at the latest by the first periodical survey in 2023.

Methodology used for calculating the EEXI:

EEXI calculations are based on the methodology developed for the EEDI for newbuilds; in simple words it is carbon dioxide emissions divided by transport work. The EEXI is described by the vessel's CO_2 emissions, which are in turn are calculated based on the installed power of the main engine, fuel oil consumption, and a conversion factor between fuel and the corresponding CO_2 mass.

$$EEXI = \frac{\text{ME and AE emission - Energy savings}}{\text{Deadweight x Speed}}$$

It is clear from the above-mentioned formula that the EEXI is a function of:

- Installed engine power - one of the most important parameters.
- Vessel speed and deadweight

The decision is with the owner to adjust the numerator and/or the denominator to attain the desired EEXI.

Compliance with the EEXI:

Compliance with the EEXI may require changes to the design of the vessel and/or machinery onboard. To achieve compliance under the EEXI regulations, vessels will be provided with an Attained EEXI, which will be a report of the vessel's estimated energy efficiency as compared to the EEDI. The Attained EEXI will then be compared to the Required EEXI (which will depend on the size and type of the vessel). A vessel will be compelled to take steps to improve its efficiency if the Attained EEXI is not on a par with the Required EEXI. The verification of the ship's EEXI will take place after January 1, 2023, at the vessel's first annual, intermediate or renewal survey for its International Energy Efficiency Certificate (IEEC). Strategies to make vessels complaint with their Required EEXI may include propulsion optimisation, using alternative fuels in the form of ammonia, methane, and synthetic fuels, limiting engine loads and modifications to shaft power limitations. However, for older vessels the installation of dual fuel engines to run alternative fuels is not really an option.

The available strategies to make vessels complaint with their Required EEXI broadly fall under three categories:

- *Power Optimisation*: This includes engine power limitation (EPL), Shaft Power Limitation (SHaPoLi) and engine derating. These are used to reduce the output power of the engine and as a result the operating speed of the vessel.

- *Engine Modification* for lower or zero carbon fuels, using alternative fuels in the form of ammonia, methane, and synthetic fuels.

- *Installing energy efficiency technologies to limit hull resistance or improve propeller thrust:* This includes hull air lubrication systems, wind assisted propulsion, low friction coating, and waste heat recovery systems.

Impact of the EEXI on the industry:

- In the coming years, advancements in technology will help vessels stay on a par with these regulations. The impact of EEXI regulations will be far reaching, as, for the first time, all ships in the industry – existing and those to be built – will have to meet new environmental criteria. It is estimated that 80% of the global fleet will have to make technical changes.

- Compliance with the EEXI is a priority for most stakeholders in the shipping industry, and lack of compliance may be viewed as a negative as stakeholders, like insurance agencies may charge greater premiums for such vessels or even charterers, who may refuse to work with such ships, instead opting for the safer, more compliant options.

- To agree to any installations or modifications under this is in the interest of the charterer. Such modifications will improve the ship's performance and will benefit long term time charterers. A better performing and a more efficient vessel will directly influence the CII rating of the vessel and will increase its tradability and marketability around the world.

- One must remember that unlike the CII, the EEXI is simply a one-time look at the structure of the vessel design. However, both regulations work in tandem. Becoming compliant with EEXI will improve the ships performance on CII reviews, enhancing its ability to garner future work.

The Ship Energy Efficiency Management Plan (SEEMP): A host of regulations by the IMO

The SEEMP comprises a host of regulations introduced by the IMO that aims to tackle global greenhouse gas emissions related to the maritime industry. The SEEMP is designed to control and measure GHG emissions from the existing fleet. The SEEMP is a plan which is ship specific and must be implemented according to the ship type, cargoes carried, ship routes, and other relevant factors, creating a system in which each ship creates a SEEMP that best suits its current circumstances.

The SEEMP plans to accomplish a few broad points such as requiring shipping companies to create a more comprehensive energy management policy for all the ships in their fleets, which will act as a basis to form the SEEMP for an individual type of ship. Another point to stress would be the enhancement of shipping efficiency by improving the overall operating efficiency of the vessel in the long run by implementing correct and optimised methods for energy and fuel saving. Tackling fuel consumption and the release of GHGs have also been

cited as the main priorities of the project, as fuel consumption not only directly causes the release of such greenhouse gases but also acts as a significant operating cost of the vessel.

Impact of the SEEMP on the industry:

- The SEEMP is set to shake up the economic and practical structure of the shipping industry, with methods such as speed optimisation. This potentially saves owners millions of dollars in fuel costs, but there are limits and there are negatives which could affect the engine. It could also lead to vessels slowing down. In theory the upside is immense enough to the point that greater emphasis on speed optimisation would become the norm. However, in practice, slow steaming is already the norm and operators are already taking steps to optimise speed given the current cost of bunker fuel.

- Weather routing is also a practice that has been popular for quite some time and may reach new heights of relevance in this new shipping climate. It involves tracking weather patterns to create maps for the safest and least turbulent courses, which is geared at optimising the speed and efficiency of the vessel.

- The ship's electrical power plant generates enough energy to ensure all the propulsion, cargo, and other auxiliary equipment are operational at any given time. The use of a generator at low load, use of multiple pumps will lead to more fuel and electrical consumption, affecting the energy efficiency. It is likely that going forward, crews will be trained in electrical energy optimisation, and unnecessary electrical use maybe discouraged, affecting not only the ship, but also training philosophies for new seafarers, which will be geared towards maximising efficiency.

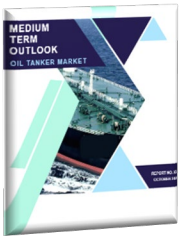
- Hull roughness will also become a more prevalent factor for ship owners to address as it has an inverse relationship to the fuel consumption of the vessel at a given speed. The hull roughness of the ship is analysed at regular intervals for cleaning and painting of the surface. A better and advanced system such as MGPS (Marine Growth Prevention Systems) can reduce the marine growth on the hull and improve the overall energy efficiency of the vessel.

Conclusion

The main goal of these regulations (the EEXI and the CII) is to instill a culture of ongoing improvements for Operators in the shipping industry, making it crucial for stakeholders to not just understand the regulations but also the emerging technology around it, and how that may impact the global shipping industry.

SHORT TERM OUTLOOK – OIL TANKER MARKET

A monthly report covering the next four months and including trends in oil supply, demand and trade, tanker demand and supply, spot and time charter rates for MRs up to VLCCs, comparisons with FFAs plus the latest news on developments impacting the oil and tanker sectors.



MEDIUM TERM OUTLOOK – OIL TANKER MARKET

Concise analyses of topical issues, consistent market data series and views on future trends in tanker charter rates. The report covers Oil Prices; Economic Developments; Oil Demand and Supply; Trade; Tanker Demand, Supply and Rates. Sent to clients around January, April, July and October each year.

SHORT TERM OUTLOOK – VLGC MARKET

A monthly report looking four months ahead at likely trends in the VLGC Spot Market with the latest on key LPG carrier trades, benchmark LPG prices, arbitrage developments, a comparison with FFAs and recent news.

MEDIUM TERM OUTLOOK – LPG CARRIER MARKET

A quarterly series of regular reviews, analyses and forecasts of the LPG Carrier Market. The report covers Economic Developments; LPG production, consumption and pricing; LPG, chemical gases and ammonia trade, LPG Carrier Demand, Supply and Rates for Fully Ref, Semi-Ref and Pressurised Ships. Reports sent to clients around January, April, July and October each year.

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